



# Airport Detailed Operational Description (DOD) Step 1 – Yearly Update 2013

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This document details and refines the SESAR Airport Operations Concept for Step 1 “Time Based Operations”.

“Time Based Operations” is a building block for the implementation of the SESAR 2020 concept and is focused on flight efficiency, predictability and environment.

It follows on from SESAR Deployment Baseline.

This first Yearly Update version of the document aims to present the most accurate overview of concepts covering the scope of OIs devoted to WP6. The Airport DOD Step 1 will continue to evolve every year according to the evolution of both the Road Map and the results of Primary Project’s (or OFAs) validations. The DOD can be seen as guiding principles established at a certain time of SESAR Programme which will be further enhanced with the developments and outcomes of the WP6 primary projects.

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9	<b>Table of Contents</b>		
10	<b>EXECUTIVE SUMMARY</b>		<b>7</b>
11	<b>1 INTRODUCTION</b>		<b>8</b>
12	1.1	<b>PURPOSE OF THE DOCUMENT</b>	<b>8</b>
13	1.2	<b>CONOPS REFERENCE</b>	<b>9</b>
14	1.3	<b>SCOPE</b>	<b>11</b>
15	1.4	<b>INTENDED READERSHIP</b>	<b>12</b>
16	1.5	<b>STRUCTURE OF THE DOCUMENT</b>	<b>13</b>
17	1.6	<b>BACKGROUND</b>	<b>13</b>
18	1.7	<b>ACRONYMS AND TERMINOLOGY</b>	<b>13</b>
19	1.7.1	<i>Acronyms</i>	<i>13</i>
20	1.7.2	<i>Terminology</i>	<i>15</i>
21	<b>2 OPERATING METHODS</b>		<b>19</b>
22	2.1	<b>INTRODUCTION</b>	<b>19</b>
23	2.2	<b>PREVIOUS OPERATING METHODS</b>	<b>21</b>
24	2.3	<b>NEW OPERATING METHODS</b>	<b>26</b>
25	2.4	<b>DIFFERENCES BETWEEN NEW AND PREVIOUS OPERATING METHODS</b>	<b>31</b>
26	<b>3 OPERATIONAL ENVIRONMENT</b>		<b>32</b>
27	3.1	<b>OPERATIONAL CHARACTERISTICS</b>	<b>32</b>
28	3.1.1	<i>Generic Airport Characteristics</i>	<i>32</i>
29	3.1.2	<i>Mapping of Operational categories on the Operational Focus Areas (OFAs)</i>	<i>36</i>
30	3.1.3	<i>Traffic Characteristics</i>	<i>41</i>
31	3.1.4	<i>Infrastructure Characteristics</i>	<i>42</i>
32	3.1.5	<i>Weather Characteristics</i>	<i>43</i>
33	3.2	<b>ROLES AND RESPONSIBILITIES</b>	<b>44</b>
34	3.3	<b>CONSTRAINTS</b>	<b>48</b>
35	<b>4 OPERATIONAL SCENARIOS / USE CASES</b>		<b>49</b>
36	4.1	<b>OPERATIONAL SCENARIO HIERARCHY</b>	<b>49</b>
37	4.2	<b>OPERATIONAL SCENARIO PER ATM PHASE</b>	<b>49</b>
38	4.2.1	<i>Additional Information</i>	<i>51</i>
39	4.2.2	<i>Assumptions</i>	<i>54</i>
40	4.2.3	<i>Operational Scenario Long Term Planning</i>	<i>56</i>
41	4.2.4	<i>Operational Scenario Medium to Short-Term Planning</i>	<i>63</i>
42	4.2.5	<i>Operational Scenario Execution Phase</i>	<i>68</i>
43	4.2.6	<i>Operational Scenario Post-Operations Analysis Phase</i>	<i>91</i>
44	<b>5 PROCESSES AND SERVICES (P&amp;S)</b>		<b>96</b>
45	5.1	<b>OPERATIONAL NODES</b>	<b>96</b>
46	5.2	<b>OPERATIONAL PROCESSES</b>	<b>96</b>
47	5.2.1	<i>Manage Airport Operations</i>	<i>97</i>
48	5.2.2	<i>Manage Runway</i>	<i>98</i>
49	5.2.3	<i>Manage Turn-round</i>	<i>98</i>
50	5.2.4	<i>Manage Movement on Airport Surface</i>	<i>99</i>
51	5.2.5	<i>Manage Safety at Airport</i>	<i>100</i>
52	5.2.6	<i>Operational Architecture</i>	<i>101</i>
53	5.3	<b>OPERATIONAL SERVICES IDENTIFICATION AND DEFINITION (OPTIONAL)</b>	<b>103</b>
54	<b>6 REQUIREMENTS</b>		<b>104</b>
55	6.1	<b>INTRODUCTION</b>	<b>104</b>
56	6.2	<b>OPERATIONAL REQUIREMENTS</b>	<b>105</b>
57	6.3	<b>PERFORMANCE REQUIREMENTS</b>	<b>112</b>
58		<i>Introduction</i>	<i>112</i>
59	6.3.1	<i>Safety</i>	<i>112</i>
60	6.3.2	<i>Security</i>	<i>112</i>
61	6.3.3	<i>Environment Sustainability</i>	<i>112</i>

62	6.3.4	Cost effectiveness.....	113
63	6.3.5	Capacity.....	113
64	6.3.6	Airport Fuel Efficiency.....	114
65	6.3.7	Flexibility.....	114
66	6.3.8	Predictability.....	115
67	6.3.9	Access and Equity .....	115
68	6.3.10	Participation .....	116
69	6.3.11	Interoperability.....	116
70	<b>7</b>	<b>OPERATIONAL FOCUS AREAS AND OSED MAPPING .....</b>	<b>117</b>
71	<b>7.1</b>	<b>MAPPING OF OPERATIONAL FOCUS AREAS TO OI STEPS AND OTHER X.2.....</b>	<b>117</b>
72	<b>7.2</b>	<b>ALLOCATION OF DOD ELEMENTS TO OPERATIONAL FOCUS AREAS.....</b>	<b>121</b>
73	7.2.1	Allocation of Environment to Operational Focus Areas.....	121
74	7.2.2	Allocation of Scenarios to Operational Focus Areas .....	121
75	7.2.3	Allocation of Processes and Services to Operational Focus Areas .....	123
76	<b>8</b>	<b>ISSUES .....</b>	<b>125</b>
77	<b>9</b>	<b>REFERENCES.....</b>	<b>126</b>
78	<b>9.1</b>	<b>APPLICABLE DOCUMENTS .....</b>	<b>126</b>
79	<b>9.2</b>	<b>REFERENCE DOCUMENTS.....</b>	<b>126</b>
80		<b>APPENDIX A: OIS CHANGES .....</b>	<b>127</b>
81		<b>APPENDIX B: BUSINESS PROCESS MODEL AND NOTATION (BPMN).....</b>	<b>131</b>
82			

83 **List of tables**

84	Table 1-1 BNs and OFAs addressed in the DOD .....	11
85	Table 1-2 Acronyms .....	15
86	Table 1-3 Terminology .....	18
87	Table 2-1 DB OI steps superseded by Step 1 OI Steps .....	31
88	Table 2-2 "Intermediate" Step 1 OI steps superseded by more advanced Step 1 OI Steps .....	31
89	Table 3-1: Classes for category 1, "Network Function" .....	33
90	Table 3-2: Classes for category 2, "Layout & Basic Operational Criteria" .....	34
91	Table 3-3: Classes for category 3, "Capacity Utilisation" .....	35
92	Table 3-4: Classes for category 4, "External Influencing Factors" .....	36
93	Table 3-5: External Influencing Factors on Airport Operations .....	36
94	Table 3-6: Mapping of Categories versus OFAs .....	37
95	Table 3-7: Combinations of Airport Operational Categories .....	37
96	Table 3-8: Network Function versus Layout & Basic Operational Criteria .....	38
97	Table 3-9: Network Function versus Capacity Utilisation .....	39
98	Table 3-10: Capacity Utilisation versus Layout & Basic Operational Criteria .....	39
99	Table 3-11: External Influences versus Layout & Basic Operational Criteria .....	40
100	Table 3-13: Mapping of IATA codes for Airports cited in the above tables .....	41
101	Table 3-14: Traffic Volume and Traffic Mix for Different Categories of Airports .....	41
102	Table 3-15: Airport Equipage Rates .....	42
103	Table 3-16: Aircraft Equipage Rates .....	43
104	Table 3-17: Weather Categories .....	44
105	Table 3-18: Low Visibility Landing Minima .....	44
106	Table 3-19: Roles and Responsibilities at the Airport .....	48
107	Table 4-1: ATM Phases and Flight Phases .....	50
108	Table 4-3 Key Performance Areas and Indicators for airports .....	57
109	Table 4-4 Identified Use Cases for Long Term Planning .....	63
110	Table 4-5 Identified Use Cases for Medium to Short Term Planning .....	68
111	Table 4-6 Identified Use Cases for Execution Phase .....	69
112	Table 4-7 Identified Use Cases for Arrival .....	77
113	Table 4-8 Ground Handling actions during Turn-round .....	79
114	Table 4-9 Identified Use Cases for Turn-round .....	84
115	Table 4-10 Identified Use Cases for Departure .....	91
116	Table 4-11 Post-Operations Analysis on Trajectory Level - ATM Flight Phases .....	93
117	Table 4-12 Identified Use Cases for Post-Operations Analysis Phase .....	95
118	Table 7-1 Mapping of Operational Focus Areas to OI Steps and other X.02 .....	121
119	Table 7-3: List of Associated Scenarios and Use Cases to OFA .....	123
120	Table 7-4: List of the associated Processes and Services to OFA .....	124
121		
122		

123 **List of figures**

124	Figure 1-1: The 4 types of SESAR Operational Concept documents .....	8
125	Figure 1-2 The 4 types of SESAR Operational Concept documents .....	9
126	Figure 2-1 Air transport as a continuous process .....	19
127	Figure 4-1: The Operational Scenario Hierarchy .....	49
128	Figure 4-2: Life Cycle of a Business Trajectory compared to the ATM flight phases .....	49
129		

## 130 Executive summary

131 This document is the first update of the Step 1 DOD (corrected version) issued on February 20, 2012.  
132 The high level objectives of the Step 1 DOD and the structure of the document have been updated  
133 and have not been significantly modified.

134 This Detailed Operational Description document provides the description of an Airport Operational  
135 concept aiming to achieve the SESAR Step 1 (Time Based) objectives.

136 During Step 1, the process to elaborate the DOD has also been bottom-up. In other words; it has  
137 been built from the various contributing OSEDs, generating high level requirements from the lower  
138 level requirements.

139 The DOD describes the concept as it will be at the end of Step 1. The Primary projects, as well as the  
140 validation strategies, describe and develop the ways to reach that Step 1 end level. For that reason OI  
141 Steps that describe interim solutions and ways of working, which will be superseded by other OI  
142 Steps in Step 1, are not part of this DOD but might be part of the Validation Strategy and Primary  
143 Project Development.

144 This first Yearly Update of this document aims to present the most accurate overview of concepts  
145 covering the scope of OIs devoted to WP6. The Airport Step 1 DOD will continue to evolve every year  
146 according to the evolutions of both the Integrated Road Map and the results of Primary Projects (or  
147 OFAs) validations. The DOD can be seen as guiding principles established at a certain time of the  
148 SESAR Programme which will be further enhanced with the developments and outcomes of the WP6  
149 primary projects.

150

151

### 152 DOD Step 1 development

153 "Time Based Operations" is the building block for the implementation of the SESAR 2020 concept  
154 and is focussed on efficiency, predictability and the environment. It follows on from SESAR  
155 Deployment Baseline (DB).

156 "Time Based Operations" encompasses SESAR Definition Phase Service Level 2. The goal is a  
157 synchronised and predictable European ATM system, where partners and stakeholders are aware of  
158 the business and operational situations and collaborate to optimise the Airport Operations.

159 Airport operations in Step 1 are driven by enhanced stakeholders' participation in a rolling  
160 collaborative process, by continuously sharing the latest demand and capacity intentions, defining  
161 targeted measures in the airport operations plan, realising the plan taking into account operational  
162 updates, evaluating operations against performance targets and updating the plan.

163 Fundamental to Step 1 improvements is the integration of airport operations in the network.

164 The SESAR Airport Concept Step 1 foresees the following key elements:

- 165 • Increased surface and runway safety,
- 166 • Optimum surface management and arrival and departure sequence planning,
- 167 • Accurate arrival and departure times and separation,
- 168 • Optimum use of existing airport infrastructure and available capacity,
- 169 • Reducing noise pollution and gas and particulate emission through operational improvements,
- 170 • Better relations with neighbours (communities and local authorities),
- 171 • Additions and changes to airport infrastructure,
- 172 • Optimum use of on-board devices / systems,
- 173 • Improved efficiency by shared information and collaborative decision making leading to improved  
174 collaborative work between ANSP, Airspace User and Airport on operational and environmental  
175 issues,
- 176 • Improved resilience to adverse conditions,
- 177 • Improved weather forecasts.

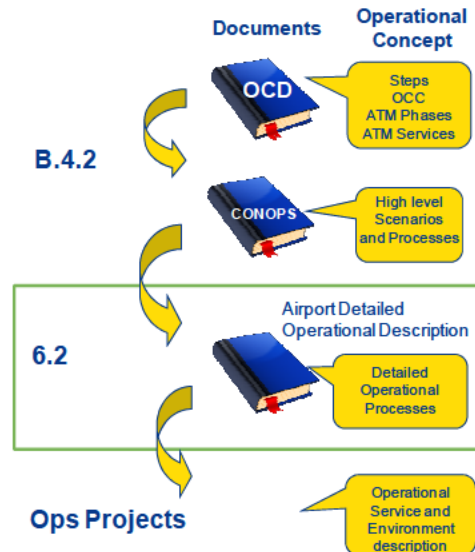
178 While the above are essentially issues local to the airport they will be developed and implemented to  
179 support the system wide goals and benefits.

## 180 1 Introduction

### 181 1.1 Purpose of the document

182 The Detailed Operational Description (DOD) provides a top-down view of the ATM Phases as  
 183 guidance to the Primary project developing Operational Services and Environment Definition (OSED)  
 184 and Safety and Performance Requirements (SPR). This covers scenarios and associated use cases,  
 185 Processes and Services (P&S), high-level requirements and environment descriptions. This document  
 186 is the first update of the 6.2 Step 1 DOD.

187 Figure 1-1 presents the DOD within the overall documentation, together with the SESAR Projects  
 188 responsible for their production and maintenance.



189

190

Figure 1-1: The 4 types of SESAR Operational Concept documents

191

192 The purpose of the update task is to set up a reference document which integrates the changes that  
 193 have occurred since the delivery of the previous version (WP6.2 – D07 – Airport Detailed Operational  
 194 Description (DOD) Step 1 – Edition 01.00.01), delivered on February 20, 2012. There are two ways  
 195 for updating:

- 196 - Top-down, by taking into account the modifications done at higher level (especially Road Map  
 197 and CONOPS),
- 198 - Bottom-Up, by taking into account the development of concepts elaborated by the Primary  
 199 Projects, either the concept itself via the OSED or the applicability of the concept through the  
 200 validation exercises.

201 The above chain is then completed as follows:



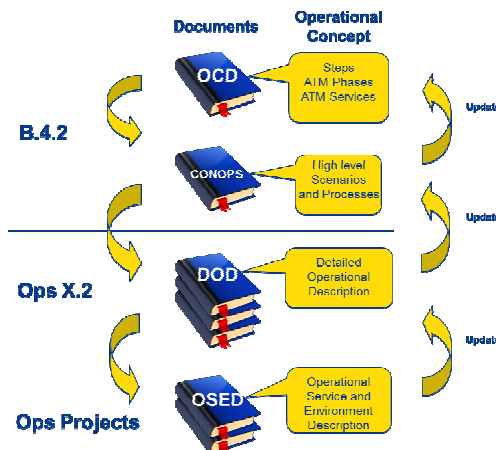


Figure 1-2: The 4 types of SESAR Operational Concept documents

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204

205 The review of OSED, SPR and INTEROP will be referenced against the DOD to provide evidence of  
 206 coherency and maturity. Specifically, requirements will be captured and agreed through the SEMP  
 207 (Requirements Management (RM) process), , and OSEDs and their use cases will be reviewed and  
 208 compared against the referenced scenarios in the DOD and agreed.

209 This activity is undertaken for both release preparation and validation reviews using the accumulated  
 210 evidence referenced through the DOD.

211 For Step 1, the DOD is guided by the Concept of Operations (SESAR– D66-B4.2 – SESAR Concept  
 212 of Operations Step 1 ed 2013 – 01.01.00-22/11/2013" [11]).

213 The DOD describes the concept as it will be at the end of Step 1. The Primary projects as well as the  
 214 validation strategies describe and develop the way to reach that Step 1 end level. For that reason OI  
 215 Steps that describe interim solutions and ways of working, which will be superseded by other OI  
 216 Steps in Step 1, are not part of this DOD but might be part of the Validation Strategy and Primary  
 217 Project Development.

218 The submission of this version of the document certainly does not mean that the Airport DOD Step 1  
 219 is fixed in concrete and that the primary projects have to arrange their development around the  
 220 content of this DOD. The DOD can be seen as guiding principles which will be further enhanced with  
 221 the developments and outcomes of the WP6 primary projects. The Airport DOD Step 1 is therefore a  
 222 living document that will continue to be updated, over the Step 1 validation life cycle.

## 223 1.2 CONOPS Reference

224 The SESAR Concept of Operations "SESAR– D66-B4.2 – SESAR Concept of Operations Step 1 ed  
 225 2013 – 01.01.00-22/11/2013" [11] defines the main aspects of the changes expected from SESAR  
 226 Programme for ATM Operations:

### 227 Moving from Airspace to Trajectory Management

228 The central pillar of SESAR is the efficient management of the European ATM network in order to  
 229 accommodate, as far as possible and in the context of network performance targets, Airspace Users'  
 230 preferred trajectories from planning through execution gate to gate. Trajectories will be expressed in  
 231 all 4 dimensions (4D) and flown with significantly higher accuracy than today.

232 In Step 1 User preferred routing<sup>1</sup>, without pre-defined routes, is applicable in low and medium  
 233 complex airspace. More detailed information about the flight is available for network planning through  
 234 the use of the Extended Flight Plan and improved OAT Flight Plan. Aircraft derived data or onboard  
 235 trajectory information is shared with the ground system to feed the ground tools. This improves  
 236 predictability and consistency between air and ground trajectories.

<sup>1</sup> Including free routing / direct routing

## 237 **Conflict Management**

238 Thanks to the improvement of the trajectory accuracy and the related information better shared  
239 between Air and Ground, the tools supporting Conflict Alert and Collision Avoidance are improved.

240

241 Thanks to the improvement of the trajectory accuracy and the related information better shared  
242 between Air and Ground the tools supporting Conflict Alert and Collision Avoidance are improved.

243 Conflict Detection Tools look-ahead time is increased. STCA is especially better adapted to TMA  
244 operations. ACAS is improved thanks to the reduction of inappropriate Resolution Advisory (RA)  
245 alerts occurring during level off and also benefits from automation in the execution of the RAs.

## 246 **Traffic Synchronisation**

247 AMAN is extended to support the management of arrival flows further out from the destination airport.  
248 DMAN servicing multiple airports enable a constant delivery of flights from multiple airports merging  
249 into the En-route phase of flight.

250 AMAN and DMAN are synchronised by including the operations of close proximity airports in the  
251 arrival metering before departure to constrained destination airports.

252

253 On-board trajectory information down linked by capable aircraft (EPP and ETA min/max) enhances  
254 the accuracy of AMAN and other controller support tools.

255 Controlled Time of Arrival (CTA) is proposed by the AMAN when needed, implemented by Controllers  
256 and met by aircraft with high accuracy, improving the performance and reliability of arrival  
257 sequencing.

258 ASAS spacing supports tactical actions to achieve optimum arrival spacing.

259 More information is available to Controllers and Flight Crews to ensure a safe, expeditious and  
260 efficient movement on the ground. The coordination of AMAN/DMAN with surface management  
261 operations supports efficient mixed mode operations (arrivals and departures) on a single runway and  
262 dependent parallel runway operations.

## 263 **Network and Airport Collaborative Management**

264 Airport Collaborative Decision Making (A-CDM) processes progressively build the Airport Operations  
265 Plan (AOP) and Network Operation Plan (NOP) through the sharing of more and more up-to-date and  
266 precise data as the day of operations approaches.

267 User Driven Prioritisation Process (UDPP) is mainly used to address airlines constraints in reduced  
268 airports capacity situation, with a primary focus on addressing departure congestion in the planning  
269 phase, and it is used as well for coping with constraints in the En-route airspace and arrival airport.

270 The use of Target Time Over/Arrival (TTO/TTA) improves the effectiveness and the smoothing effect  
271 of regulations on the demand in congested airports and areas.

272 A new Variable Profile Area (VPA) design principle, based on flexible allocation and management of  
273 small fixed predefined modules of airspace, ensures that civil and military airspace users'  
274 requirements are met and properly balanced via CDM process.

275 Dynamic DCB / Short-Term ATFCM Measures manage traffic peaks and complexity, to smooth ATC  
276 workload through the application of fine-tuned measures close to the real time operations.

277 AOP and NOP ensure the best overall system outcome by linking key airport operational parameters  
278 of the turnaround giving a better situational awareness of the aircraft progress at the airport to  
279 Airspace Users, Airport ATC, ANSPs and Network. A-CDM is extended to include interconnected  
280 regional airports and affects all IFR flights.

## 281 **Enhanced route Structures**

282 An efficient fixed airspace structure combined with advanced airborne and ground system capabilities  
283 is deployed.

284 TMAs are optimised through Performance Based Navigation (PBN) using Advanced RNP. The aim is  
 285 to generate route structures in lateral dimensions (2D), while the vertical dimensions of the flight  
 286 remains managed tactically by Controller.

287 RNP procedures facilitate the increased use of Continuous Climb Operations (CCO) and Continuous  
 288 Descent Operations (CDO), improving the flight efficiency and reducing among other things, fuel burn,  
 289 CO<sub>2</sub> emissions and noise.

290 **Airport Integration and Throughput**

291 Flight Crew Enhanced Vision provides a clearer vision of landing and ground operations in Low  
 292 Visibility Conditions. Low Visibility Procedures and Precision Approaches using initial CAT II/III GBAS  
 293 are used more systematically.

294 Airport surface safety is enhanced thanks to increased situation awareness and the introduction of  
 295 conflict detection tools and alerting systems for Controller, Flight Crew and vehicle drivers. Surface  
 296 management and predictability of surface operations are improved thanks to the automatic generation  
 297 of taxi routes, which are shared between Tower Controllers and can be provided via datalink to  
 298 aircraft and vehicles in order to be displayed on board. Situation awareness of ATCOs, flight crews  
 299 and vehicle drivers is improved, particularly in low visibility conditions.

300 Time based Separation (TBS) dynamically adapted to the dissolving of wake turbulence on final  
 301 approach, aids towards consistent and accurate delivery between arrival aircraft.

302 **Remotely Provided Air Services for Aerodromes**

303 Remotely Operated Aerodrome Air Traffic Services is provided from a remote location, significantly  
 304 reducing the infrastructure costs by co-locating remote tower modules for a number of airports  
 305 centralized at a single site.

306 **1.3 Scope**

307 The operational content deals with the following subset of Business Needs (BN) and Focus Areas  
 308 (OFA), where the highlighted OFAs are identified as primary for this DOD.

Business Needs	Operational Focus Area (OFA)
BN02 Airport Integration and Throughput	OFA01.01.01 LVPs using GBAS
	OFA01.01.02 Pilot Enhanced Vision
	OFA01.02.01 Airport Safety Nets
	OFA01.02.02 Enhanced Situational Awareness
	OFA01.03.01 Enhanced Runway Throughput
	OFA04.02.01 Integrated Surface Management
	OFA05.01.01 Airport Operations Management
BN01 Traffic Synchronisation	OFA06.03.01 Remote Tower
	OFA02.02.04 Approach Procedures with Vertical Guidance
	OFA04.01.01 Integrated Arrival/Departure Management at Airport
BN03 Moving from Airspace to 4D Trajectory Management	OFA03.01.04 Business and Mission Trajectory
BN04 Network Collaborative Management and Dynamic Capacity Balancing	OFA05.03.06 UPPP
	OFA05.03.07 Network Operations Planning
	OFA06.01.01 CWP Airport
	ENB02.01.01 SWIM
	ENB02.01.01 AIM/MET

309 **Table 1-1: BNs and OFAs addressed in the DOD**

310

## 311 1.4 Intended Readership

312 This DOD is intended first for WP6 primary projects, WP5 primary projects addressing departure and  
313 approach aspects, B4.2, B4.1 and B5.

314 More precisely, the process dealing with DOD refining and updating in the frame of SESAR Step 1  
315 involves the following primary operational projects:

- 06.03.01 The Airport in the ATM environment,
- 06.03.02 Airport ATM performance (execution phase),
- 06.05.01 Airport Operations Plan Definition,
- 06.05.02 Airport Operations Plan Validation,
- 06.05.03 Airport Capacity and Flow Management,
- 06.05.04 AirPort Operations Centre (APOC) definition,
- 06.05.05 Integration of MET Data into APOC processes,
- 06.06.01 Operations in adverse weather and/or exceptional operating conditions / recovery management,
- 06.06.02 Integration of airport - airline/ground handlers - ATC processes (incl. turn-round) in ATM,
- 06.07.01 Airport safety support tools for pilots, vehicle drivers and controllers,
- 06.07.02 A-SMGCS Routing and planning functions,
- 06.07.03 A-SMGCS Guidance Function,
- 06.08.01 Flexible and Dynamic Use of Wake Turbulence Separations,
- 06.08.02 Enhanced Runway Management Through Optimised Braking Systems,
- 06.08.03 Separation minima reductions across flight phases,
- 06.08.04 Coupled AMAN/DMAN,
- 06.08.05 GBAS operational implementation,
- 06.08.07 Improved weather resilience - re-classify criteria for Low Visibility Procedures LVP),
- 06.09.02 Advanced integrated CWP (A-CWP),
- 06.09.03 Remote & virtual TWR,
- 09.49 Global Interoperability - Airborne Architecture and Avionics Interoperability Roadmap
- 11.01 Flight and Wing Operations Centres
- 11.02 Meteorological Services (MET) Co-ordination & Management.

316 Secondly this document is aimed at the SESAR community in general, with a special relevance to:

- 317 • P5.2: Consolidation of Operational Concept Definition and Validation (in TMA); a close  
318 coordination is required between the two x.2 projects considering many overlaps or common  
319 CONOPS topics between Airport and TMA areas.
- 320 • P7.2: Co-ordination and consolidation of concept definition and validation (NOP) ; coordination is  
321 required between the two x.2 projects considering that 7.2 is the focal point to consolidate the  
322 NOP issues addressed by 6.2. Moreover, the interaction between airport and runway  
323 management has to be coordinated with the UDPP concept.
- 324 • P8.1: Information Models Development and P8.3: Information Service Models Development ; co-  
325 ordination is required between the three projects in order to share the same views on the  
326 Information Models and Information Service Models matching the Airport Operations and then  
327 depicted in DOD modelling and description.
- 328 • P9.13 D-TAXI and P9.14 On-board Alerts to ensure consistency. Aircraft system functions being  
329 derived from operational concept requirements.
- 330 • P12.1.7 and the P12.x.y "mirror" system projects focusing on Airport System definitions and  
331 development. These technical projects must build a traceability matrix between the OSED, SPR

332 and their system requirements, making it possible to check the coverage level with regard to the  
333 CONOPS.

## 334 1.5 Structure of the document

335 Chapter 1 introduces the document,  
336 Chapter 2 describes the previous operating methods, the new methods and the differences  
337 between them,  
338 Chapter 3 describes the operational environments, roles and actors connected to airport  
339 operations,  
340 Chapter 4 describes the operational scenarios and identifies the related use cases,  
341 Chapter 5 describes the processes and services associated with the chapter 4 scenarios,  
342 Chapter 6 details the operational and performance requirements at the airport level,  
343 Chapter 7 details the OI Steps, OFA and OSED mapping associated with this document,  
344 Chapter 8 outlines outstanding issues,  
345 Chapter 9 lists appropriate references,  
346 Annex A lists OIs changes between previous version and the update,  
347 Annex B BPMN (Business Process Model and Notation) elements.

## 348 1.6 Background

349 The first edition of the 6.2 Step 1 DOD was delivered on November 18<sup>th</sup>, 2011 and was modified  
350 following recommendations for consistency. Then, the final deliverable D07 "Airport Detailed  
351 Operational Description Step 1 – Ed.01.00.01" was issued on February 20<sup>th</sup>, 2012, with the  
352 complementary name "corrected version – V2". This update aims to reflect mainly the consequences  
353 of the changes in the Integrated Roadmap (OIs) and additionally a few modifications incurred by the  
354 development of the PPs.

355 The next yearly update, expected by end of 2014, will be more focused on the bottom-up approach by  
356 fully integrating both the developments of PPs and the results of consistency check of OSEDs and  
357 validation reports.

## 358 1.7 Acronyms and Terminology

### 359 1.7.1 Acronyms

360 A list of the important terminology and acronyms used in this document is presented below; they are  
361 taken, when available, from the SESAR ATM Lexicon. In case of any difference between the  
362 definitions provided here and the SESAR Lexicon, the SESAR Lexicon should be taken as the  
363 authority.

Term	Definition
A-CDM	Airport Collaborative Decision Making
A-CWP	Advanced Controller Working Position
A-DPI	ATC Departure Planning Information Message
ACARS	Aircraft Communications Addressing and Reporting System
ADFT	Actual Departure Fix Time
ADS-B	Automatic Dependant Surveillance - Broadcast
ADS-C	Automatic Dependant Surveillance – Contract
AFIS	Aerodrome Flight Information Service
AFISO	Aerodrome Flight Information Service Officer
AIAT	Actual Initial Approach Fix Time
AIBT	Actual In Block Time
AIP	Aeronautical Information Publication
ALDT	Actual Landing Time
AMAN	Arrival Manager
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
AOBT	Actual Off-Block Time
AOC	Airline Operations and Control Centre
AOP	Airport Operations Plan
APOC	Airport Operations Centre

Term	Definition
A-SMGCS	Advanced Airport Surface Movement Guidance and Control System
A-VDGS	Advanced Visual Docking Guidance System
ARES	Airspace Reservation
A-RNP	Advanced Requirements Navigation Performance
ASAS	Airborne Separation Assistance System
ASMA	Arrival Sequencing and Metering Area
ATC	Air Traffic Control
ATFCM	Air Traffic Flow and Capacity Management
ATIS	Automatic terminal Information Service
ATM	Air Traffic Management
ATMAP	ATM Airport Performance
ATOT	Actual Take Off Time
ATS	Air Traffic Service
ATSAW	Airborne Traffic Situational Awareness
ATV	Airport Transit View
AU	Airspace User
AUO	Airspace User Operations
BDT	Business Development Trajectory
BT	Business Trajectory
CAA	Civil Aviation Authority
CAVOK	Ceiling and Visibility OK
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CODA	Central Office of Delay Analysis
CONOPS	Concept of Operations
CPDLC	Controller Pilot Data Link Communication
CTA	Controlled Time of Arrival
CTOT	Calculated Take Off Time
DCB	Demand and Capacity Balancing
DMAN	Departure Manager
DOD	Detailed Operational Description
DPI	Departure Planning Information message
D-OTIS	Data-link Operational Terminal Information Service
D-TAXI	Data-link TAXI clearance delivery
EASA	European Aviation Safety Agency
EDFT	Estimated departure Fix Time
EFPL	Extended Flight Plan
EIAT	Estimated Initial Approach Fix Time
EIBT	Estimated In-Block Time
ELDT	Estimated Landing Time
EOBT	Estimated Off Block Time
ETA	Estimated Time of Arrival
ETOT	Estimated Take Off Time
EXIT	Estimated Taxi-In Time
EXOT	Estimated Taxi-Out Time
FAB	Functional Airspace Block
FATO	Final Approach and Take-Off paths for rotorcraft
FMS/MMS	Flight Management System/Mission Management System
FOC	Flight Operations Centre
FOD	Foreign Object Debris
GA	General Aviation
GBAS	Ground Based Augmentation System
GLS	Global Landing System
GNSS	Global Navigation Satellite Service
HMI	Human-Machine Interface
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
IP	Implementation Package
IR	Implementing Rule
KPA	Key Performance Areas

Term	Definition
LVC	Low Visibility Conditions
LVP	Low Visibility Procedures
MET	Meteorological
MLS	Microwave Landing System
NM	Network Manager
NMF	Network Management Function
NMOC	Network Manager Operations Centre
NOP	Network Operations Plan
NOTAM	Notice to Airman
OCD	Operation Concept Document
OFA	Operational Focus Area
OI Step	Operation Improvement Step
P&S	Process and Services
PDI	Performance Driver Indicator
RTM	Remote Tower Module
R&D	Research and Development
R/T	Radio Telephony
iRBT/iRMT	Initial Reference Business Trajectory / Reference Mission trajectory (Step 1)
RNP	Required Navigation Performance
ROT	Runway Occupancy Time
R/T	Radio Telephony
RWSL	Runway Status Lights
SARPS	Standards and Recommended Practices
iSBT/iSMT	Initial Shared Business Trajectory / Shared Mission Trajectory (Step 1)
SES	Single European Sky
SESAR	Single European Sky ATM Research
SIAT	Scheduled Approach Fix Time
SIBT	Scheduled In Block Time
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SL	Service Level
SLDT	Scheduled Landing Time
SOBT	Scheduled Off Block Time
SNI	Simultaneous Non-Interfering operations (between rotorcraft and fixed wings)
SSC	Single Sky Committee
SSR	Secondary Surveillance Radar
STAR	Standard Instrument Arrival
STOT	Scheduled Take-Off Time
SWIM	System Wide Information Management
TDFT	Target Departure Fix Time
TIAT	Target Initial Approach Fix Time
TIBT	Target In Block Time
TLDT	Target Landing Time
TMA	Terminal Manoeuvring Area (also Terminal Control Area)
TOAT	Target Off-Block Approval Time
TOBT	Target Off-Block Time
TSAT	Target Start-up Approval Time
TTA	Target Time of Arrival
TTOT	Target Take-off Time
TWR	Tower
UDPP	User Driven Prioritization Process
WT	Wake TurbulenceTurbulence

364

Table 1-2 Acronyms

365

## 1.7.2 Terminology

366

**Actual Initial Approach Fix Time (AIAT):** The actual time the aircraft crosses the Initial Approach Fix (IAF) – or any other pre-defined point within the TMA (e.g. TMA entry point).

**Actual In-block Time (AIBT):** The actual date and time when the parking brakes have been engaged at the parking position.

<b>Actual Landing Time (ALDT):</b> The actual date and time when the aircraft has landed (touch down).
<b>Actual Off-Block Time (AOBT):</b> The actual date and time the aircraft has vacated the parking position (pushed back or on its own power).
<b>Actual Take Off Time (ATOT):</b> The time that an aircraft takes off from the runway (Equivalent to ATC ATD—Actual Time of Departure, ACARS = OFF).
<b>Advanced Surface Management Guidance and Control System (A-SMGCS):</b> A system providing routing, guidance and surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all weather conditions within the aerodrome visibility operational level (AVOL) while maintaining the required level of safety.
<b>Airport Operations Plan (AOP):</b> A single, common and collaboratively agreed rolling plan available to all airport stakeholders whose purpose is to provide common situational awareness and to form the basis upon which stakeholder decisions relating to process optimisation can be made.
<b>Airport Transit View (ATV):</b> the description of the "visit" of an aircraft to the airport. It consists basically of three separate sections: -The final approach and inbound ground section of the inbound flight, -The turn-round process section in which the inbound and the outbound flights are linked, -The outbound ground section and the initial climb segment of the outbound flight.
<b>Air Traffic Control clearance:</b> Authorization for an aircraft to proceed under conditions specified by an Air Traffic Control Unit. <i>Note 1.— For convenience, the term "air traffic control clearance" is frequently abbreviated to "clearance" when used in appropriate contexts.</i> <i>Note 2.— The abbreviated term "clearance" may be prefixed by the words "taxi", "take-off", "departure", "en-route", "approach" or "landing" to indicate the particular portion of flight to which the air traffic control clearance relates.</i>
<b>Air Traffic Control instruction:</b> Directives issued by Air Traffic Control for the purpose of requiring a pilot to take specific action.
The term <b>airspace user</b> mainly refers to the organizations operating aircraft which includes rotorcraft, and their pilots. <i>Three classifications of airspace users are considered:</i> 1. <i>ICAO-compliant manned flight operations (the largest segment by far): ICAO-compliant manned flight operations are those conducted in accordance with ICAO provisions (e.g. SARPs, PANS). ICAO-compliant airspace users include:</i> a) <i>all civil aircraft operators engaged:</i> § <i>in commercial air transport -scheduled and non-scheduled (passenger transport, mail and cargo services, emergency medical services, etc...),</i> § <i>in business and general aviation: air taxi operators, aerial work, private air transport, sporting and recreational aviation, etc... ; and</i> b) <i>the portion of States' users operating State aircraft using civil air traffic rules (GAT)</i> 2. <i>ICAO non-compliant manned flight operations: ICAO non-compliant manned flight operations are those which cannot comply for operational or technical reasons (e.g.: conducted by State aircraft -OAT-)</i> 3. <i>Flight operations of unmanned aerial vehicles (UAVs): Flight operations of unmanned aerial vehicles (UAVs), a growing segment of airspace users, include civil and military applications of UAV technology.</i>
<b>Cleared Route:</b> The part of a route that has been approved by an ATCO for a mobile in his/her area of responsibility.
<b>Departure Clearance:</b> Instructions which specify the aircraft identification, clearance limit; route of flight; level(s) of flight for the entire route or part thereof and changes of levels if required, any necessary instructions or information on other matters such as SSR transponder operation, approach or departure manoeuvres, communications and the time of expiry of the clearance (cancelled if the flight has not been started) and in addition runway and Standard Instrument Departure (SID).
<b>Estimated Initial Approach Fix Time (EIAT):</b> The estimated time the aircraft crosses the Initial Approach Fix (IAF) – or any other pre-defined point within the TMA (e.g. TMA entry point).



<p><b>Estimated In-Block Time (EIBT):</b> The estimated time that an aircraft will arrive in-blocks. (Equivalent to Airline/Handler ETA – Estimated Time of Arrival).</p> <p><i>The estimated in-block time is based on the flight progress and updated continuously as the aircraft approaches the airport, lands and taxis to its stand.</i></p>
<p><b>Estimated Landing Time (ELDT):</b> The estimated time that an aircraft will touchdown on the runway (Equivalent to ATC ETA–Estimated Time of Arrival = landing).</p>
<p><b>Estimated Off-block Time (EOBT):</b> The estimated time at which the aircraft is foreseen to commence movement associated with departure (ICAO).</p> <p><i>Derived from the filed Flight Plan / iSBT. It serves to provide a reference time first issued by the Aircraft Operator and updated according to actual events at airport for determining whether or not a new TOBT shall be agreed upon. The EOBT serves to determine the ETOT used to plan ATC operations for the flight.</i></p>
<p><b>Estimated Take-Off Time (ETOT):</b> The Estimated Take-Off Time an aircraft is expected to commence its take-off roll.</p>
<p><b>IATA Schedules Conference:</b> The Schedules Conference is a working conference. As part of the scheduling process, the purpose of this voluntary assembly of both IATA and non-IATA airlines worldwide is to provide a forum for the allocation of slots at fully coordinated airports (Level 3), and for the reaching of consensus on the schedule adjustments necessary to conform to airport capacity limitations (Level 2). The bi-annual (June and November) Schedules Conference is IATA's largest event. The Conference operating procedures are published in the Worldwide Scheduling Guidelines.</p>
<p><b>Landing Clearance:</b> Instruction which specifies the runway, surface wind, (visibility), the actual runway conditions and the clearance to land on this runway; communication may be either via Data Link or via voice communication (R/T): the selection being dependent upon ICAO SARPS and local procedures (if an aircraft is still airborne, the ATM system may uplink the planned “exit” and “taxi routing” data to the flight deck).</p>
<p><b>Minimum Turn-round Time (MTTT):</b> The minimum turn-round time agreed with an AO/GH (aircraft operator/ground handler) for a specified flight or aircraft type.</p> <p><i>The minimum time required to perform the necessary ground handling processes between in-blocks and off-blocks. This MTTT may be different per aircraft type as also per type of flight (European / intercontinental / cargo) and be based on airline / operator demands.</i></p>
<p><b>Mobile:</b> Any cooperative aircraft / vehicle operating in the movement area of the aerodrome (source EUROCONTROL A-SMGCS Implementation Levels)</p>
<p><b>Movement area:</b></p>
<p><b>Network Operations Plan (NOP):</b> A set of information derived and reached collaboratively both relevant to, and serving as a reference for, the management of the Pan-European network in different timeframes for all ATM stakeholders, which includes, but is not limited to, targets, objectives, how to achieve them, anticipated impact.</p>
<p><b>Planned Route:</b> Part of an aerodrome used for take-off, landing, and taxiing of aircraft. Consisting on the manoeuvring area and the apron(s) (source ICAO Doc. 9830)</p>
<p><b>Pre-departure Information:</b> the Pre-departure information is delivered during the pre-departure phase and contains the designated runway (potentially the SID), and the most recent information regarding airport conditions, meteo forecasts, SIGMET (if any) and NOTAM. This information is available through the D-OTIS.</p>
<p><b>Push-back/start up Approval:</b> the Push-back/start up approval is issued by Tower Ground Controller (or Apron Manager) and indicates that flight crew is now allowed to push-back and move the aircraft following the push-back path delivered with the approval. The authorisation to move is restricted to this movement only.</p>
<p><b>Remote Tower Module:</b> (RTM) is the term for the complete module including both the CWP(s) and the Visual Reproduction display screens.</p>
<p><b>Runway Exit:</b> A designated turn-off or high speed turn-off from the runway that leads the aircraft out of the runway and out of the runway safety strip to the apron areas of an airport.</p>

<p><b>Runway Holding Position:</b> A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.</p>
<p><b>Scheduled Times:</b> Scheduled Times are milestone events published in a schedule or the initial flight plan (SOBT and SIBT) and the times of other airport events estimated from these times (STOT and SLDT). These times are used for schedule creation and planning purposes.</p>
<p><b>Scheduled In-Block Time (SIBT):</b> The planned arrival time of the flight according to the airspace users schedule.</p>
<p><b>Scheduled Landing Time (SLDT):</b> The Scheduled Landing Time is used in airport performance monitoring activities. It is derived from the SIBT and an estimate of the in-bound taxi time or the SOBT and forecast flight duration.</p>
<p><b>Scheduled Off-Block Time (SOBT):</b> The planned departure time of the flight according to the airspace users schedule.</p>
<p><b>Scheduled Take-Off Time (STOT):</b> The Scheduled Take-Off Time is used in airport performance monitoring activities. It is derived from the SOBT and an estimate of the out-bound taxi time.</p>
<p><b>Target Initial Approach Fix Time (TIAT):</b> The agreed (planned) time the aircraft should cross the Initial Approach Fix (IAF) – or any other pre-defined point within the TMA (e.g. TMA entry point).</p>
<p><b>Target In-block Time (TIBT):</b> The agreed time the aircraft should arrive at the parking position.</p>
<p><b>Target Off-block Time (TOBT):</b> The time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready, all doors closed, boarding bridge removed, push back vehicle available and ready to start up / push back immediately upon reception of clearance from the TWR (A-CDM Manual).</p>
<p><b>Target Start-up Approval Time (TSAT):</b> The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect to receive start-up / push back approval.</p> <p><i>Note: The actual start up approval (ASAT) can be given in advance of TSAT (A-CDM Manual).</i></p>
<p><b>Target Take Off Time (TTOT):</b> Time taking into account the Target Start Up Approval Time (TSAT) plus the Estimated Taxi-Out Time (EXOT).</p>
<p><b>Target Time of Arrival (TTA):</b> An ATM computed arrival time. It is not a constraint but a progressively refined planning time that is used to coordinate between arrival and departure management applications. It is an ATM computed time.</p> <p><i>As soon as the iSBT is instantiated, it becomes an agreed parameter of the iRBT that the Airspace users agree to fly and the ANSPs and Airports agree to facilitate. TTA should be managed and facilitated to ensure a precision in the order of +/- 3 min allowing Network Management and ATC to ensure monitoring and trajectory adherence during execution.</i></p>
<p><b>Taxi Clearance:</b> The Taxi clearance is issued by TWR Ground Controller to the flight crew and indicates that the flight crew is now allowed to taxi from its current position to the next assigned (cleared) position.</p>
<p><b>Transfer Control:</b> The transfer of responsibility of a flight from one controller to another, using R/T or data link. The transfer of control at least implies a communication from the controller towards the Flight Crew to provide it with next frequency. Then the Flight Crew contacts the next controller in charge of the aircraft.</p>

Table 1-3 Terminology

## 2 Operating Methods

**DISCLAIMER:** This chapter of Step 1 Airport DOD Update has imported the description text of the OI Steps directly from the existing ATM roadmap (Integrated Roadmap DS11 released in October 2013). Consequently, any comment made by reviewers for this section will have to be corrected first in the ATM roadmap to avoid discrepancies.

Operational Improvements included in the «Deployment Baseline» (DB) are considered as being part of the “as is” baseline for Step 1. This starting baseline for Step 1 is described in section 2.1. Any OI Steps that are part of the «Deployment Baseline» but which are superseded by OI Steps in «Step 1» are listed in Section 2.3. **Error! Reference source not found..** Even though these OI Steps will be superseded and not part of the final “to be” Step 1 solution, their validation and implementation is required for their following improvement’s implementation. The OI Steps listed in this section have been checked against the SESAR D79-WPB.01-Integrated Roadmap Dataset 11-release Note-00.01.00 – 11/10/2013[4].

The Operational Improvements included here are not assumed to be implemented in all airports nor in any single airport in their totality. Just as an airport with one runway does not have the same operational tools and procedures as one with multiple parallel and crossing runways, not all airports will implement the same changes. The operating methods description detailed below is to show all of the changes that will have occurred across Europe with a Step 1 implementation. Which of the new methods are to be implemented is a decision of the local authorities based upon their needs and capabilities.

### 2.1 Introduction

The airport view of the ATM concept is from the perspective of “en-route to en-route” as this includes the ground as well as the aircraft turn-round process. In this view, the airport can be considered as another, rather complex, “sector” through which the aircraft passes, where complementary processes, such as the aircraft turn-round, work together in a fashion similar to a modern production facility.

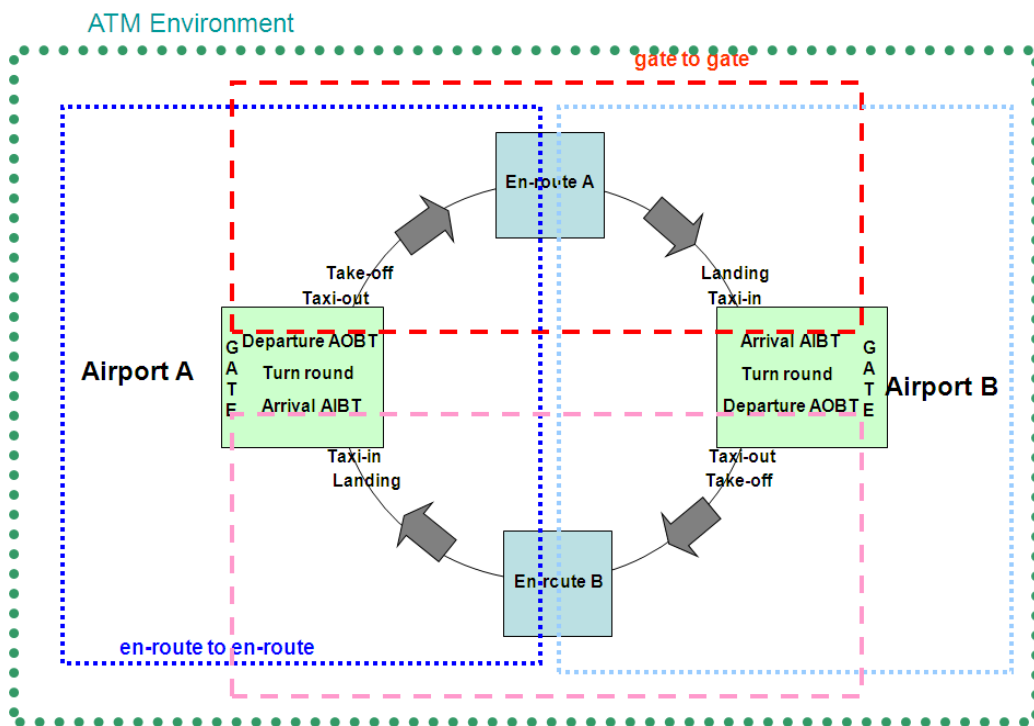


Figure 2-1 Air transport as a continuous process

396 It is essential that not only the runway and surface movement of the aircraft be included in this  
397 concept, but also the ground handling process if reactionary delay is to be fully addressed.

398 Airport organisation is aimed at supporting co-operation between all stakeholders at appropriate  
399 decision-making stages whilst ensuring a seamless process over the entire planning spectrum,  
400 starting many years ahead down to real time. Besides these high-level operational processes, there is  
401 also a medium to long-term development process which focuses on future demand and capacity  
402 planning for airport expansion. This includes issues ranging from airport infrastructure and  
403 environmental aspects to landside capacity and regional planning. The focus of airports is divided  
404 between both the potential aircraft movement rate and also passenger throughput.

405 Airport operators own and/or operate their nodes of the Air Transport Network. It is their responsibility  
406 to provide a safe airport infrastructure in balance with environmental limitations. In partnership with all  
407 stakeholders, the airport aims at achieving a common business approach, by linking flight segments,  
408 surface operations, and the aircraft turn-round process. This requires collaborative decision making  
409 based upon an equal acceptance of all stakeholders (level playing field), a common planning process  
410 and understanding of its inherent assumptions, a common situational awareness of traffic evolution  
411 during execution, a common situational awareness of the status of the turn-round process, and a  
412 common performance framework to all stakeholders sharing a common target, aiming at on-schedule  
413 performance meeting the business needs of the airspace users and airport operators.

414 Based on the capacity figures of available resources, provided by the Airport Operator and the (local)  
415 ANSP, an initial Airport Resource Allocation and Capacity Plan is initiated ahead of the seasonal  
416 planning. For coordinated airports this initial plan will be input for the Slot Coordination Process in  
417 which the traffic demand from the users is balanced against the airport and airspace capacity and  
418 constraints (if any).

419 A seasonal Airport Operational Plan is established in a collaborative manner between the airport  
420 operator, ATC and users (aircraft operators), and iteratively maintained up to date. This operational  
421 plan accommodates the appropriate level of on demand operations.

422 The execution of the Airport Resource and Capacity Plan involves the real-time management and  
423 separation of aircraft moving on the airport surface. Short notice changes and/or refinements are  
424 handled using a mixture of collaborative processes and tactical interventions.

425 If surface movement capacity is to be increased without increasing the risk of runway incursions a  
426 range of actions need to be taken. Better situational awareness both for the controller, aircrew and  
427 vehicle drivers including conflict detection and warning systems will not only enhance airports surface  
428 safety but will also create room for surface movement capacity expansion.

429 Optimum management of surface traffic flows will not only increase efficiency and predictability during  
430 the ground movement phase but will also have a positive impact on the environment. The planning of  
431 surface routes may consider constraints imposed by the need to minimise the environmental impact  
432 especially surface holding or the need to avoid braking or changes in engine thrust levels as the  
433 aircraft moves from the runway to the stand or vice versa.

434 The turn-round process links the airborne and ground segments. Seamless progress of the turn-round  
435 process is a main factor affecting punctuality. Co-operative mechanisms will improve visibility for ATM  
436 actors regarding the progress of the turn-round process and result in better estimated times of  
437 subsequent events such as off-blocks and take-off.

438 Runways act as 'single servers' processing one aircraft landing or one aircraft taking off at a time.  
439 Although a single server, more than one aircraft could be simultaneously on the runway. For example  
440 an aircraft could already be lining up for take-off while the landing aircraft is still rolling out to its exit.

441 A degree of departure and arrival queuing is a consequence of airports being used close to their  
442 capacities. The effects of weather conditions on queuing (e.g. wet runways, strong winds, low  
443 visibility) are well known today and contribute to the variability of instantaneous runway capacity.

444 Increasing runway throughput and runway utilisation has to be achieved within the SESAR safety  
445 goals. Dependencies between multiple runways determine the practical runway capacity which in  
446 most cases is lower than the combined single runway capacities. Reducing dependencies between  
447 runways by implementing more accurate surveillance techniques and controller tools as well as  
448 advanced procedures, will enlarge the capabilities of existing runway configurations (like closely  
449 spaced parallel runways).

450 In order to provide some mitigation for the inherent delays/queuing associated with capacity  
451 constrained airports and to gain a significant capacity enhancement without impacting the overall  
452 queue management concepts on airports with multiple runways, the use of interlaced take-off and  
453 landing procedures (runway mixed mode operations) instead of segregated use of multiple runways  
454 can be envisaged. These procedures will be implemented when feasible and when required to  
455 maximise runway capacity taking into account the implied more complicated ground movement  
456 operations and potential safety issues that may arise.

457 The concept of remotely provided air traffic services applies at aerodromes where the service provider  
458 has determined that this is feasible, that the site and techniques to be used are proven to meet all  
459 appropriate safety requirements and where/ when this is cost-effective.

## 460 2.2 Previous Operating Methods

461 This section describes the operating methods that were used previous to the SESAR Step 1  
462 implementation and make up the baseline for Step 1 activities. The following basic conditions are set  
463 to be unchanged in SESAR Step 1:

464 The notion of a runway as a protected surface for aircraft to land and take-off safely will remain  
465 unchanged.

466 The Tower Runway Controller will remain the authority for assuring safe operations on the runway.

467 The main aspect of current surface movement operations that will remain is the reliance on 'see and  
468 avoid' principle as the primary mean to ensure the safety of surface movements.

469 Controllers will remain responsible for issuing information and instructions to aircraft under control in  
470 order to assist pilots to navigate safely and timely on the airport surface.

471 Voice communication for time critical and tactical clearances will also remain.

472 A range of technical and procedural solutions, both ground and airborne, will have been introduced or  
473 more widely implemented. These are the airport related OI Steps that are part of the Deployment  
474 Baseline (DB). They have been grouped according to the Business Needs / Operational Focus Area  
475 to which they apply and are ordered alphabetically according to the OI Step code.

476

### 477 **BN01 - Traffic Synchronization**

#### 478 **OFA04.01.01 – Integrated Arrival/Departure Management at Airports**

479 (no OI step identified in the Integrated Roadmap)

480

### 481 **BN02 - Airport Integration and throughput**

#### 482 **OFA01.01.01 – LVPs using GBAS**

483 • Capacity gains can be achieved by increased utilisation of the combined runways. Reducing  
484 dependencies between runways by implementing more accurate surveillance techniques and  
485 controller tools as well as advanced procedures, will enlarge the capabilities of existing runway  
486 configurations (like closely spaced parallel runways). **[AO-0403]**

487 • Improved Operations in Low Visibility Conditions through enhanced ATC procedures and/or  
488 navigation systems. LVP (Low Visibility Procedures) are collaboratively developed and are  
489 implemented at applicable airports involving in particular a harmonised application across  
490 airports and the use of optimised separation criteria. Navigation systems can be enhanced  
491 through changes applied to ILS antenna (smaller ILS sensitive and critical areas in CAT II/III) or  
492 use of MLS. **[AO-0502]**

493

#### 494 **OFA01.01.02 – Pilot Enhanced Vision**

495 (no airport-related OI step identified in the Integrated Roadmap)

496

497 **OFA01.02.01 – Airport Safety Nets**

- 498 • ECAC airports and aircraft operators develop procedures and apply recommendations contained  
499 in the European Action Plan for the prevention of runway incursions (e.g. compliance of  
500 infrastructure with ICAO provisions, best practices on flight deck procedures for runway crossing,  
501 while taxiing; assessment for pilots regarding aerodrome signage, markings and lighting). **[AO-  
502 0101]**
- 503 • The system detects conflicts and infringements of some ATC rules involving aircraft or vehicles  
504 on runways, and provides the controller with appropriate alerts. Whereas the detection of  
505 conflicts identifies a possibility of a collision between aircraft and/or vehicles, the detection of  
506 infringements focuses on dangerous situations because one or more mobiles infringed ATC  
507 rules. This improvement addresses also incursions by an aircraft into an area where the  
508 presence of an aircraft (or vehicle) is temporarily restricted or forbidden (e.g. closed taxiway, ILS  
509 or MLS critical area). **[AO-0102]**
- 510 • The system provides the controller with the position and automatic identity of all relevant aircraft  
511 and all relevant vehicles on the movement area (i.e. manoeuvring area plus apron). **[AO-0201]**
- 512 • The system provides the controller with information on Foreign Object Debris detected on the  
513 movement area. **[AO-0202]**

514

515 **OFA01.02.02 – Enhanced Situational Awareness**

- 516 • In addition to display of the airport layout (showing taxiways, runways, fixed obstacles) and the  
517 own aircraft position, the Flight Crew has an improved situational awareness thanks to the  
518 additional display of surrounding traffic (incl. both aircraft and optionally airport vehicles). A  
519 decrease in flight crew and controller workload is expected by reducing requests for repeated  
520 information with respect to surrounding traffic. An improvement of safety is also expected,  
521 especially at taxiway and runway intersections, as well as for aircraft landing and taking off.  
522 **[AUO-0401]**

523

524 **OFA01.03.01 – Enhanced Runway Throughput**

- 525 • This improvement proposes a change in the current ATM procedures that enables ATC  
526 controllers to reduce separations without any support of a new ATC controller tool. The level of  
527 operational applicability and benefits will depend on local wind conditions and runway orientation.  
528 Under defined crosswind conditions the wake turbulence minima to be applied between two  
529 aircrafts, can be reduced by 0.5 Nm for arrivals. **[AO-0301]**
- 530 • The Time Based Separation Transitional Step proposes a change in the current ATM procedures  
531 that will enable ATC controllers to apply a 0.5NM fixed reduction of the ICAO wake turbulence  
532 distance-based radar separation minima between wake turbulence separated aircraft pairs in  
533 specified headwind conditions. The level of operational applicability and benefits will depend on  
534 local wind conditions and runway orientation. **[AO-0302]**
- 535 • Appropriate runway exits are provided for the aircraft mix using the runway. The Runway  
536 Occupancy Time (ROT) as well as the predictability is based on the number of exits, the  
537 design/shape of the exit, the location with respect to the landing threshold as well as pilot/airline  
538 behaviour policy. Finding a well-accepted balance between number, shape and location is  
539 necessary. Multiple runway entries and a wide holding area can help to optimize the sequencing  
540 process for departing aircraft and can generate significant operational benefits during periods of  
541 traffic congestion. **[AO-0305]**
- 542 • The main flight operations elements that affect the Runway Occupancy Time (ROT) include not  
543 only braking distance or runway/taxiway design but also pilot's awareness of ROT requirements,  
544 pilot's reaction times to line-up/departure clearances, pre-departure actions, etc. This  
545 improvement addresses enhancements to operating practices of airlines and pilots in that  
546 respect. **[AUO-0701]**

547

548 **OFA04.02.01 – Integrated Surface Management**

549 (no airport-related OI step identified in the Integrated Roadmap)

550

551 **OFA05.01.01 – Airport Operations Management**

552 • Systematic strategies are agreed and applied by CDM partners to deal with predictable (e.g.  
553 forecast bad weather, industrial action, scheduled maintenance) or unpredictable adverse  
554 conditions (e.g. unforeseen snow or fog, accident). This involves effective methods of  
555 exchanging appropriate information on the expected or actual arrival of such conditions, special  
556 procedures, and system support to facilitate the sequencing of operations where needed (e.g.  
557 de-icing) [AO-0501].

558 • A set of milestones in the turn-round process are established at airport and flight progress is  
559 monitored against those milestones. The information is shared by all involved partners, not only  
560 at the airport concerned but also in other relevant units such as the NMOC and destination  
561 airport. The completion of a milestone triggers decision making processes for downstream  
562 events. Shared information on the progress of turn-round will be used to estimate departure  
563 demand and enable arrival/departure balancing. [AO-0601]

564 • The pre-departure sequence refers here only to the organisation of flights from the stand/parking  
565 position. Pre-departure sequences are established collaboratively with the airport CDM partners  
566 concerned taking into account agreed principles to be applied for specified reasons (e.g. slot  
567 compliance, airline preferences, night curfew, evacuation of stand/gate for arriving aircraft, etc.).  
568 The resulting pre-departure list is used by ATC while sequencing departing aircraft, as and when  
569 feasible. [AO-0602]

570 • De-icing stations are managed through CDM procedures enabling airport and ANSP to know the  
571 flights to de-ice and establish sequences accordingly. [AO-0603]

572 • A correctly balanced environmental regime at an airport can help to ensure that legal compliance  
573 to regulation is maintained, that the rules are harmonised to the extent possible, and the global  
574 and local impacts are minimised to the extent possible. The objectives are to ensure that  
575 decisions taken at the local level achieve the optimum environmental performance from aircraft  
576 operations at and around airports, by achieving the most appropriate balance between social,  
577 economic and environmental imperatives. A key aim will be to balance sometimes conflicting  
578 needs for noise and atmospheric emissions reduction and to account for system wide  
579 implications of local decisions. Most importantly, a key objective is to ensure that non optimal  
580 environmental procedures and constraints are avoided and where such constraints are being  
581 considered that the least damaging options are selected. Optimum environmental efficiency and  
582 capacity can be achieved at and around airports through the collaborative local selection of the  
583 most appropriate ATM capabilities and OIs available, within an overarching and harmonising  
584 framework. This framework must involve all operational stakeholders. [AO-0703]

585 • De-icing stations are created where the fluids, spoiled on the apron, can be collected and  
586 treated. Furthermore, technical solutions for the bio-degradation of de-icing fluids are  
587 implemented. Application techniques are developed in collaboration with airlines to improve the  
588 anti-icing treatment on aircraft at the stands so that the amount of de-icing fluids released in the  
589 storm water can be reduced. [AO-0705]

590 • The environmental performance (compliance to operational procedures, key performance  
591 indicators) of ATM stakeholders at the airport is recorded and monitored in support of continuous  
592 improvement process. In particular, it is possible to determine the amount of airport related  
593 versus external pollution. This improvement involves use of noise monitoring system, flight  
594 tracking and air quality monitoring system. [AO-0706]

595 • Convergence is ensured between airport slots, ATFM slots together with flight plan / iSBT  
596 monitoring processes in order to improve consistency on a daily basis. [DCB-0301]

597

598 **BN03 - Moving from Airspace to 4D Trajectory Management**599 **OFA03.01.04 – Business and Mission Trajectory**

- 600 • Airspace users are assisted in filing their flight plans and in re-rerouting according to the  
601 airspace availability and ATFM situation, through collaboration with NMOC, ANS providers  
602 and airports. Airspace users can make more informed decisions when compromises are  
603 needed between delay, re-routing, trajectory limitations or costs. On the basis of the offered  
604 routings, they can select the one which is best suited to their company policy for optimising  
605 flight time, fuel burn or other parameters. [AUO-0201]

606

607 **BN04 - Network Collaborative Management and Dynamic Capacity Balancing**608 **OFA05.03.04 - Enhanced ATFCM processes**

- 609 • After analysis of anticipated capacity shortfalls at local, regional or network wide levels,  
610 responses are selected from pre-defined scenarios and adjusted to the planned situation until  
611 day of operation. This relies on improved working relationship and processes between all  
612 involved stakeholders especially during the anticipating and reacting phases to optimise capacity  
613 throughput in sector groups based upon current improvement of ATFM activities. [DCB-0206]
- 614 • Critical event means an unusual situation or crisis involving a major loss of EATMN capacity, or a  
615 major, imbalance between capacity and demand, or a major failure in the information flow  
616 involving many partners and requiring immediate action to minimise consequences and to  
617 retrieve network stability. A pan-European procedure is established for managing critical events  
618 such, as industrial actions etc, which can be tailored to the needs/requirements of individual  
619 countries thus leading to better utilisation of limited available capacity. Since the impact of some  
620 events goes beyond ATM a European Aviation Crisis Coordination Cell (EACCC) has been  
621 established supporting the activation and coordination of contingency plans at State level.  
622 [DCB-0207]

623

624 **OFA05.03.06 – UDPP**

- 625 • Aircraft Operators' tactical priorities are introduced in a cooperative process with the NMOC  
626 through ATFM slot exchanges (such slot exchange will be between flights within a single  
627 company). NMOC may propose slot exchanges between flights to minimise the overall  
628 inconvenience to the community as a whole with the objective of minimising the total ATFM  
629 delay. [AUO-0101]

630

631 **OFA05.03.07 – Network Operation Planning**

- 632 • The contents of summer and winter versions of the NOP - consolidating the existing information  
633 on traffic demand and capacity plans - are improved by using feedback from previous seasons.  
634 Stakeholders contribute to the elaboration of the NOP and updates are integrated more  
635 dynamically. [DCB-0101]
- 636 • The Network Operation Plan provides an overview of the ATFCM situation from strategic  
637 planning to real time operations (accessible from 6 months to the day of operation) with ever  
638 increasing accuracy up to and including the day of operations. The data is accessible online by  
639 stakeholders for consultation and update as and when needed, subject to access and security  
640 controls. The elements and formats of the NOP will be established taking into account the  
641 requirements of the users of these plans. It will be possible for them to access and extract data  
642 for selected areas to support their operation and, if required, to create their specific operations  
643 plan. The NOP will also be updated taking into account the actual traffic situation and real time  
644 flow and capacity management. The first steps of the interactive Rolling NOP were already  
645 implemented through the deployment of the NOP portal. Further systems and tools are available  
646 or planned for deployment (between 2010/2013-15) to support the Interactive approach to the  
647 NOP (e.g. NEVAC, ADR, CIAM, LARA...); most of the enablers required are expected to be  
648 gradually deployed over this period. [DCB-0102]



- 649 • Up-to-date and comprehensive capacity data and information from ANSPs and airports is  
 650 available. The process offers an interactive support to stakeholders in the development of  
 651 medium-term plans. Capacity planning information, data and tools are available on-line. Latent  
 652 capacity is used to relieve bottlenecks through consolidated capacity planning process based on  
 653 coordination and network synchronisation of ANSPs/airports enabling the adaptation of the  
 654 capacity delivery where and when required. **[DCB-0201]**
- 655 • The interface between airports and ATFCM is reinforced at the tactical level in order to improve  
 656 predictability of operations through exchanges of accurate departure and arrival times, NMOC  
 657 providing airports with arrival estimates up to 3 hours prior landing (taking account of updated  
 658 information on flight progress) whilst airports provide NMOC with flight data updates before take-  
 659 off. **[DCB-0302]**
- 660 • Key Performance Indicators are developed and monitored to determine how effective ATM is  
 661 meeting users' demand and to act as driver for further improvements of the ATM system. Both  
 662 users and providers are able to assess the actual operation (routes flown, usage of allocated  
 663 airspace, runway utilisation, etc.) against the forecast operation and to assess the adequacy of  
 664 the capacity provision. In particular for RP1, the agreed NM KPIs on en-route delay and flight  
 665 efficiency/route extension will be monitored and reported by NM and PRB **[SDM-0101]**.

666

667 **BN05 - Conflict management and automation**

668 (no airport-related OI step identified in the Integrated Roadmap)

669

670 **EN02 – SWIM**671 **ENB 02.01.01 SWIM**

- 672 • Airspace users, airport and ATM have a consistent view of the filed flight plan including late  
 673 updates until departure. **[IS-0101]**
- 674 • ATFCM is aware of deviations from the flight plan including route changes, diverting flights,  
 675 missing flight plans, change of flight rules (IFR/VFR) or flight type (GAT/OAT). This enables a  
 676 better assessment of the impact of airspace changes on aircraft while in flight, an improved  
 677 monitoring of actual traffic situation and, if necessary, the triggering of revisions to the network  
 678 and airports operations plan. **[IS-0102]**
- 679 • The data required during the pre-flight phase are provided and presented in an integrated and  
 680 flexible manner. The user can access various/information sources such as AIS, ARO, MET and  
 681 ATFM which provide NOTAM, SNOWTAM, MET messages, FPL and related messages or  
 682 network management messages. **[IS-0201]**
- 683 • Compiled ATIS information specifically relevant to the departure, approach and landing phases  
 684 of flight (such as runway in use, current weather, and airport and facility conditions) is transmitted  
 685 to the aircrew by data link. ATIS messages (synthesised voice) can be generated fully  
 686 automatically or at the controller's request. **[IS-0401]**

687

688 **OFA not part of any Business Needs**689 **OFA06.01.01 – CWP Airport**

690 (no airport-related OI step identified in the Integrated Roadmap)

691

692 **OFA06.03.01 – Remote Tower**

693 (no airport-related OI step identified in the Integrated Roadmap)

694

695 **ENB 02.01.02 AIM/MET**

696 (no airport-related OI step identified in the Integrated Roadmap)

697

698 **2.3 New Operating Methods**699 This section describes the new operating methods and lists the airport OI Steps that will be developed  
700 as part of Step 1.701 They have been grouped according to the Business Needs / Operational Focus Area to which they  
702 apply and are ordered alphabetically according to the OI Step code. Some OI Steps listed are  
703 developed outside of WP6, but have an effect on the operations developed within WP6.

704

705 **BN01 - Traffic Synchronization**706 **OFA02.02.04 – Approach Procedures with Vertical Guidance**

- 707 • Advanced RNP transitions with curved procedures connecting directly to the final approach can
- 
- 708 provide improved access in obstacle rich environments and can reduce environmental impact.
- 
- 709
- [AOM-0605]**

710

711 **OFA04.01.01 – Integrated Arrival/Departure Management at Airports**

- 712 • Pre-Departure management has the objective of delivering an optimal traffic flow to the runway.
- 
- 713 Accurate taxi time forecasts provided by route planning are taken into account for TSAT-
- 
- 714 Calculation while the flight is off-block. Pre-Departure sequence (TSAT sequence) is set up by
- 
- 715 Tower Clearance Delivery Controllers who will follow TSAT-window when issuing start-up
- 
- 716 approval.
- [TS-0202]**

- 717 • Integrated Arrival and Departure management aims at increasing throughput and predictability at
- 
- 718 an airport by improved co-ordination between Approach and Tower controllers. Arrival and
- 
- 719 Departure flows to the same runway (or for dependent runways) are integrated by setting up
- 
- 720 fixed arrival-departure pattern for defined periods. The successive pattern might be chosen by
- 
- 721 the operators or provided by an optimization algorithm considering arrival and departure demand.
- 
- 722 Departure flow to the runway is managed by pre-departure sequencing (integrating route
- 
- 723 planning) while arrival flow to the runway is managed by arrival metering.
- [TS-0308]**

724

725 **BN02 - Airport Integration and throughput**726 **OFA01.01.01 – LVPs using GBAS**

- 727 • Use of GBAS CAT II/III based on GPS L1 for precision approaches.
- [AO-0505-A]**

728

729 **OFA01.01.02 – Pilot Enhanced Vision**

- 730 • 'Out of the window' positional awareness is improved through the application of visual
- 
- 731 enhancement technologies thereby reducing the difficulties of transition from instrument to visual
- 
- 732 flight operations.
- [AUO-0403]**

733

734 **OFA01.02.01 – Airport Safety Nets**

735 • The System detects conflicting ATC clearances during runway operations, and non-conformance  
736 to procedures or clearances for traffic on runways, taxiways and in the apron/stand/gate area.  
737 Appropriate alerts are provided to controllers. **[AO-0104-A]**

738 • The System detects potential and actual risk of collision with aircraft and infringement of  
739 restricted or closed areas. The Vehicle Driver is provided with the appropriate alert, either  
740 generated by the on-board system or uplinked from the controller airport safety net. **[AO-0105]**

741 • The runway usage awareness is enhanced thanks to implementation of the Runway Status Light  
742 (RWSL) system (which covers both new procedures and new airfield lights). RWSL is a  
743 surveillance driven automatic system that visually indicates to flight crews and vehicle drivers  
744 when it is unsafe to enter, use or cross a runway, through new airfield lights which can be  
745 composed of Runway Entrance Lights (REL), Take-off Hold Lights (THL) and Runway  
746 Intersection Lights (RIL). **[AO-0209]**

747 • The on-board system detects potential and actual risk of collision with other traffic during runway  
748 operations and provides the Flight Crew with the appropriate alert. **[AUO-0605-A]**

749

750 **OFA01.02.02 – Enhanced Situational Awareness**

751 • Ground Controller Situational Awareness in all Weather Conditions is further enhanced with the  
752 use of ADS-B applications which improve accuracy in target positioning of the traffic within the  
753 controller sector. **[AO-0201-A]**

754

755 **OFA01.03.01 – Enhanced Runway Throughput**

756 • The application of time based wake turbulence radar separation rules on final approach (TBS),  
757 so as to aid towards stabilising the overall time spacing between arrival aircraft. The final  
758 approach controller and the Tower runway controller are to be provided with the necessary TBS  
759 tool support to enable consistent and accurate delivery to the TBS rules on final approach. The  
760 minimum radar separation and runway related spacing constraints will be required to be  
761 respected when applying the TBS rules. **[AO-0303]**

762 • The application of weather dependent separation (WDS) for departures from the runway for the  
763 initial common departure path, through a reduction or a suspension of the wake turbulence  
764 separation, over the duration of identified and stable forecast weather conditions, that either  
765 ensures transport of the wake turbulence out of the path of the follower aircraft, or ensures decay  
766 of the wake turbulence so that it is no longer a hazard to the follower aircraft. **[AO-0304]**

767 • The application (by ATC) of pair wise separation (RECAT 2) for arrivals on final approach, and  
768 for departures from the runway for the initial common departure path, through taking into account  
769 aircraft characteristics of the lead and follower aircraft (such as maximum landing weights and  
770 speed profiles), that impact the strength of the wake generated by the lead aircraft or the  
771 resistance of the follower aircraft to a wake encounter. **[AO-0306]**

772 • The application of weather dependent separation (WDS) for arrivals on final approach, through a  
773 reduction or a suspension of the wake turbulence separation, over the duration of identified and  
774 stable forecast weather conditions, that either ensures transport of the wake turbulence out of the  
775 path of the follower aircraft, or ensures decay of the wake turbulence so that it is no longer a  
776 hazard to the follower aircraft. **[AO-0310]**

777 • Optimised braking to vacate at a pre-selected runway exit by shortening or extending the roll-out  
778 phase. Coordinated with ground ATC through datalink, and based on avionics that controls the  
779 deceleration of the aircraft to the design speed for the selected exit. **[AUO-0703]**

780

781 **OFA04.02.01 – Integrated Surface Management**

782 • The System provides the controller with an operationally-relevant route calculated by minimising  
783 the delay according to planning, ground rules, and potential conflicting situations with other  
784 mobiles. **[AO-0205]**

785 • The system provides to the Vehicle Drivers the display of dynamic traffic context information  
786 including status of runway and taxiways, obstacles, route (potentially by application of an airport  
787 moving map). Ground signs (stop bars, centreline lights, etc.) are triggered automatically  
788 according to the route issued by ATC. **[AO-0206]**

789 • Improved efficiency of surface operations thanks to automated exchange between Vehicle  
790 Drivers and Tower Controllers using datalink for ground-related clearances and information.  
791 **[AO-0215]**

792 • Exchange between Flight Crew and Controller using datalink for start-up/pushback taxi<sup>2</sup> (D-TAXI  
793 services) supported on the airborne side by DCL/ATN, CPDLC/D-TAXI. **[AUO-0308]**

794 • The system provides to the Flight Crew the display of the airport layout (showing taxiways,  
795 runways, fixed obstacles), the own aircraft position and the route to runway or stand. Ground  
796 signs (stop bars, centreline lights, etc.) are triggered automatically according to the route issued  
797 by ATC. **[AUO-0603-A]**

798

799 **OFA05.01.01 – Airport Operations Management**

800 • Maintenance of the evolving content of the Airport Operations Plan (AOP) identifying, as a  
801 minimum:

802 (1) those elements that are common to the Network Operations Plan (NOP) and

803 (2) the procedures to ensure they are effectively shared and commonly updated within a "Rolling  
804 NOP structure".

805 The AOP will optimise the operation of the Airport through time as more accurate information is  
806 made available from the Airspace Users and other Airport stakeholders and share the  
807 information with the NMOC in real time. **[AO-0801]**

808 • Enhancement of the airside process with the inclusion of landside (passenger and baggage flow)  
809 process outputs that can affect ATM performance e.g. through delayed departures.

810 This concept builds on A-CDM to describe the functional and technical requirements for inclusion  
811 of landside processes at an airport in both the planning and execution timeframe. **[AO-0802]**

812 • Improvement of the ATM/airport operations through the integration and monitoring of Airport  
813 Transit Views (Aircraft flows). An Airport Transit View describes the visit of an airframe to an  
814 airport. This includes the connections with inbound-outbound airborne segments (which are parts  
815 of iSBT/iRBT) as well as the main CDM milestones (e.g. TLDT, TIBT, TOBT / TSAT and TTOT).

816 This concept builds on A-CDM to describe the functional and technical requirements for  
817 monitoring of aircraft movements at an airport in both the planning and execution timeframe.

818 **[AO-0803]**

819 • Development of the Airport Operations Performance Management concept. The concept  
820 identifies the functional and technical requirements required to manage the airport process.  
821 Specifically it requires an Impact Assessment of proposed tactical changes to operational inputs  
822 and rules by the Decision Support tools and procedures that facilitate the collaborative decision  
823 making involving all airport stakeholders. **[AO-0804]**

824 • Environmental sustainability restrictions are becoming more and more a significant restriction for  
825 the execution and planning of the business trajectories of aircraft operators. It is in the interest of  
826 all ATM-stakeholders (aircraft operators and airports) to take into account the (typically local)  
827 environmental restrictions in the early phase of flight planning. **[AUO-0801]**

<sup>2</sup> AUO-0308 does not cover the datalink service for negotiation of the runway exit since this is covered by AUO-0703. The OI step description text has been updated here to bring this clarification. A Change Request to the Integrated Roadmap has been raised in parallel and will materialize in DS12 (May 2014).

- 828 • Airport CDM is extended to include interconnected regional airports. Relevant A-CDM airports at  
829 regional level and the Central Flow Management Unit exchange information, especially in  
830 support of improving the estimated time of arrival for all flights bound to the region. [DCB-0304]
- 831 • Pro-actively assess the balance between available airport capacity and scheduled/forecast  
832 demand given the prevailing and/or forecast weather and other operational conditions and pro-  
833 actively make suggestions for runway configuration and capacity distribution according to  
834 priorities of performance management. [DCB-0309]
- 835 • Airport planning is continuously refined with the application of local airport CDM processes. The  
836 overall network planning proposes CTOT / TTA for all regulated flights. For those flights where  
837 the allocated constraints will have a negative impact (e.g. disturbing airport/airline operations),  
838 the Network shall take into account this information in order to possibly re-allocate CTOT / TTA.  
839 This results in an improved efficiency in the management of Airport and ATFCM Plannings  
840 [DCB-0310]

841

842 **BN03 - Moving from Airspace to 4D Trajectory Management**843 **OFA03.01.04 - Business and Mission Trajectory**

- 844 • The current flight plan will first be extended to include flight performance and 4D profile  
845 information. This extended flight plan will then evolve into the initial SBT/SMT (iSBT/iSMT). The  
846 iSBT/iSMT will be a partial implementation of the SBT/SMT, which is the published  
847 business/mission trajectory that is available for collaborative ATM planning purposes. The  
848 iSBT/iSMT will be published when the flight intentions (schedules, airport slots and routing) of the  
849 airspace user have stabilized sufficiently (in the medium-term planning). The iSBT/iSMT will  
850 include all extended flight plan information. The iSBT/iSMT will additionally include a unique flight  
851 identification (GUF). The iSBT/iSMT will be progressively refined with incoming information from  
852 the airspace user, following a layered collaborative ATM planning process, as time moves  
853 towards the execution phase and latest information affecting the flight becomes available. [AUO-  
854 0203-A]
- 855 • The iRBT/iRMT will be the partial implementation of the RB/MT, which is the reference used by  
856 all ATM partners during the flight execution. The iSBT/iSMT will change to the iRBT/iRMT either  
857 at a fixed time before off-block or when a specific A-CDM milestone occurs. The iRBT/iRMT will  
858 include all iSBT/iSMT information. The iRBT/iRMT will contain, among other information, target  
859 times (TTO/TTA). [AUO-0204-A]

860

861 **BN04 - Network Collaborative Management and Dynamic Capacity Balancing**862 **OFA05.03.06 – UDPP**

- 863 • The swapping of regulated flights on departure, on arrival, and en-route, that is already possible  
864 for the flights of the same Airspace User (AU) sharing the same Most Penalising Regulation  
865 (MPR), will be extended to all regulated flights without any constraints due to AU (or MPR if  
866 possible). Changing of flight priority between 2 flights where at least one flight is not regulated  
867 will also be possible. The AUs requests for these changes in flight priority will be introduced at  
868 the initiative of the AUs themselves, of the airport authorities or of the Network Management  
869 function. The Network Management function may propose ATFM slot exchanges that satisfy the  
870 network performance targets. The Network Management function will supervise the swapping or  
871 changing of flight priority requests. [AUO-0101-A]
- 872 • CDM airports will allow the Airspace Users to change among themselves (via the pre-departure  
873 management process) the priority order of flights in the pre-departure sequence. [AUO-0103]

874

875 **OFA05.03.07 – Network Operation Planning**

- 876 • The NOP will be enhanced to achieve collaborative planning with the support of services which  
877 can be automated (B2B services are initial examples). The NOP will provide information on  
878 stakeholders' agreements and related justifications. To enhance the planning process, the NOP  
879 will use available information provided by the airports (available from the AOPs). The NOP will

880 continuously provide up-to-date information on the Network situation. This is especially important  
 881 in the case of crisis. Furthermore, the NOP will provide access to initial network performance  
 882 objectives and support to network performance assessment in post-operations. **[DCB-0103-A]**

883

## 884 **EN02 – SWIM**

### 885 **ENB 02.01.01 SWIM**

886 • SWIM Step 1 includes the provision of the following capabilities: (1) Ground - ground flight  
 887 coordination and transfer functions between en-route systems based on ED-133 flight object  
 888 concept (ATC 2 ATC profile). (2) Business to Business services to share traffic flow management  
 889 information (including the capability to fill and validate flight plans) between the Regional NM /  
 890 AM and APOC, FOC (NMOC B2B Profile) (3) Business to Business services to share  
 891 Aeronautical information between the EAD (as part of Regional NM / AM) and ER-APP-ATC,  
 892 Airport Airside Operations, FOC/WOC (EAD B2B Profile). Swim step 1 also includes the  
 893 provision of new information exchange standards. The three profiles will still use their own  
 894 infrastructures (supervision, security, ..), they are not interoperable. **[IS-0901-A]**

895

## 896 **OFAAs not part of any Business Needs**

### 897 **OFA06.01.01 – CWP Airport**

898 • The integration and exploitation of new ATC functions such as routing, guidance, BTM and alerts,  
 899 with current elements such as surveillance and Electronic Flight strips into an Advanced  
 900 Integrated Controller Working Position (A-ICWP) will result in enhanced situational awareness for  
 901 ATCOs and flight crews, improved safety nets and integrates the Tower with external units such  
 902 as the TMA and the Network. **[AO-0208-A]**

903

### 904 **OFA06.03.01 – Remote Tower**

905 • Aerodrome Control Service or Aerodrome Flight Information Service for an aerodrome is  
 906 provided from a remote location, i.e. not from a control tower local to the aerodrome. The ATCO  
 907 (or AFISO) in this facility performs the remote ATS for the concerned aerodrome<sup>3</sup>. **[SDM-0201]**

908

### 909 **ENB 02.01.02 AIM/MET**

910 • Current meteorological and operational flight information derived from ATIS, METAR and  
 911 NOTAMS/SNOWTAMs, specifically relevant to the departure, approach and landing flight phases  
 912 is transmitted to pilots by data link. The flight crew has real-time access to the relevant airport  
 913 operational parameters applicable to the most critical phases of flight (ATIS, METAR and OFIS).  
 914 **[IS-0402]**

915 • The planning and associated decision making for a multiplicity of considerations in an  
 916 Airport/TMA, En-route and Network operations context will be improved by integrating knowledge  
 917 on the past, current and future state of the atmosphere. The obtained knowledge, translated in  
 918 meteorological (MET) information, is essential in decision making with a 'time to decision'  
 919 of more than 20 minutes (planning). Various stages of enhanced planning will become possible by  
 920 integrating MET information and the associated uncertainty. Consequently, MET information  
 921 supporting (automated) decision making processes involving: the translation of weather into  
 922 system component constraint, the impact of these constraints due to weather on ATM and the  
 923 associated required decision support process and aids. Examples of MET information that qualify  
 924 for its utilisation in a planning decision making environment are enhanced MET information  
 925 services in support of trajectory/flight planning and the en-route re-planning of trajectory/flight.  
 926 This includes information on forecasted meteorological hazards such as icing, Clear Air  
 927 Turbulence (CAT), volcanic ash, etc. and basic parameters such as wind, temperature, humidity

<sup>3</sup> The remote tower concept is not intended to be (fully) implemented at airports with a significant traffic volume and a certain complexity. The thresholds for this have to be defined by the local authority. However some aspects of remote tower might be applicable at other airports (even large and complex ones) as a contingency measure in case of system malfunction at the tower (to be addressed in Step 2).

928 and air pressure. Furthermore, information on the future state of the atmosphere (including the  
929 consequences on low visibility conditions, convective weather, winter conditions) to assess the  
930 Network impact from a MET perspective on a day-1 up to day-7 is included. [MET-0101]  
931

## 932 2.4 Differences between new and previous Operating Methods

933 A range of previous technical and procedural solutions, both ground and airborne, which are part of  
934 the Deployment Baseline (section 2.1) will be superseded by more advanced solutions in Step 1  
935 (section 2.2). In the table below, the Step 1 OI steps, listed in the left column, come as replacement  
936 solutions to previous OI Steps (DB) listed in the right column.

Step 1 OI step		DB OI Step superseded by Step 1 OI step	
AO-0201-A	Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1	AO-0201	Enhanced Ground Controller Situational Awareness in all Weather Conditions
AO-0303	Time Based Separation for Final Approach - full concept	AO-0302	Time Based Separation (TBS) for Arriving Aircraft -Transitional Step
AO-0304	Weather-dependent reductions of Wake Turbulence separations for departure	AO-0301	Crosswind Reduced Separations for Arrivals
AO-0310	Weather-dependent reductions of Wake Turbulence separations for final approach		
AUO-0101-A	ATFM Slot Swapping for Step 1	AUO-0101	ATFM Slot Swapping
IS-0402	Extended provision of Terminal Information using datalink	IS-0401	Automatic Terminal Information Service Provision through Use of Datalink

937 **Table 2-1 DB OI steps superseded by Step 1 OI Steps**

938 A range of technical and procedural solutions, both ground and airborne, implemented as  
939 «intermediate» improvements serving as stepping stones to the final Step 1 state, will be developed  
940 during Step 1, but then superseded by more advanced Step 1 solutions. As a consequence, those  
941 «intermediate» Step 1 OI steps are not referenced in section 2.2 but are shown in the table below  
942 (left column) with their corresponding “more advanced” Step 1 solutions listed in the right column.

“Intermediate” Step 1 OI step		More advanced Step 1 OI step	
AO-0204	Airport Vehicle Driver's Traffic Situational Awareness	AO-0206	Enhanced Guidance Assistance to Airport Vehicle Driver Combined with Routing
AUO-0702	Optimised braking to vacate at a pre-selected runway exit coordinated with Ground ATC by voice	AUO-0703	Optimised braking to vacate at a pre-selected runway exit coordinated with Ground ATC by Datalink

943 **Table 2-2 “Intermediate” Step 1 OI steps superseded by more advanced Step 1 OI Steps**

## 944 3 Operational Environment

945 The objective of this section is to describe the detailed operational environment which forms the  
 946 "airport operational context". In the SESAR research structure, airport operations exist in the following  
 947 ATM phases: Long Term Planning, Medium / Short Term Planning, Execution Phase, including  
 948 Arrival, Turn round and departure, and Post-Operations analysis.

949 This section first describes the operational characteristics of airports with the intent to provide a  
 950 method for categorising airports with respect to future verification / validation activities. Together with  
 951 an indication of traffic characteristics, airport capabilities and aircraft equipage, this section then  
 952 reviews the actors / roles involved in airport operations and their responsibilities.

953 The ATM Master Plan has developed a simplified categorisation to support their work on deployment.  
 954 This can be found in SESAR D02-WPC02- Performance Plan – Airports Classification-00.00.01,  
 955 28/11/2011<sup>[12]</sup>. This identifies four categories of airports determined by the number of hourly  
 956 movements.

### 957 3.1 Operational characteristics

958 The SESAR airport concept will be deployed according to the operational needs at airports throughout  
 959 Europe. However each airport varies significantly according to its configuration, demand  
 960 characteristics and local operational limitations both geographical and environmental/political.

961 This means that validation and/or verification of operational improvements at a specific airport cannot  
 962 simply be extended to other airports. The differences are numerous. For the purpose of comparison  
 963 and projecting validation results at other airports, a set of objective criteria have been defined that will  
 964 allow the 'real' airport(s) used in the validation exercise, to be categorised objectively. This will support  
 965 a realistic generalisation of the results from one particular airport to the overall population of airports  
 966 within the ECAC states.

#### 967 3.1.1 Generic Airport Characteristics

968 **DISCLAIMER:** Airports mentioned in this section are possible examples and purely for indicative  
 969 purposes. The specific category and class of every airport mentioned in the document needs to be  
 970 checked and confirmed by the appropriate airport and/or authority.

971 In principle, thousands of influencing factors on airport operations exist, both internal and external.  
 972 This makes every airport unique. However, there are several key features / factors that shape the  
 973 mental image of an airport. Those key features can be used as means to classify airports in Europe.

974 The key airport features identified are:

- 975 •The function of the airport within the European Network ("Network Function" – coverage and  
 976 importance),
- 977 •The physical layout of the airport ("Layout and Basic Operational Criteria"),
- 978 •The utilisation of available capacity ("Capacity Utilisation"), and
- 979 •The impact of external influences ("External Influencing Factors").

##### 980 3.1.1.1 Category 1, "Network Function"

981 The "Network function" of an airport is an indicator of the impact it may have on both the European Air  
 982 Transport Network and individual Airline Networks in the case of operational disruptions. A larger  
 983 airport acting as a transfer hub for one of the main European airlines will have a larger impact on the  
 984 total network than a small regional airport with only destination / origin traffic.

985 The following airport classification can be distinguished for the category "Network Function":

986



987

Class	Description
1. Intercontinental Hub	Large intercontinental airport acting as a transfer hub for one or more major European airlines with a wide route network spanning to a large number of destinations inside and outside Europe. Examples for this type of airport are: London LHR, Paris CDG, Frankfurt, Amsterdam, Madrid etc.
2. European Hub	Large European airport acting as a transfer hub for at least one European airline with a wide route network encompassing a wide range of European destinations. Only a limited number of destinations outside Europe are served directly from this airport. Examples of this class of airport are: Copenhagen, Helsinki, Vienna, Brussels, Palma, Milan-MXP etc.
3. Primary node	Medium sized airport with a limited hub function and intercontinental P2P connections). Examples of this class of airport are: London-STN, Lyon-Saint Exupéry, Budapest, Warsaw, Athens etc.
4. Secondary Node	An airport with limited or no intercontinental traffic, mainly scheduled connections to the large intercontinental (class 1) or European (class 2 ) hubs, a significant size of charter/leisure operations and acting as a major base for one or more low fare carriers. Examples of this type of airport are: London-LTN, Nuremberg, Gothenburg, Leeds Bradford, Milan-BGY, Rome –CIA, Valencia etc.
5. Third Level node	A regional airport with a limited number of scheduled connections mainly operated by one or two (low fare) carriers. Examples of this class of airport are: Bern, Dortmund, Aarhus, Rotterdam, Girona etc.
6. Fourth Level node <sup>4</sup>	A (regional) airport with only a very few (<10) aircraft movements a day. Examples of this class of airport are: Mora (Sweden), Hof (Germany) etc.
7. General / Business Aviation	An Airport dedicated to General / Business Aviation close to large metropolitan areas. Examples for this class of airports are: Paris LBG, Farnborough, Egelsbach, Copenhagen-Roskilde, Cannes etc.
8. Military / Civil mixed operations	Primarily a military airfield with a (limited) number of civil operations (commercial and/or business aviation). Examples for this class of airports are: Eindhoven, Aalborg etc.
9. Fixed wing / rotorcraft mixed operations	An airport, often of class 3, 4 or 5, with a large portion (> 20%) of the air transport movements performed by Rotorcraft operations . Examples for this class of airports are: Nice, Aberdeen, Stavanger, etc.

Table 3-1: Classes for category 1, “Network Function”

988

989

990 The preceding airport classes are identified based on their significance to the European network and  
 991 to the network of the carriers operating at that airport. Secondary classes could be identified such as  
 992 general aviation aerodromes (green fields) and pure military aerodromes. However their impact on the  
 993 European network, and indeed for the SESAR airport concept, is very limited if not non-existent. For  
 994 this reason those airport classes are excluded.

#### 995 Selection criteria:

996 The following criteria could be used to distinguish between classes:

- 997 • Total passenger numbers;
- 998 • Total aircraft movements;
- 999 • Transfer passenger percentage.

### 1000 3.1.1.2 Category 2, “Layout & Basic Operational Procedures”

1001 Airports can be categorized on their runway – taxiway layout and the associated basic operational  
 1002 procedures. The number of runways, their geometry (parallel or converging / crossing) as well as the  
 1003 connecting taxiway system determines the “basic” runway and ground movement operations. Three  
 1004 types of runway geometry / basic operation have been selected.

- 1005 • Multiple independent runways;
- 1006 • Multiple dependent runways;
- 1007 • Single runway.

<sup>4</sup> It is considered that the ATC services may be provided often by a Remote Tower for these airports.

1008 Multiple runway layouts are numerous; they can be parallel, converging or crossing. For airports with  
 1009 three or more runways it can even be a combination of these. Here the runway combination with the  
 1010 highest capacity prevails where the use of the crossing / converging runway combination is mostly  
 1011 dictated by weather conditions.

1012 Parallel runways, separated at a sufficient distance (more than 1035 meters, ICAO Annex 14) can be  
 1013 operated fully independently. This can either permit the use of segregated mode (one runway  
 1014 dedicated for landings and the other runway dedicated for take-offs) or the use of both runways in  
 1015 mixed mode.

1016 Closely spaced parallel runways (less than 1035 meters separation) and converging / crossing  
 1017 runways are operated dependently. That means that operations on one runway are synchronised with  
 1018 operations on the other (and vice versa). The best in class capacity of dependent runways will be less  
 1019 than the capacity of the same number of independent runways.

1020 A single runway will always be used in mixed mode with both landings and take-offs.

1021 According to the ATM Master Plan, objectives and targets (“Best-in-class”) have been set for the  
 1022 capacity of the following runway layouts and basic operational procedures:

- 1023 • Two (parallel) independent Runways: VMC – 120 mov/hr IMC – 96 mov/hr;
- 1024 • Two (parallel) dependent Runways: VMC – 90 mov/hr IMC – 72 mov/hr;
- 1025 • Single Runway: VMC – 60 mov/hr IMC – 48 mov/hr.

1026 For taxiway systems, two configurations are distinguished,

- 1027 • A complex layout;
- 1028 • A non-complex layout.

1029 Complex taxiway layouts are those where one or more of the following issues apply:

- 1030 • Ground movement traffic in opposing directions takes place on a regular basis;
- 1031 • Crossing of active runways is required;
- 1032 • Congestion at taxiway nodes;
- 1033 • Backtracking on the runway is required.

1034 In the case of backtracking, the airport layout may look simple, comprising a single runway with one  
 1035 or two entries/exits from the runway. However the operations are complex because of the high  
 1036 runway occupancy time caused by backtracking and the dependency between runway operation and  
 1037 ground movement.

1038 An airport with a single runway and a parallel taxiway along the full length of that runway is therefore  
 1039 a non-complex taxiway system, whereas an airport with a single runway having only one entry/exit is  
 1040 classified as a complex layout.

1041 An increasing amount of taxiways does not always result in greater complexity of surface movement  
 1042 operations. It also provides flexibility to the controller in solving congested situations and/or re-  
 1043 sequencing aircraft flows. Complex surface lay-outs provide more routing options.

1044 The following airport classification can be distinguished for the category “Layout & Basic Operational  
 1045 Criteria”

Class	Description
1. Multiple Independent Runways, complex surface layout	An example of this class of airports might be Madrid Barajas
2. Multiple Dependent Runways, complex surface layout <sup>5</sup>	Examples of this class of airports might be London Heathrow, Paris CDG, Frankfurt and Amsterdam
3. Single Runway, complex surface layout	An examples of this class of airports might be London Gatwick
4. Multiple Independent Runways, non-complex surface layout	An example of this class of airports might be Munich
5. Multiple Dependent Runways, non-complex surface layout <sup>3</sup>	Examples of this class of airports might be Hamburg and Hanover
6. Single Runway, non-complex surface layout	Examples of this class of Airports might be Rotterdam, Bremen and Stuttgart

1046 **Table 3-2: Classes for category 2, “Layout & Basic Operational Criteria”**

<sup>5</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.

1047

1048 Differentiation:

1049 The following additional criteria could be used to distinguish between the preceding classes:

- 1050 • Potential go-around conflicts;
- 1051 • Closely spaced parallel, converging and crossing runways;
- 1052 • Potential conflicts with the Final Approach and Take-Off area (FATO) of heli-pads;
- 1053 • Runway crossings by taxiing/towed aircraft;
- 1054 • Backtracking;
- 1055 • Potential surface conflicting situations (opposing traffic, significant amount of towing traffic).

1056 **3.1.1.3 Category 3, “Capacity Utilisation”**

1057 Airports can be distinguished in the way their available capacity is utilised. High utilisation means that  
 1058 the airport is vulnerable to disruptions such as adverse weather conditions. In those cases the impact  
 1059 on the network may be large. Airports with low runway utilisation will have fewer disruptions from  
 1060 capacity reduction due to adverse conditions or other type of disturbances.

1061 The following airport classification can be distinguished for the category “Capacity Utilisation”

Class		Description
1	Highly utilised airports/runways, traffic mix of super-heavy, heavy, medium and light aircraft. More than 90% utilisation during 3 or more peak periods a day.	Examples of this class of airports might be London Heathrow, Amsterdam, Paris CDG, Madrid
2	Highly utilised airports/runways, homogeneous traffic: dominant super-heavy, heavy or medium or light. More than 90% utilisation during 3 or more peak periods a day	Examples of this class of airports might be Barcelona, Palma, Oslo
3	Normally utilised airports/runways. 70 – 90% utilisation during 1 or 2 peak periods a day	Examples of this class of airports might be Düsseldorf, Manchester, Hamburg
4	Low utilised airports/runways less than 70% utilisation during peak periods	Examples of this class of airports might be Ljubljana, Luxembourg, Southampton

1062

Table 3-3: Classes for category 3, “Capacity Utilisation”

1063

1064 Differentiation:

1065 The following additional criteria could be used to distinguish between classes:

- 1066 • Traffic mix (G/H/M/L distribution<sup>6</sup>);
- 1067 • Number and duration of peak periods during the day;
- 1068 • Landing/take-off demand versus available capacity;
- 1069 • Network delay (optional).

1070 **3.1.1.4 Category 4, “External Influencing Factors”**

1071 “External (Environmental) Influencing Factors” can limit airport operations. For example, a significant  
 1072 weather situation, like wind constantly blowing at 90° to the runway, or obstacles such as high  
 1073 buildings or mountains close to the airport will limit operations. Political factors such as country  
 1074 boundaries adjacent to the TMA, military airspaces close by or airspace reservations allocated for  
 1075 military needs can also limit operations. Restrictions on operating hours may also be imposed to  
 1076 restrict the noise exposure of the local community.

<sup>6</sup> G=Super-Heavy, H=Heavy, M=Medium, L=Light

1077 Airports may be constrained by a combination of more than one of the above issues. Frequent bad  
 1078 weather conditions (like fog) may be a big constraint for an airport while political / community  
 1079 influences may not permit the addition of a parallel runway or longer operating hours which could  
 1080 otherwise significantly reduce the impact of bad weather conditions.

1081 The following airport classification has been distinguished for the category “External Influencing  
 1082 Factors”

Class	Description
1. Highly Constrained (Geographical / Weather issues)	Example of this class of airports might be Funchal
2. Highly Constrained (Political / Community issues)	Examples of this class of airports might be Amsterdam, Madrid
3. Moderately Constrained (both Geographical / Weather and Political / Community)	Example of this class of airports might be Cologne
4. Lightly or Unconstrained	

Table 3-4: Classes for category 4, “External Influencing Factors”

1083  
 1084  
 1085

**Selection criteria:**

1086 The following list gives an overview of different factors that may determine the external influences on  
 1087 an airport and its operations:

<p>Weather:</p> <ul style="list-style-type: none"> <li>• Fog (ICAO CAT I/II/IIIa/IIIb/IIIc); of course these categories are not limited to fog situations, as heavy rain or heavy snow fall can also reduce the visibility;</li> <li>• Rain (light, moderate, heavy);</li> <li>• Snow / Ice (light, moderate, heavy) on the ground and/or on aircraft;</li> <li>• Wind (light, moderate, heavy, steady, changing direction, gusts);</li> <li>• Thunderstorm (light, moderate, heavy);</li> <li>• Temperature and barometric pressure;</li> <li>• Volcanic eruption and dispersed ash (a special situation, but as this has occurred twice in the last 13 month and heavily disrupted operations, it is worth mentioning,);</li> <li>• etc.</li> </ul>
<p>Topographical Issues</p> <ul style="list-style-type: none"> <li>• Height above Mean Sea Level;</li> <li>• Obstacles (mountains, buildings, industrial buildings);</li> <li>• Location (close to water, close to obstacles, close to other airports);</li> <li>• etc.</li> </ul>
<p>Political Issues</p> <ul style="list-style-type: none"> <li>• Airport close to country boundary (approach and departure via a second country);</li> <li>• Restricted airspace (military or other reason);</li> <li>• Expansion or opening of a new airport (long term or short term capacity constraints);</li> <li>• etc.</li> </ul>
<p>Community Issues</p> <ul style="list-style-type: none"> <li>• Noise;</li> <li>• Gas and particulate emissions;</li> <li>• Operating hours (limited, restricted or 24 hours);</li> <li>• Expansion of an existing airport;</li> <li>• etc.</li> </ul>

Table 3-5: External Influencing Factors on Airport Operations

1088  
 1089

### 3.1.2 Mapping of Operational categories on the Operational Focus Areas (OFAs)

1090  
 1091

**DISCLAIMER:** The mapping of airports to categories (and thus OFAs) is purely indicative. A dedicated mapping exercise is not the responsibility of a DOD and needs to take place outside 6.2. From this exercise the mapping of some airports may change as the local situation of many airports may not be known centrally or interpreted differently locally. Final applicability of the mapping of airports to categories (and OFAs) needs to be checked and confirmed by the appropriated airport and/or authority

1092  
 1093  
 1094  
 1095  
 1096  
 1097

1098 The approach taken is to provide generic criteria that will allow results from validation and verification  
1099 activities at specific airports to be projected onto other airports within the same category. For each  
1100 OFA the two most significant categories have been assigned. The two other categories may also  
1101 apply but are less dominant.

OFA	OFA description	Network function	Layout & Basic Operational Criteria	Capacity Utilisation	External influences
01.01.01	LVPs Using GBAS	-	Yes	-	Yes
01.01.02	Pilot Enhanced Vision	Yes	-	Yes	-
01.02.01	Airport Safety Nets	-	Yes	-	Yes
01.02.02	Enhanced Situational Awareness	-	Yes	-	Yes
01.03.01	Enhanced Runway Throughput	-	Yes	Yes	Yes
	Vortex				
02.02.04	Approach Procedures with vertical guidance <sup>7</sup>			Yes	Yes
03.01.04	Business and Mission Trajectory	Yes	-	Yes	-
04.01.01	Integrated Arrival/Departure Management at Airports	-	Yes	Yes	-
04.02.01	Integrated Surface Management	Yes	Yes	-	-
05.01.01	Airport Operations Management	Yes	-	Yes	-
05.03.04	Enhanced ATFCM processes	Yes	-	Yes	-
05.03.06	UDPP	Yes	-	Yes	-
05.03.07	Network Operations Planning	Yes	-	Yes	-
06.01.01	CWP Airport	-	Yes	Yes	-
06.03.01	Remote Tower	-	Yes	Yes	-

Table 3-6: Mapping of Categories versus OFAs

1102  
1103 While six different combinations of Airport Classification categories can be distinguished, only five fall  
1104 within the 15 OFAs.

Combinations of Categories allocated to the OFAs:
- Network Function versus Layout & Basic Operational Criteria
- Network Function versus Capacity Utilisation
- Capacity Utilisation versus Layout & Basic Operational Criteria
- External Influences versus Layout & Basic Operational Criteria
- Capacity Utilisation versus External Influences
Combination of Categories NOT allocated to an OFA
- Network Function versus External Influences

Table 3-7: Combinations of Airport Operational Categories

1105  
1106 The following tables show the matrices for each of the five combinations of two categories. Within  
1107 these matrices, example airports are given for each combination of parameter value / classes. These  
1108 are initial recommendations and may be revised in the light of a detailed examination of the OFA and  
1109 the Operational Category as well as by a check and confirmation of the appropriate airport operator  
1110 and/or authority.

1111 The Airports used in the matrices as examples have been identified by the three letter IATA code.  
1112 Translation of the three letter airport codes can be found in Table 3-12.

1113 If a cell is empty then no representative example airport could be identified. Validation / verification  
1114 exercises on this particular combination of parameter values / classes are of no added value.

1115 In cells which include one or a number of airports, validation / verification exercises can add value and  
1116 the results may be usefully projected (within limits) on the other airports mentioned in that cell or those  
1117 with specific features in common.

1118

<sup>7</sup> Even though the majority of the work in this OFA applies to WP5, there is a small part covered by PP6.8.5 (RNP transition to GLS).

	Inter-cont. Hub	European Hub	Primary Node	Second. Node	Third Level Node	Fourth Level Node <sup>8</sup>	General / Buss. Aviation	Mixed Civil / Military	Mixed Fixed wing / rotor-craft <sup>9</sup>
Multiple Ind. runways, complex Surface Layout	MAD, FCO,	PMI							
Multiple Dep. Runways, Complex Surface Layout <sup>10</sup>	LHR, CDG, AMS, FRA, ZRH, IST	CPH, HEL, VIE, BRU, MXP, BCN, ORY, ARN,	BUD, DUS, LIS, TXL, PRG, LYS	SXF, CGN			RKE, LBG		NCE, SVG
Single Runway, Complex Surface Layout	LGW		WAW, OPO, LIS	LTN, LBA, FNC, LCY, OPO					
Multiple Ind runways, non-complex Surface Layout	MUC	OSL	ATH						
Multiple Dep. Runways, non-complex Surface Layout <sup>11</sup>			HAM	HAJ, LEJ					
Single Runway, non-complex Surface Layout			STN, STR, VLC	NUE, GOT, BGY, CIA, SOF, OTP, LUX, CRL, HHN, LIN	DTM, AAR, RTM, GRO, BRE, DRS, LJU	MXX, HOQ	BRN, FAB, QEF	EIN,	BGO, ABZ

Table 3-8: Network Function versus Layout & Basic Operational Criteria

1119  
1120

	Inter-cont. Hub	European Hub	Primary Node	Second. Node	Third Level Node	Fourth Level Node <sup>12</sup>	General / Buss. Aviation	Mixed Civil / Military	Mixed Fixed wing / rotor-craft
Highly Utilised Apt, traffic mix of G, H, M&L	MAD, FCO, LHR, AMS, CDG, FRA, LGW, MUC, ZRH, IST	MXP							

<sup>8</sup> It is considered that a Remote Tower may often provide the ATC services for these airports.

<sup>9</sup> Airports with a mixed Fixed wing / Rotorcraft operation are often a primary, a secondary or a tertiary Node

<sup>10</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.

<sup>11</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.

<sup>12</sup> It is considered that the ATC services may be provided often by a Remote Tower for these airports.

	Inter-cont. Hub	European Hub	Primary Node	Second. Node	Third Level Node	Fourth Level Node <sup>12</sup>	General / Buss. Aviation	Mixed Civil / Military	Mixed Fixed wing / rotor-craft
Highly Utilised Apt. dominant traffic mix of G, H,M or L		ARN, BRU, CPH, PMI, HEL, VIE, PMI, BCN, ORY, OSL	STN, PRG, DUS, LYS						NCE
Normally Utilised Apt		PRG	ATH, HAM, WAW, TXL, LIS, STR	LTN, LIN, LCY, CGN					BGO
Low Utilised Apt.			BUD, VLC	SXF, FNC, LBA, HAJ, NUE, GOT, BGY, CIA, SOF, OTP, LUX, CRL, HHN, OPO	DTM, AAR, RTM, GRO, BRE, LJU	MTX, HOQ	RKE, LBG, BRN, FAB, QEF	EIN	SVG, ABZ

Table 3-9: Network Function versus Capacity Utilisation

1121  
1122

	Highly Utilised Apt, traffic mix of G, H,M&L	Highly Utilised Apt. dominant traffic mix of G, H, M or L	Normally Utilised Apt	Low Utilised Apt.
Multiple Ind. runways, complex Surface Layout	MAD, FCO	PMI		
Multiple Dep. Runways, Complex Surface Layout <sup>13</sup>	CDG, LHR, AMS, ZRH, FRA, MXP, IST	ARN, BRU, PRG, CGN, DUS, CPH, VIE, ORY, HEL, BCN, LYS, NCE		BUD, SXF, LBG, RKE, SVG
Single Runway, Complex Surface Layout	LGW		LCY, LTN, WAW, LIS	FNC, LBA, EIN, OPO
Multiple Ind. runways, non-complex Surface Layout	MUC	OSL	ATH	
Multiple Dep. Runways, non-complex Surface Layout <sup>8</sup>			HAM	LEJ, HAJ
Single Runway, non-complex Surface Layout		STN	LIN, STR, BGO	BRE, NUE, GOT, CIA, LUX, DTM, RTM, DRS, BGY, VLC, LJU, SOF, OTP, CRL, HHN, AAR, GRO, ABZ

Table 3-10: Capacity Utilisation versus Layout & Basic Operational Criteria

1123  
1124

	Highly constrained	Moderately constrained	Lightly constrained
--	--------------------	------------------------	---------------------

<sup>13</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.

Multiple Ind. runways, complex Surface Layout	MAD	FCO	PMI
Multiple Dep. Runways, Complex Surface Layout <sup>14</sup>	CDG, LHR, AMS, ZRH, FRA, ARN, BRU, ORY, LYS, NCE, IST	PRG, CGN, DUS, CPH, MXP, VIE	HEL, BCN, BUD, SXF, SVG
Single Runway, Complex Surface Layout	LGW, LCY	FNC, LIS, LTN, WAW, LBA, EIN	OPO
Multiple Ind. runways, non-complex Surface Layout	MUC	OSL	ATH
Multiple Dep. Runways, non-complex Surface Layout <sup>15</sup>	HAM	LEJ	HAJ
Single Runway, non-complex Surface Layout	LIN	BRE, STR, STN, NUE, GOT, CIA, LUX, DTM, RTM	DRS, BGY, VLC, LJU, SOF, OTP, CRL, HHN, AHR, GRO, BGO, ABZ

Table 3-11: External Influences versus Layout &amp; Basic Operational Criteria

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1126

	Highly constrained	Moderately constrained	Lightly constrained
Highly Utilised Apt, traffic mix of G,H,M&L	MAD, CDG, LHR, AMS, ZRH, FRA, LGW, MUC, IST	FCO, MXP	
Highly Utilised Apt. dominant traffic mix of G,H,M&L	ARN, BRU, ORY, LYS, NCE	PRG, DUS, CPH, STN, VIE, OSL	PMI, HEL, BCN
Normally Utilised Apt	HAM, LCY, LIN,	STR, LTN, WAW, LIS, CGN	ATH, BGO
Low Utilised Apt.		FNC, LEJ, BRE, LBA, NUE, GOT, CIA, LUX, DTM, RTM, EIN	HAI, DRS, OPO, BUD, SXF, HAJ, BGY, VLC, LJU, SOF, OTP, CRL, HHN, AHR, GRO, SVG, ABZ

Table 3-12: External Influences versus Capacity Utilisation

1127

1128

The table below shows the translation of IATA code to City / airport name.

CODE	CITY	AIRPORT NAME	CODE	CITY	AIRPORT NAME
AAR	Aarhus	Tirstrup	LBG	Paris	Paris - Le Bourget
ABZ	Aberdeen	Dyce	LCY	London	London City
AMS	Amsterdam	Schiphol	LEJ	Leipzig	Leipzig / Halle
ARN	Stockholm	Stockholm – Arlanda	LGW	London	Gatwick
ATH	Athens	Hellenicon	LHR	London	Heathrow
BCN	Barcelona	Barcelona-El Prat	LIN	Milan	Linate
BGO	Bergen	Flesland	LIS	Lisbon	Portela de Sacavem
BGY	Bergamo	Orio al Serio	LJU	Ljubljana	Ljub jana-Brnik
BRE	Bremen	Bremen (Neueland)	LTN	London	Luton
BRN	Bern	Belp	LUX	Luxembourg	Findel
BRU	Brussels	National	LYS	Lyon	Lyon – Saint Exupéry
BUD	Budapest	Ferihegy	MAD	Madrid	Madrid-Barajas
CDG	Paris	Charles de Gaulle	MUC	Munich	Munchen
CEQ	Cannes	Mandelieu	MPX	Milan	Milan – Malpensa
CGN	Koln	Cologne (Koeln)-Bonn	MXM	Mora (Sweden)	
CIA	Rome	Rome-Ciampino	NCE	Nice	Cote d'Azur
CPH	Copenhagen	Kastrup	NUE	Nürnberg	Nürnberg (Nuremberg)
CRL	Charleroi	Charleroi Brussels Sth	OPO	Porto/Oporto	Dr F. Sa. Ceineiro
DRS	Dresden		ORY	Paris	Orly
DTM	Dortmund		OSL	Oslo	Oslo-Gardermoen
DUS	Dusseldorf	Dusseldorf (Rhein-Rhur)	OTP	Bucharest	Otopeni

<sup>14</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.

<sup>15</sup> Dependent Runways Class includes closely spaced parallel, converging and crossing runways.



CODE	CITY	AIRPORT NAME	CODE	CITY	AIRPORT NAME
EIN	Eindhoven		PMI	Palma	Palma de Mallorca
FAB	Farnborough		PRG	Prague	Ruzyně
FCO	Rome	Rome-Fiumicino	QEF	Egelsbach	
FNC	Funchal	Santa Cruz Madeira	RKE	Copenhagen	Roskilde
FRA	Frankfurt	Frankfurt Main	RTM	Rotterdam	
GRO	Girona	Girona-Costa Brava	SOF	Sofia	International
GOT	Goteborg	Landvetter	STN	London	Stansted
HAN	Hanover	Hanover (Langenhagen)	STR	Stuttgart	Stuttgart (Echterdingen)
HAM	Hamburg	Hamburg (Fuhlsbüttel)	SVG	Stavanger	Sola
HEL	Helsinki	Vantaa	SXF	Berlin-	Berlin (Schoenefeld)
HHN	Hahn	Frankfurt-Hahn	TXL	Berlin	Berlin (Tegel)
HOQ	Hof (Germany)		VIE	Vienna	Schwechat
IST	Istanbul	Ataturk	VLC	Valencia	Valencia
LBA	Leeds/Bradford		WAW	Warsaw	Okecie

1129 **Table 3-12: Mapping of IATA codes for Airports cited in the above tables**1130 **3.1.3 Traffic Characteristics**

1131 The traffic volume and growth forecast applicable to the overall European Airspace does not provide  
 1132 any specific information for the development of traffic at a specific airport. As mentioned before, there  
 1133 are numerous differences between airports, and the specific differences in growth in traffic volume or  
 1134 change in traffic mix over time are examples.

1135 Traffic volume ranges from several hundred (commercial) annual movements for the very small  
 1136 airports to almost two thousand daily commercial movements. An average number of movements or a  
 1137 total (cumulative) number of movements for all European airports is therefore not applicable for a  
 1138 local situation.

1139 The same is the case for traffic mix in the context of the distinction between Super Heavy, Heavy,  
 1140 Medium and Light (ICAO classes). The percentage distribution between these four classes is different  
 1141 for every airport and in fact only really significant to traffic management if the airport operates at, or  
 1142 close to, runway capacity. The SH/H/M/L distribution determines the in-trail separation to be used on  
 1143 the approach, landing, take-off and climb phases in order to minimise Wake Turbulence incidents.  
 1144 Even when applied for safety reasons it does not determine the practical capacity of an airport which  
 1145 operates at less than 50% of its theoretical capacity.

1146 Based on the Generic Airport Characteristics Category 1 - "Network Functions", an approximate  
 1147 indication can be given on traffic volume and traffic mix. It must be stressed that it is not more than  
 1148 just an indication and deviations from this categorisation will exist.

Airport Category (network function classes see table 3-1)	Indicative Annual Movements <sup>16,17</sup> (total of arrivals AND departures)	G/H/M/L mix
Intercontinental Hub	300.000 +	>15% Super Heavy-Heavy <1% Light
European Hub	150.000 – 300.000	<15% Super Heavy-Heavy 10-20% Light
Primary Node	75.000 – 150.000	< 5% Super Heavy-Heavy 20-30% Light
Secondary Node	30.000 – 75.000	< 1% Super Heavy-Heavy >30% Light
Third Level Node	5000 – 30.000	No Super Heavy-Heavy > 40% Light
Fourth Level Node	< 5000	No Super Heavy-Heavy > 90% Light
General / Business Aviation	A few hundred – 80.000	No Super Heavy-Heavy > 90% Light
Military / Civil Mixed Ops	< 30.000	> 50% military ops
Fixed wing / rotorcraft mixed operations	< 150.000	> 20% Rotorcraft Ops

1149 **Table 3-13: Traffic Volume and Traffic Mix for Different Categories of Airports**

1150

1151 Several studies, e.g. "EUROCONTROL Challenges of Growth 2013" [10] show that in the future many  
 1152 airports will shift between airport categories. Secondary Nodes may become Primary nodes,

<sup>16</sup> Airports measure activity in movements which can be a landing or a take-off. The rest of the ATM world deals with flights where each flight consists of two movements (a take-off and a landing).

<sup>17</sup> Number of movements given in this column includes both fixed-wing aircraft and rotorcraft operations. These values are indicative and should not be used as a strict limit for classifying airports.

1153 European Hubs may become Intercontinental Hubs. Military aerodromes with mixed military / civil use  
 1154 may become fully dedicated to civil operations and may serve as tertiary or even secondary nodes to  
 1155 relieve the larger airports.

### 1156 3.1.4 Infrastructure Characteristics

#### 1157 3.1.4.1 Airport (ground) Equipment

1158 This section identifies the technical basis for characterising the airport infrastructure. The  
 1159 implementation rate at a particular airport is hard to determine without insight into the local cost  
 1160 benefit analysis. Incentives may be necessary to increase implementation to the minimum level at  
 1161 which the expected benefits to the overall ATM system become achievable.

1162 In the table below, an indication is given of implementation at airports with an estimated level of  
 1163 confidence, based on the knowledge at the time when this document is issued and provides some  
 1164 possible trends for the future.

Airport Equipage	Current	Trend
Surveillance Systems (multi-lateration)	High (Airport classes 1 – 2) Low (Airport classes 3 – 6)	=
Surveillance Systems ADS-B	Low	+
AMAN/DMAN	High (Airport classes 1 – 2) Low (Airport classes 3 – 6)	+
A-SMGCS (level 4)	High (Airport classes 1 – 2) Low (Airport classes 3 – 6)	+
GNSS / GBAS / SBAS	Low	+
MLS	Low	-
ILS	High	=
Datalink (CPDLC)	Medium	+
A-CDM DB	High (Airport classes 1 – 2) Low (Airport classes 3 – 6)	+
SWIM	Low	+
AOP, APOC, DCB	Low	+
DME	High	-
NDB, VOR	High	-

1165 **Table 3-14: Airport Equipage Rates**

#### 1166 3.1.4.2 Aircraft (airborne) Equipment

1167 This section identifies the aircraft technology that impacts the airport operation. The implementation  
 1168 rate of aircraft technology that brings benefits to airport operations is hard to determine as  
 1169 implementation strongly depends on the associated cost benefit to the airline. This will be influenced  
 1170 by such factors as the retrofit cost and the expected future life of the airframe. Scheduled, low cost  
 1171 and charter airlines may differ substantially in their business models. Incentives may be necessary in  
 1172 increasing implementation to the minimum level at which the expected benefits to the ATM system  
 1173 becomes achievable.

1174 In the table below an indication is given of on-board implementation, based on the knowledge with a  
 1175 confidence level at the time when this document is issued and provides some possible trends for the  
 1176 future.

Aircraft Equipage	Current	Trend
ADS- B out	High	+
ADS- B in / ATSAW	??	??
ATSA-SURF	??	??
Optimised Braking (e.g. BTv)	Low	+
CPDLC / D-TAXI	Low	+
GNSS / GBAS Cat II/III	Medium	+
GNSS / SBAS	Low	+

Aircraft Equipage	Current	Trend
MLS	Low	-
ILS	Low	=
E&SV/HUD	High	+
Electronic Flight Bag	Low	+
VHF-RT	Medium	=

Table 3-15: Aircraft Equipage Rates

1177

1178 “??” means there is no reliable information about present or expected status.

1179 

### 3.1.5 Weather Characteristics

1180 Weather conditions have a significant impact on the airport operational performance. Operational  
 1181 improvements must therefore be considered in both good and degraded weather conditions as some  
 1182 improvements may only provide benefits during specific conditions. The following three basic weather  
 1183 categories have been distinguished for an airport:

- 1184 • **Nominal** weather describes conditions in which the airport operates in more than 90% of time and  
 1185 which form the basis of the declared capacity for scheduling purposes. Use of Nominal conditions  
 1186 in the scheduling round may differ for summer and winter seasons. Nominal conditions translate  
 1187 into conditions such as no wind, no snow, no visibility constraints etc.
- 1188 • **Adverse** weather describes degraded conditions within the operational envelope of the airport,  
 1189 which have a significant negative impact on operations unless an appropriate response is  
 1190 organised; adverse weather conditions may be reduced visibility conditions (e.g. Cat II) or strong  
 1191 and gusting wind.
- 1192 • **Disruptive** weather describes adverse conditions which are generally rare and would have a  
 1193 severe impact on airport performance. The airport cannot be expected to provide resources to  
 1194 mitigate such conditions e.g. snow at a Mediterranean airport.

1195 The table below gives the characteristics for the categories of **Nominal** and the typical **Adverse**  
 1196 conditions which have a negative impact on operations at airports. Coordination with primary project  
 1197 6.5.5 may further detail this table and/or adjust where necessary.

Weather Constraint	Nominal Conditions	Typical Adverse Conditions	Comments
Visibility	More than 1,500 m	Less than 550 m	Visibility Condition 2 <sup>18</sup>
Cloud Base	More than 1,500 ft	Less than 200 ft	
Wind Intensity and Direction	Less than 15 kt	More than: <ul style="list-style-type: none"> <li>• 15 kt head</li> <li>• 30 kt cross</li> </ul>	Head winds reduce the arrival stream capacity for distance based separation. The limits on tail winds will depend on runway length Cross wind of 5 kts will reduce arrival stream capacity in order to increase distance to cater for standing wake turbulence over the touchdown area and on last part of final approach.
Wind gusts	No gusting	Gusting	Cross wind gust characteristics impact runway use (runway selection, in-trial separations)
Icing conditions	Above +3 deg C, no moisture	Below +3 deg C	Some aircraft might experience clear ice conditions in high humidity with cold soaked within temperatures up to + 15 deg. C. Engine anti-ice is for some aircrafts used in temperatures up to + 10 deg. C with dew point spread of 3 deg C or less.
Precipitation	No precipitation, No standing water on the runway → Runway braking conditions Good	Heavy rain, standing water on the runway → Runway braking conditions Medium to Poor	The amount of standing water will negatively impact the Runway braking conditions.

<sup>18</sup> ICAO (Manual on A-SMGCS doc 9830) Visibility sufficient for the pilot to taxi and to avoid collision with other traffic on taxiways and at intersections by visual reference, but insufficient for personnel of control units to exercise control over all traffic on the basis of visual surveillance

Weather Constraint	Nominal Conditions	Typical Adverse Conditions	Comments
Snow/slush/ice	No snow, slush or ice on the runway → Runway braking conditions Good	Snow, slush or ice on the runway → Runway braking conditions Medium to Poor	
Duration of weather events	Less than 15 minutes	15 minutes or more	
Thunderstorm / lightning	No occurrence	Within 5 km of airport or on arrival / departure paths	Within 5 km of airport may result in the temporary halt of aircraft handling (e.g. fuelling) at the aircraft stand. On arrival / departure path may result in runway changes or temporary halt of runway operations.

Table 3-16: Weather Categories

1198

1199 A further specification to characterise visibility might be applicable where Runway Visible Range is  
1200 used as the metric.

Category	Landing Decision Height (DH)	Runway Visual Range
1	DH ≥ 200 ft	≥ 550 m
2	100 ft ≤ DH < 200 ft	≥ 300 m
3a	0 ft ≤ DH < 100 ft	≥ 200 m
3b	0 ft ≤ DH < 50 ft	≥ 200 m
3c	DH = 0 ft	0 m

Table 3-17: Low Visibility Landing Minima

1201

1202 In some cases, the operational improvement is developed to provide its principal benefit in specific  
1203 adverse conditions. If these conditions are significant for the airport validation site, these conditions  
1204 should be considered within the operational envelope of the airport validation exercises / activities.

## 1205 3.2 Roles and Responsibilities

1206 A summary of the roles and responsibilities is provided here. The reader should refer to the "SESAR–  
1207 D66-B4.2 – SESAR Concept of Operations Step 1 ed 2013 – 01.01.00-22/11/2013" [11] and the  
1208 "DEL-06.05.04 D08\_OFA050101\_OSED 00.02.02" [13] deliverables for more detailed information.  
1209 Where WP6.2 has recommended some changes to the role granularity and their descriptions, these  
1210 are provided as footnotes.

1211 The roles and responsibilities related to airport operations are presented in table 3-19. The precise  
1212 allocation of roles to actors or business units will depend on the operational and business needs of  
1213 the stakeholders at the individual airport.

1214

1215 Some specific roles might be combined and performed by a single individual depending on local  
1216 conditions. For example, the roles and responsibilities of the Tower Clearance Delivery Controller, the  
1217 Tower Ground Controller and Tower Runway Controller might well be combined.

1218 In other cases some specific roles and related responsibilities might be outsourced to other actors  
1219 within the airport operational environment. The roles of Stand Planner and Apron Manager are often  
1220 performed by one or more dedicated airline and/or ground handling agents.

1221 However it is important to note that, independently of the precise roles allocated to the airport actors,  
1222 the airport authority will always be obliged to operate the airfield according to the conditions of the  
1223 licence.

1224

Role Name	Summary of Responsibility
<b>Airspace Users Operations (AUO)</b>	
<b>Flight Crew</b>	The Flight Crew remains ultimately responsible for the safe and orderly operation of the flight in compliance with the ICAO Rules of the Air, other relevant ICAO and CAA/EASA provisions, and within airline standard operating procedures. It ensures that the aircraft operates in accordance with ATC clearances and with the agreed Reference Business Trajectory.

Role Name	Summary of Responsibility
<b>Airline Operations and Control Centre (AOC)<sup>19</sup></b>	The Airline Operations and Control Centre is an organisational unit of an airline and is usually run by a variety of professionals from different areas. It hosts the roles of Flight Dispatch, Slot Management and Strategic & CDM Management, thereby managing the operations of the Airline and implementing the flight programme. The AOC (flight Dispatch) is in charge of the iSBT and the iteration to integrate ATM constraints.
<b>Flight Dispatcher</b>	The Flight Dispatcher is an actor included in the Airline Operations and Control Centre and is responsible for planning and monitoring the progress of a flight.
<b>Slot Manager</b>	The Slot Manager is an actor included in the Airline Operations and Control Centre and is responsible for the day to day management of all slot restricted airports within the network of the specific Airspace User. The Slot Manager communicates / coordinates with the Slot Coordinator of the relevant slot restricted airports.
<b>Strategic and CDM manager</b>	The Strategic / CDM Manager is an actor included in the Airline Operations Centre and is responsible for the overall management of the Airspace Users daily operations and the initiation or / participation in CDM processes with concerned partners to resolve potential and existing issues
<b>Flight Schedule Planner</b>	The Flight Schedule Department of an Airspace User schedules their flight programme for each subsequent season during the long-term planning phase. The output of the process in Trajectory Management terms is the Business development Trajectory (BDT). The flight plan / iSBT schedulers take part in the IATA Schedules Conferences and create their Flight Schedule based on the business strategy and management objectives of the airline as well as aircraft and flight crew resources.
<b>Ground Handling Agent<sup>20</sup></b>	The Ground Handling Agent has the role to execute the aircraft turn round agreements established with the Aircraft Operators and is responsible for the turn round of all arriving aircraft. Ground Handling covers a complex series of processes that are required to separate an aircraft from its load (passengers, baggage, cargo and mail) on arrival and combine it with its load prior to departure.
<b>De-icing Agent</b>	The specific responsibility for the De-icing Agent is to ensure that the departing aircraft is free of snow and ice. The main interactions of the De-icing Agent are with the Flight crew to communicate the point in time for start of holdover time as well as with the Apron Manager for stand de-icing and with the Tower Ground Controller for remote de-icing.
<b>Airport Operations (APO)</b>	
<b>Airport Operator</b>	The Airport Operator is responsible for safe operations at the airport. This includes the physical conditions of the runways, taxiways, aprons, terminal facilities and security at the airport as well as creating and maintaining a good relationship with local / national authorities and neighbouring communities. In also includes assurance that the scale of equipment and facilities provided are adequate for the activities which are expected to take place at that Airport, as well as provision of staff that are competent and where necessary, suitably qualified (licensing of vehicles and companies on airside).
<b>Airport Duty Officer</b>	The airport duty officer is the manager responsible for the daily operations, entitled by the airport operator, in charge of assuring that the airport is operated in accordance with its national licensing conditions and international regulations. <u>Other responsibilities:</u> <ul style="list-style-type: none"> <li>Changes to the airport infrastructure, including the manoeuvring area under the delegated authority of the Tower Supervisor.</li> <li>Ensuring that the best interest of passengers and airlines are met.</li> </ul>
<b>Airside Operations Control Centre<sup>21</sup></b>	The Airside Operations Control Centre is the central organisational unit responsible for airport airside operations. In addition, the airside Operations Centre is responsible for the on-time provision of resources like aircraft parking stands, gates, busses etc.

<sup>19</sup> The Airline Operations and Control centre (AOC) is often referred to as Flight Operations Centre (FOC). The term FOC has been adapted in the CONOPS and ADD.

<sup>20</sup> The term Fixed Based Operator (FBO) is often used by Business Aviation as their ground handling service provider.

<sup>21</sup> The Airside Operations Centre must not be mistaken with the APOC (Airport Operations Centre). The APOC will be the operational management structure that permits relevant airport actors to have a common operational overview and to communicate, coordinate and collaboratively decide on the progress of present and near term airport operations.

Role Name	Summary of Responsibility
<b>Airport Slot Coordinator</b>	The Airport Slot Coordinator's role in ATM is three-fold: 1.To prepare the allocation of airport slots to Aircraft Operators wanting to operate from/to a fully coordinated airport on a seasonal basis, in a neutral, non-discriminatory and transparent way. This responsibility occurs during the Long-term Planning phase. 2.To facilitate the operations of Aircraft Operators at schedule facilitated airports. The corresponding responsibility (Airport Slot Negotiation) is to negotiate with the Aircraft Operators the allocation of airport slots in accordance with the rules and regulations and to define the airport slot allocation plan. This responsibility occurs during all phases. 3.To monitor the use of airport slots and adherence of Aircraft Operators to allocated schedules. The corresponding responsibility (Airport Slot Monitoring) is to monitor that the utilisation of airport slots by the Aircraft Operators is in accordance with the airport slot allocation plan. This responsibility occurs during the Execution phase.
<b>Stand Planner</b>	The Stand Planner has the role to of assigning flights/aircraft to their stands on a given airport, taking into account inter alia: aircraft type, aircraft load (e.g. passenger vs. cargo), gate assignment to airlines, origin/destination of flight (e.g. Schengen, international, etc...). The Stand Planner modifies the plan dynamically to comply with real time constraints (stand usage conflicts, stand out-of-service etc.). The stand plan is generated during the medium/short-term phase and is iterated up to and including the execution phase.
<b>Apron Manager</b>	The Apron Manager is responsible for guidance of aircraft to and from the stands (e.g. providing push-back approval), ensuring the safe and efficient movement of aircraft and vehicles within his area of responsibility according to local procedures. The Apron Manager also maintains close coordination with Tower Ground Controller on planned aircraft movements. Normally, control of the activities and the movement of aircraft and vehicles rest with ATC with respect to the manoeuvring area. In the case of aprons, such responsibility sometimes rests with the apron management.
<b>Air Navigation Service Provider (ANSP)</b>	
<b>Local ANSP (ATC provider)</b>	Provides operational targets, thresholds, rules, etc. for the performance baseline and maintains the system supporting the AOP. Where airport operators may not have the competence to assess the airside capacity (runway and manoeuvring area) and the immediate constraints within the TMA, the Air Traffic Service Operations (ANSP) may provide guidance to the airport operator in the context of runway and manoeuvring area capacity to assist them in the overall capacity declaration.
<b>Executive Controller</b>	The Executive Controller is part of the controller team providing Air Traffic Service (ATS) to designated area (e.g. control sector, multi sector area). He is responsible for the safe and expeditious flow of all flights operating within his area of responsibility. His principal tasks are to separate and sequence known flights operating within his area of responsibility and to issue instructions to pilots for conflict resolution and segregated airspace circumnavigation. Additionally, he monitors the trajectory (4D and 3D) of aircraft according to the clearance they have received. He is assisted in these tasks by automated tools for conflict detection and resolution, trajectory monitoring and area proximity warning (APW). The responsibilities of the Executive Controller are focused on the traffic situation, as displayed at the Controller Working Position (CWP), and are very much related to task sharing arrangements within the sector team.
<b>ACC/Approach Supervisor</b>	The ACC/Approach Supervisor is responsible for the general management of all activities in the Operations Room. He decides on staffing and manning of controller working positions in accordance with expected traffic demand.
<b>Tower Clearance Delivery Controller</b>	The Tower Clearance Delivery Controller is part of the controller team responsible for providing Air Traffic Service (ATS) at controlled aerodromes. He is responsible for verification of Flight data (e.g. FPL, CTOT, Stand, TSAT, etc.), delivery of ATC Clearance (Departure Clearance) and Start Up Approval. His main task is to provide the Flight crew its departure clearance (which consists of information like, clearance limit, departure procedure, route and altitude information, communication frequency and transponder code). The Tower Clearance Delivery Controller also provides the flight crew with start-up information (TSAT). He is assisted by a departure management system (DMAN)
<b>Tower Ground Controller</b>	The Tower Ground Controller is part of the controller team responsible for providing Air Traffic Service (ATS) at controlled aerodromes. His main task is the provision of ATS to aircraft and vehicles on the manoeuvring area. The TWR Ground Controller must also ensure that airport maintenance vehicles and manoeuvring aircraft are separated. He will be assisted by an advanced surface movement guidance and control system (A-SMGCS).

Role Name	Summary of Responsibility
<b>Tower Runway Controller</b>	The Tower Runway Controller is part of the controller team responsible for providing Air Traffic Service (ATS) at controlled aerodromes. He is responsible for the provision of air traffic services to aircraft within the control zone, or otherwise operating in the vicinity of controlled aerodromes (unless transferred to Approach Control/ACC, or to the Tower Ground Controller), by issuing clearances, instructions and permission to aircraft, vehicles and persons as required for the safe and efficient flow of traffic. The Tower Runway Controller will be assisted by arrival (AMAN), departure (DMAN) and surface (A-SMGCS) management systems, where available.
<b>Airport Tower Supervisor</b>	The Airport Tower Supervisor is responsible for the safe and efficient provision of air traffic services by the Tower crew. He decides on staffing and manning of controller working positions in accordance with expected traffic demand. He represents the Tower when coordinating with the Airport Operator on operational issues. Other general tasks: <ul style="list-style-type: none"> <li>• Maintains close liaison with the Airport Operator with respect to the daily inspection of the movement area, the aerodrome lighting system, the marking of obstructions, snow clearance etc.</li> <li>• Coordinates with the Airport Operator regarding traffic emergencies/incidents on the movement area.</li> <li>• Implements and discontinues adverse conditions operations (e.g. low visibility operations / CAT II or CAT III) after liaison with Airport Operator and ACC/Approach Supervisors.</li> </ul>
<b>Local Capacity Manager</b>	The Air Navigation Service Providers perform their own day to day local capacity planning coordinated with the Network Management function. Local Capacity Management is a planning role, which contributes to the sub-regional (e.g. FAB) capacity planning.
<b>Aerodrome Flight Information Service Officer (AFISO)</b>	A properly trained person; competent, duly authorized and, if necessary, licensed to provide aerodrome flight information service.
<b>Network Operations</b>	
<b>Network Manager (NM)</b>	The Network Manager acts as a catalyst and facilitator for efficient overall network management by all ATM actors. In the Execution Phase the Network Manager assures the stability of the NOP, reacting to unexpected events, which impact overall network performance. Such unusual meteorological conditions imply loss of significant assets (e.g. runways, airports), among other means. Activating pre-agreed scenarios will enable the Network Manager to restore Network stability.
<b>Other</b>	
<b>Airport Operations Centre (APOC)</b>	An operational management structure that permits relevant airport stakeholders to have a common operational overview and to communicate, coordinate and collaboratively decide on the progress of present and near term airport operations. The APOC hosts the roles of APOC Supervisor and Airport CDM Project Manager.
<b>APOC Supervisor</b>	The APOC supervisor (short term and execution phases) will liaise with all APOC participants for the purpose of coordination and arbitration between actors in the management of the Airport Operations Plan (AOP). He will act as a final decision maker in case of issues for which no consensus has been reached. The following roles and responsibilities are identified: <ul style="list-style-type: none"> <li>• Liaison between airport operations and Network,</li> <li>• Liaison between airport stakeholders,</li> <li>• Ensures that total airport overview and information is available to all relevant stakeholders,</li> <li>• Coordinate with the relevant AOP stakeholders on the feasibility of specific airport scenario's,</li> <li>• Ensures that agreed actions are taken by the appropriate stakeholder(s),</li> <li>• Monitors that expected benefits from agreed actions are reached and coordinates any new operational measure if appropriate,</li> <li>• Acts as arbitrator in case a mutually agreed decision cannot be made in time,</li> </ul> Updates the AOP with information within the AOP sphere of responsibility.
<b>Airport Performance Board (APB)</b>	The Airport Performance Board (APB) is made up of board level (i.e. Strategic) representatives from the various airport stakeholders' organisations. The representatives must have the ability to agree to performance decisions for the airport operation and accept that the collaborative result may or may-not equal strategic agreements between individual stakeholders.

Role Name	Summary of Responsibility
<b>Operational Steering Board (OSB)</b>	The Operational Steering Board (OSB) is made up of operational based managers/representatives from the airport stakeholders' organisations and will meet on a regular basis (e.g. monthly) or as it is deemed necessary by the local airport. The Operational Steering Board (OSB) will use the high level (Strategic) agreed parameters from the Airport Performance Board (APB) and extend this to define performance metrics to be measured, the performance levels (thresholds) against which warnings / alerts are generated and the target values for the KPI/DPI included in the Current Airport Performance Framework.
<b>Vehicle Driver<sup>22</sup></b>	The Vehicle Driver is the one operating on the airport manoeuvring area (i.e. beyond the apron) and as such is licensed by the Airport Operator. The single main responsibility of the Vehicle Driver is to ensure the safe and efficient movement of his assigned vehicle on the airport manoeuvring area.
<b>Meteorological services (MET)</b>	Presents available weather data (observations and forecasts) to be selected as specific fields in the AOP by the relevant stakeholders at the airport.

**Table 3-18: Roles and Responsibilities at the Airport**

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1227

### Systems

1228

Table 3-18 describes only human actors, but not systems. For the modelling of the scenarios, systems are required, for this reason the following system is defined:

1229

1230

- **ATM System**

1231

SESAR WPB4.3; A collection of ATM components organised to accomplish a specific ATM function or set of ATM functions.

1232

1233

## 3.3 Constraints

1234

Military activity, ATC workload and traffic density could be a subject to airspace constraints that impact airport ground operations.

1235

<sup>22</sup> Vehicle Drivers are employees of many of the organisations, performing activities at the airside part of the airport. These activities range from aircraft ground handling, aircraft de-icing to airport infrastructure maintenance and airside operations (bird-control, snow clearing, Follow me etc.).



1236 **4 Operational Scenarios / Use Cases**

1237 **4.1 Operational Scenario Hierarchy**

1238 As illustrated by the figure below, 3 types of operational scenarios ranging from high-level to very  
 1239 detailed scenarios can be found in the various SESAR concept documents.

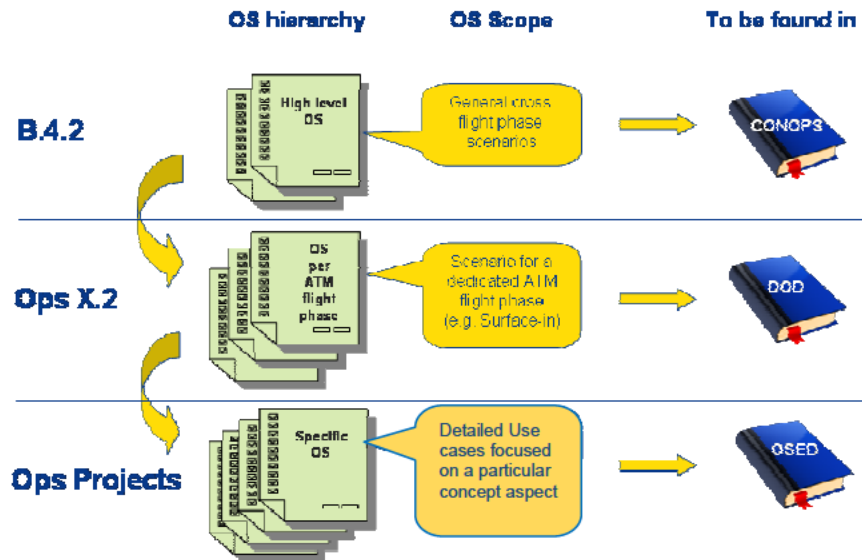


Figure 4-1: The Operational Scenario Hierarchy

1240

1241

1242

1243 The X.2 Work Packages are then responsible for the production and maintenance of “Operational  
 1244 Scenarios per ATM flight phase”.

1245 **4.2 Operational Scenario per ATM Phase**

1246 The level of specialisation of the operational scenarios found in the DOD is defined according to ATM  
 1247 phases.

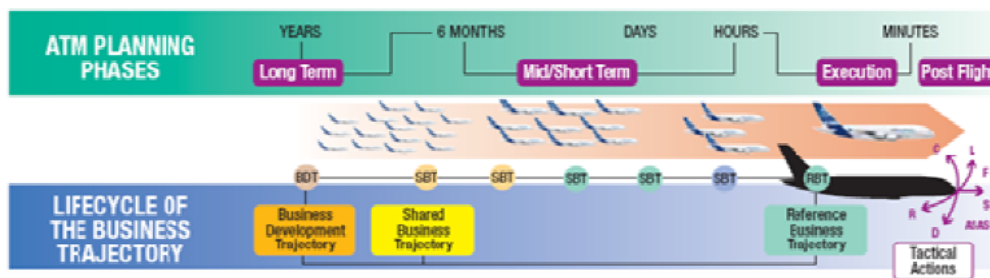


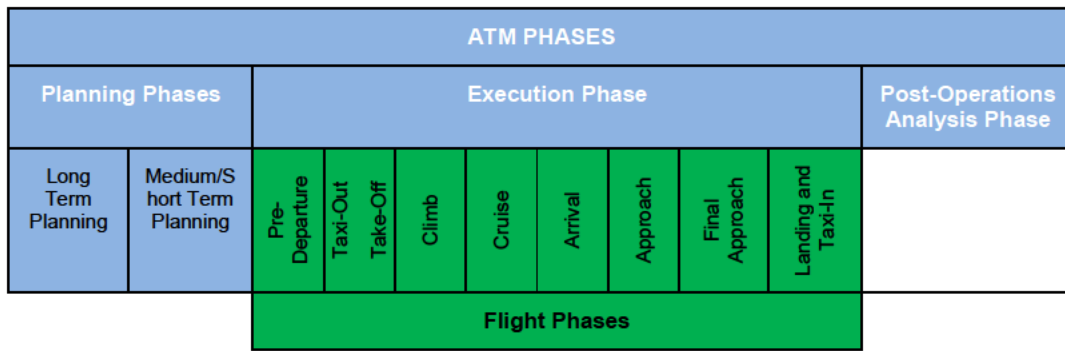
Figure 4-2: Life Cycle of a Business Trajectory compared to the ATM flight phases

1248

1249

1250 With reference to " SESAR– D66-B4.2 – SESAR Concept of Operations Step 1 ed. 2013 – 01.01.00-  
 1251 22/11/2013" [11], the Execution Phase is divided in several segments corresponding to the Flight  
 1252 Phases; the overlapping of these two views are detailed in the below table:

1253



1254

Figure 4-3 ATM Phases and Flight Phases 1

1255

The ATM phases and the Flight Phases are described in Table 4-1:

ATM Phase	Flight Phase	Operational Scenario	Description
Long Term Planning		Long term Planning Phase (Section 4.2.3)	The long term issues of activities associated with the development of airport process and infrastructure and aircraft operator business ( e.g. business plans, resources, budget planning, historical data, performance targets, demand forecasts, trends, options, facilities).
Medium-Short Term Planning		Medium-Short term Planning Phase (Section 4.2.4)	All activities concerning to the planning of Shared Business/Mission Trajectories (e.g. resource allocations, airspace organizations adoption and mode of operations, network operations plan, adjustments or refinements of assets and budgets).
X Trajectory Execution		Execution Phase (Section 4.2.5)	All activities concerning to the agreement and execution of the Reference Business/Mission Trajectories. It includes the monitoring of events applying service refinements or adjustments needed in order to maintain the stability of Network Operations Plan.
	<i>En-Route</i>	<i>Out of WP6 scope</i>	<i>The period from reaching the initial cruise level to the top of descent.</i>
	<i>Descent</i>	<i>Out of WP6 scope</i>	<i>The period from the top of descent until touchdown.</i>
	Landing <sup>23</sup> and Taxi-In	Arrival (Section 4.2.5.3)	The period from touch down through taxi until in-blocks.
		Turn-round (Section 4.2.5.4)	The period from in-blocks to off-blocks.
	Pre-Departure Taxi-Out Take-Off	Departure (Section 4.2.5.5)	The period from off-blocks, through taxi and take-off until the wheels are off the ground.
	<i>Climb</i>	<i>Out of WP6 scope</i>	<i>The period from take-off to the initial cruise level.</i>
	<i>En-Route</i>	<i>Out of WP6 scope</i>	<i>The period from reaching the initial cruise level to the top of descent.</i>
Post-Operations Analysis		Post-Operations Analysis Phase (Section 4.2.6)	The period after the conclusion of the flight (on block), e.g. Performance Analysis.

1256

Table 4-1: ATM Phases and Flight Phases

1257

Except for Climb, En-Route and Descent ATM flight phases (greyed-out in the table above), airport operational processes can be found in all other ATM phases.

1258

<sup>23</sup> Information has to be shared and exchanged before landing or after take-off for airport management purposes. Although those parts of the landing and take-off operations are out of the scope of WP6, the airport scenarios have to integrate them.

1259 Therefore, 4 airport operational scenarios can be identified in the domain of airport operations  
1260 corresponding to the ATM Phases, in accordance with CONOPS structure:

- 1261 • Long Term Planning Phase,
- 1262 • Medium-Short Term Planning Phase,
- 1263 • Execution Phase, encompassing the ATV Phases Arrival, Turn-round, Departure,
- 1264 • Post-Operations Analysis Phase.

1265 Those 4 airport operational scenarios per ATM Phase are presented in detail in sections 4.2.3 to  
1266 4.2.6.

1267 These four scenarios describe the processes occurring at the airport level as well as the interactions  
1268 among the relevant airport actors as related to SESAR– D66-B4.2 – SESAR Concept of Operations  
1269 Step 1 ed. 2013 – 01.01.00-22/11/2013 [11]. For the purpose of this document, the Ground Flight  
1270 Phases are developed within the ATV scope.

## 1271 4.2.1 Additional Information

### 1272 4.2.1.1 Airport Coordination

1273 While airports continue to come under pressure to maximize their performance by limiting capacity  
1274 shortfalls and their consequences, the aviation industry must deal with the realities of airport  
1275 congestion and find ways to minimize its impact.

1276 Depending on the level of activity at airports, procedures to ensure acceptance of airline schedules  
1277 have been developed. For the purpose of schedule co-ordination for airlines and aircraft operators  
1278 there are three broad levels of airports:

1279 **Level 1** describes those airports whose capacities are adequate to meet the demands of users. Such  
1280 airports are referred to as **non-coordinated**;

1281 **Level 2** describes airports where, due to demand, a more formal level of co-operation and facilitation  
1282 is required to avoid exceeding scheduling parameters. These airports are referred to as **schedules**  
1283 **facilitated**;

1284 **Level 3** describes those airports where demand exceeds the coordination parameters and voluntary  
1285 cooperation to resolve the problems of over-demand is no longer appropriate. In this scenario, formal  
1286 procedures have been implemented at the airport to allocate capacity and coordinate schedules.  
1287 Airports with such high levels of congestion are referred to as **coordinated** (according to IATA  
1288 Worldwide Scheduling Guidelines).

### 1289 4.2.1.2 IATA & Scheduling

1290 IATA places a facilitating role in the planning process through the organisation of the twice yearly,  
1291 global, Schedules Conference. During the conference, schedules are adjusted mainly through  
1292 bilateral discussions between airlines and coordinators when it involves offered alternatives, or  
1293 between airlines to exchange slots. As a schedule change at one airport could affect one or more  
1294 other airports, the conference provides the best forum in which all such repercussive changes can be  
1295 quickly and efficiently processed and all airlines can leave the conference with schedules which they  
1296 consider are the best compromise between what is wanted and what is available.

1297 The June conference considers northern winter schedules, and the conference held in November  
1298 deals with the northern summer schedules for the following year. All relevant dates for summer and  
1299 winter schedule coordination activities can be found in the calendar of Schedule Coordination.

1300 The Conference also deals with adjustments to planned future schedules to fit in with the slots  
1301 available at airports. This activity has nothing to do with adjustments to schedules on the day of  
1302 operation for air traffic flow management. The two types of slot allocation are quite different and  
1303 unrelated.

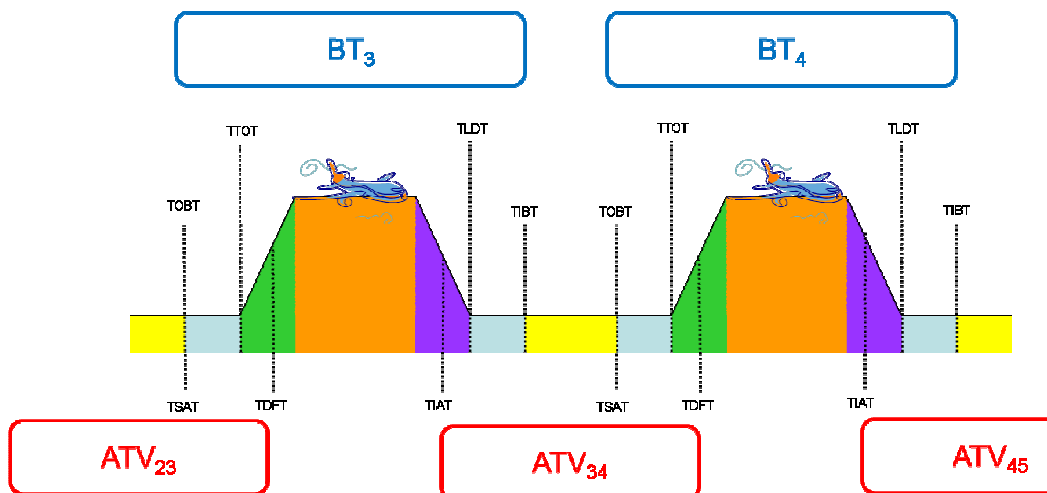
### 1304 4.2.1.3 Airport Transit View (ATV)

1305 From the viewpoint of improving predictability and efficiency, aircraft movement and handling on the  
1306 ground is as important as movement in the air. The integration of the airfield surface operations in the

1307 4D trajectory of aircraft allows airports to be developed as ground sectors within the SESAR concept.  
 1308 The aircraft's movement on the surface, including turn-round handling, is to be carefully managed to  
 1309 minimize delays. Information sharing between the Airport Operational Plan (AOP) and the Network  
 1310 Operations Plan (NOP) will assure the best overall system outcome while paying due attention to the  
 1311 needs of the airport, the individual aircraft operators and also the network.

1312 The ATV can be described as shown in Figure 4-4. A Business Trajectory (BT) consists of several  
 1313 phases, starting at "off-blocks" (pushback) at airport A, through phases as taxi-out, take-off, climb, en-  
 1314 route, approach, landing and taxi-in ending with "on-blocks" (end docking) at airport B.

1315



1316

1317

**Figure 4.4: Flight phases of a single flight trajectory**

1318 Each BT contains two ground segments: an outbound ground segment at airport A, and an inbound  
 1319 ground segment at airport B.

1320 Trajectories can be of different types. Some consist of only one flight (from A to B) and there are even  
 1321 flights from A to A. The second one is typical for training, test and General Aviation flights but certainly  
 1322 also for many of the military missions currently flown in the European Airspace and on a large number  
 1323 of combined civil / military used airports.

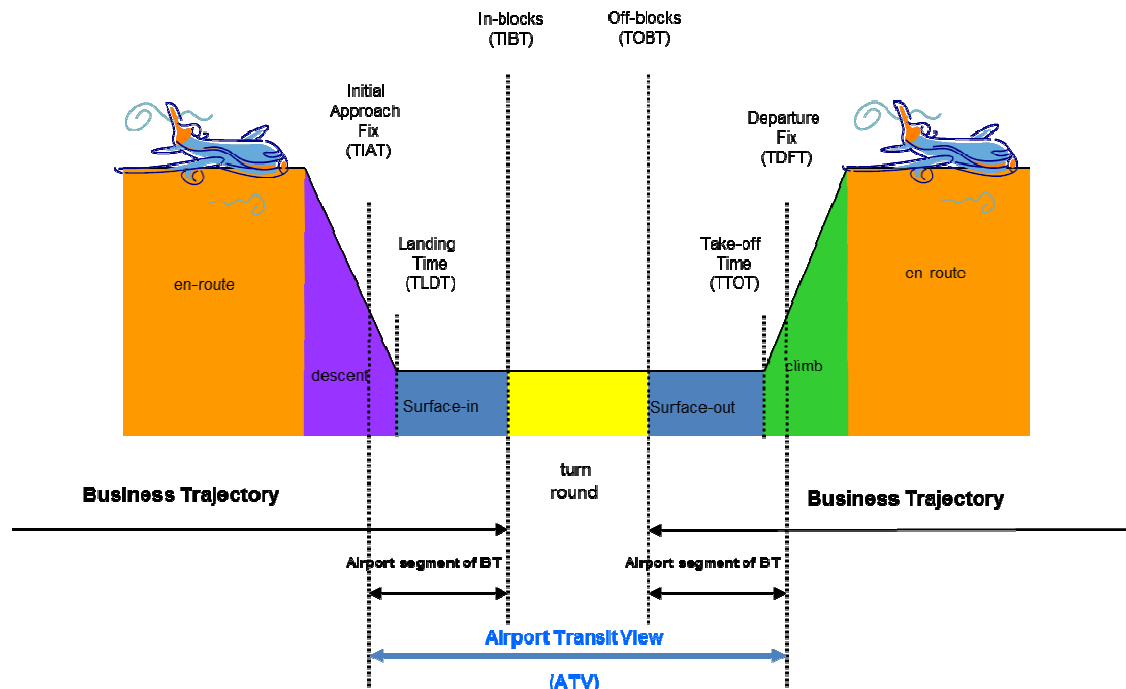
1324 During the planning phases (often short term), these flights evolve into trajectories where they fit into  
 1325 the airspace user's airframe utilisation schedule and in the airports / networks resource availability  
 1326 planning (landing slots, high-level parking/stands availability). For this to fit into the airport resource  
 1327 availability planning (i.e., ground handler, airport operator, airspace user, and local ATC), the ground  
 1328 segment of the trajectories is important.

1329 Definition of Business Trajectory Segments Applicable to Airports

1330 Where the BT is seen from an Airspace User perspective (flight from A to B), the Airport Transit View  
 1331 (ATV) takes the perspective of the ground node actors (Airport Operator, Local ANSP, Ground  
 1332 Handler).

1333 Irrespective of the definition of a Business Trajectory, in most cases the Airport Transit View links two  
 1334 flights that will be performed by the same aircraft (tail-number) and thus describes the 'visit' of the  
 1335 aircraft to the airport. It connects the ground segment of the inbound flight with the ground segment of  
 1336 the outbound flight through an aircraft turn-round process. During this turn-round process the aircraft  
 1337 is prepared for the execution of the next flight of the same business trajectory (in case of an  
 1338 intermediate stop, from A to B to C; e.g. QF001 SYD-SIN-LHR) or for the execution of a new business  
 1339 trajectory.

1340



1341

1342

**Figure 4.5: Business trajectory applicable to airports (ATV)**

1343 An ATV is the local set of data describing the path and operations of an airframe during its “visit” to  
 1344 the airport. It starts at the Initial approach fix and includes the taxi-in segment, the turn-round  
 1345 processes from the airspace user, the taxi-out segment and ends with the handover to the TMA  
 1346 departure controller (see Figure 4-5).

1347 This will guarantee a similar scope of the airport segment for all airports and will as well generate a  
 1348 partial overlap of AOP and NOP, for full consistency. The ATV does not by definition start with the  
 1349 descent/landing and end with the take-off/climb phases. For example an aircraft may not perform a  
 1350 subsequent outbound flight but is towed to a maintenance area or a remote parking area; five ATV  
 1351 types are identified:

1352 • ATV Type 1: The current “visit” to the airport, executed in three separate sections (the final  
 1353 approach and landing/taxi-in ground flight phases of the inbound flight, the turn-round process  
 1354 section in which the inbound and the outbound flights are linked, the taxi-out/take-off ground  
 1355 flight phases and the initial climb segment of the outbound flight).

1356 • ATV Type 2: The current visit Type 1 is divided in two parts, with a long break (of x hours) in  
 1357 between the arrival and the departure services. This break may be a night stop due to the  
 1358 closure of the airport, or a long stay due to schedule timings of the AU, particularly for long-haul  
 1359 operations. The ATV Type 2 is corresponding to the final approach and landing/taxi-in ground  
 1360 flight phase of the inbound flight and to the arrival operations of turn-round process section in  
 1361 which the inbound and the later outbound flights are linked.

1362 • ATV Type 3: The current visit Type 1 is divided in two parts, with a long break (of x hours) in  
 1363 between the arrival and the departure services. This break may be a night stop due to the  
 1364 closure of the airport, or a long stay due to schedule timings of the AU, particularly for long-haul  
 1365 operations. The ATV Type 3 is corresponding to the departure operations of turn-round process  
 1366 section linked to an earlier inbound flight and to the taxi-out/take-off ground flight phase and the  
 1367 initial climb segment of the outbound flight.

1368 • ATV Type 4: The inbound flight is not linked to outbound flight because of towing operation to  
 1369 another parking location or hangar or of planning reasons. In that case, the ATV Type 4 is  
 1370 corresponding to the final approach and landing/taxi-in ground flight phase of the inbound flight  
 1371 and to the arrival operations of turn-round process section, following by towing operation on  
 1372 ground or stand by on the apron.

- 1373 • ATV Type 5: The outbound flight is not linked to inbound flight because of towing operation  
 1374 from another parking location or hangar or of planning reasons. In that case, the ATV Type 5 is  
 1375 corresponding to the departure operations of turn-round process section linked to an earlier  
 1376 inbound flight and to the taxi-out/take-off ground flight phase and the initial climb segment of  
 1377 the outbound flight.

1378 ATV Types 4 & 5 describe scenarios where the arrival and departure BT's of the airframe may be on  
 1379 different days or weeks and hence the airframe is effectively 'not in use' from an airport perspective.  
 1380 In these scenarios an ATV is not relevant for the ATM network as the arrival is unlikely to impact a  
 1381 departure.

1382 An ATV does not just link two flight segments; it serves as a planning and execution tool. The key  
 1383 linking points between an "inbound" iRBT / "outbound" iSBT and an ATV are the A-CDM data points  
 1384 TIAT, TLDT, TIBT, TOBT, TTOT, TDFT. The conjoined set of data making up an ATV is required for  
 1385 efficient and predictable management in various operational phases (Medium/Short Term Planning  
 1386 and execution Phases). Examining these operations on an individual trajectory basis is not sufficient.  
 1387 To achieve the overall SESAR predictability and capacity targets, any knock-on effect needs to be  
 1388 known / published throughout the network. The ATV is the link that provides this ability.

## 1389 4.2.2 Assumptions

1390 The operational scenarios are based on the following assumptions:

- 1391 • SESAR Deployment Baseline (DB) results or corresponding output / results of other similar ATM  
 1392 research programmes are fully implemented at airports and network level,
- 1393 • CDM (DB) operational procedures are implemented,
- 1394 • Two way coordination with adjacent military aerodromes (if relevant) is established,
- 1395 • Service Levels agreed between the airport operator and airspace users or set by regulatory  
 1396 bodies will be regularly updated,
- 1397 • Airport (and TMA) and airspace demand and capacity forecasts are available and exchanged  
 1398 with other stakeholders (like Airspace Users),
- 1399 • The long term planning process, which spans from over years ahead until five months before the  
 1400 day of operation, relies on the sharing of the network capacity situation by all concerned parties,
- 1401 • The long term planning inputs in terms of declared capacity and performance framework  
 1402 including targets are available. The level of the imbalance between demand and capacity at  
 1403 airport will be reviewed to determine the airport status as a non-coordinated, schedules facilitated  
 1404 or coordinated airport,
- 1405 • Airspace Users should provide future traffic forecasts containing aircraft type, origin/destination  
 1406 and preferred time of operation to the airport operator<sup>24</sup>,
- 1407 • The NOP, that is the plan of all operations at a network level, is in place. The initial AOP, that is  
 1408 the plan of all operations at airport level, is in place. Thus planning and operational coordination  
 1409 is done through the exchange and update of A-CDM milestones for each BT,
- 1410 • Flights are assigned to airframe numbers by the owner of the "flights" (trajectories) and the  
 1411 owner of the airframe (often the same Airspace User but not always by definition). It is assumed  
 1412 that this airframe utilisation scheme is fixed input to this operational scenario provided by the  
 1413 Airspace User(s) not earlier than 1 to 2 days before day of operation (Short Term Planning  
 1414 Phase),
- 1415 • If the airport is coordinated, all flights (especially during peak traffic periods) are subject to  
 1416 regulation to ensure that demand does not exceed capacity,
- 1417 • The anticipated ATM System capabilities for SESAR Concept Storyboard Step 1 as listed in table  
 1418 4-2 are available,
- 1419 • Data for Airport Post-Operations Analysis is received from various sources, e.g. AOP,  
 1420 Stakeholders Operational database or Flight Processing Systems,

<sup>24</sup> Certain categories or operations of AUs Business Model require flexibility (e.g. Business Aviation, replacing aircraft, State or Military flights, etc.) and it is assumed some flights are possibly not forecasted before the day of operations.

- 1421 • While WP6.2 acknowledges the existence of other analysis, e.g. CODA reports or Airport-CDM  
 1422 KPI, the Airport Post-Operations Analysis is targeted at the interest of the whole local Airport  
 1423 Community and other external actors, especially NM.

1424 It is vital that all systems mentioned are capable of immediately taking input data and updates into  
 1425 account, in order to generate and transfer new or updated output data virtually in real-time to the  
 1426 relevant displays and to provide the information to the human in a way that can quickly, easily and  
 1427 uniquely be transferred into a mental image and be reacted upon.

1428

Anticipated System Capabilities (IP2, SL2 <sup>25</sup> )		
Aircraft System	Ground System	Vehicle System
ADS-B out	Surveillance Systems (e.g. multi-lateration, ADS-B)	VDS
ADS-B in / ATSAW		ADS-B out
	AMAN/DMAN	ADS-B in
ATSA-SURF	A-SMGCS (level 4)	
Optimised Braking	GNSS/GBAS	
CPDLC / D-TAXI	MLS	
GNSS/GBAS Cat II/III	ILS	
MLS	Datalink (CPDLC)	
ILS	A-CDM DB	
E&SV/HUD	SWIM	
Electronic Flight Bag	AOP, APOC, DCB	
AMM	DME	
	NDB, VOR	

Table 4-2: System Capabilities

1429

1430 Data link facilities in the aircraft make data communications with both the systems of ATC and the  
 1431 Airlines Operations Systems (AOC) possible.<sup>26</sup>

1432 ATC related Data link communications will focus on the A-CDM process. Information will be  
 1433 exchanged between flight crew and controller without the use of often overloaded R/T. Data link  
 1434 communications reduces misinterpretations and increase safety and time efficiency.

1435 Data link communications with the AOC will be used to update information for trajectory planning such  
 1436 as flight plan / iSBT on outbound trajectory, aircraft load etc.

1437 Data link communication with vehicle drivers will be used to inform them on their expected (next)  
 1438 operation and assigned routing (through restricted areas), but may (and will) also be used to  
 1439 accurately determine the off block time (for push-back tug), passenger bus at parking position etc.

1440 Ground vehicle accessibility of aircraft parking positions may require the crossing of active taxiways.  
 1441 To increase ground movement safety, reduction of taxiway incursion and conflicts between aircraft  
 1442 and vehicles, ground vehicles are equipped with ADS-B, Moving Map and output of a Conflict Alerting  
 1443 System<sup>27</sup>.

<sup>25</sup> SL2: Service Level 2 introduces the fundamental changes underpinning the SESAR Concept of Operations thanks to the progressive implementation of an information rich and information sharing environment with SWIM supporting the Shared Business Trajectory. More and more user-preferred trajectories will be accommodated along with Functional Airspace Block (FAB) implementation over Europe, enabling more direct routes in upper airspace. The User Driven Prioritisation Process (UDPP) will be applied defining prioritisation as the result of a collaborative process involving all partners. New modes of separation will be introduced and ASAS Spacing applications will be introduced in terminal areas. Advanced environmental friendly operations will be used in higher density terminal areas, with the introduction of 3D trajectory management and new controller tools.

Surface movement operations will benefit from increased automation and improved surface navigation. Positional awareness will be improved through the application of visual enhancement technologies (excerpt from the ATM-Masterplan).

Main Focus of this DOD is: Automated Surface Movement Planning and Routing, Airport Safety Nets (Pilot, Controllers and Vehicles), BTM via Data Link, Improved LV Operations (e.g. GBAS), Enhanced Navigation for Airport Vehicles, Adjustment of Separation Based on Ground Wake Vortex detection.

<sup>26</sup> Voice communication is still possible and valid, but in the scenario description the focus is on data link. Voice communication can be required in certain instances (e.g. time-critical situation, runway operations)

<sup>27</sup> Due to the cost of Moving Map equipment for vehicles, this assumption is subject to Cost Benefit Analysis at concerned airports and could be a driver to not implement this communication tool.

1444 The ground part of the ATM System has an AMAN/DMAN and an A-SMGCS (Advanced Surface  
1445 Movement Guidance & Control System) to assist the Tower Clearance Delivery Controller and the  
1446 Tower Ground Controller in optimizing and achieving the appropriate pre-departure sequence. These  
1447 systems feed the Tower Clearance Delivery Controller to determine and issue the TSAT.

## 1448 4.2.3 Operational Scenario Long Term Planning

### 1449 4.2.3.1 Scope of scenario

1450 This Operational Scenario describes, for SESAR Service Level 2 (SESAR Concept Story Board Step  
1451 1), the processes occurring at the airport level during the long-term planning phase and the relevant  
1452 interactions among airport actors.

1453 This Scenario provides an overview of all the activities required for the definition and continuous  
1454 refinement of the various outputs of the Long Term Planning Phase – optimising existing infra-  
1455 structure. This set of long-term plans (that will finally compose the Airport Strategic Plan) will be the  
1456 basic input data for an AOP that will be established at the outset of the Medium/Short-term Planning  
1457 phase.

1458 Because the long-term planning phase potentially stretches over decades (between 6 months and up  
1459 to 30 years in extreme cases<sup>28</sup>):

- 1460 • The various activities will be assessed through a time horizon organized in terms of years with a  
1461 particular focus on the next IATA scheduling season (to be considered in the medium/short-term  
1462 planning phase).
- 1463 • The scheduling season will be generally treated through details provided for generic days of  
1464 operations (according to weeks, months or any other criteria). This will not prevent long-term  
1465 planning addressing a specific day of operation in the next season if relevant (e.g. a Football  
1466 Final).

1467 The scenario starts at the early stage of the Long-term Planning and ends with the beginning of the  
1468 Medium/Short Term Planning Phase following the IATA Schedules conference.

### 1469 4.2.3.2 Scenario text

1470 The scenario is based on the logical progression of the planning function. It starts with a definition of  
1471 the performance requirements, considers the identification of the imbalance between future demand  
1472 and capacity and discusses potential solutions through enhancement of the infrastructure, the  
1473 supporting systems and the operational process. Finally it identifies what is possible in the long term  
1474 and what actions are sensible to prioritise in the period leading up to the seasonal schedule  
1475 declaration.

### 1476 4.2.3.3 Establish or Review Local Airport Performance Targets (UC 6 01)

1477 Fundamental drivers for the long-term planning are the local airport performance targets. They may,  
1478 but not necessarily will, reflect a subset of the SESAR Key Performance Areas (KPAs), but the targets  
1479 will need to be consistent with Commission Regulation 691/2010. Where monopoly airport providers  
1480 exist the State may set Airport Performance Targets and impose penalties for failure to meet the  
1481 requirements.

1482 In this context the Airport Operator, together with appropriate actors (Airspace Users, ANSP etc.),  
1483 defines the overall operational strategy - establishing the operational and performance framework and  
1484 determining the performance targets and associated levels. The Airport Operator provides the airport  
1485 related objectives, inputs and constraints on operational performance, societal outcome, performance  
1486 enablers and service levels. Further refinements of the Use Case may be found in the OFA05.01.01  
1487 OSED.

1488 For analytic purposes, the Key Performance Indicators (KPIs) may be defined and structured within 2  
1489 KPA groups:

- 1490 • Operational Performance; and

<sup>28</sup> Building extra facilities at some already very congested and constraint airport may require decades of planning – e.g. Heathrow Terminal 5



1491 • Societal Outcome.

1492 The table below shows the ATMAP indicators that have been generally adopted and are currently  
1493 among those monitored on a regular basis by the major European airports.

KPA Category	KPA	KPA definition	Examples of KPIs
Operational Performance	<b>Capacity</b>	Ability of the airport to accommodate the traffic demand	<ul style="list-style-type: none"> <li>- Runway Capacity</li> <li>- Ground movement Capacity</li> <li>- Apron capacity</li> <li>- Capacity shortage</li> </ul>
	<b>Efficiency</b>	Addresses the difference between actually flown trajectory versus initial iSBT	<ul style="list-style-type: none"> <li>- Pre-departure delay</li> <li>- ATFM Arrival delay</li> <li>- Taxi-out additional time</li> <li>- ASMA additional time</li> </ul>
	<b>Predictability</b>	Controls the variability of the deviation between ground segments of flown trajectory versus AOBT and initial TOBT	<ul style="list-style-type: none"> <li>- ATC local Pre-departure delay</li> <li>- ATFM Arrival delay</li> <li>- Taxi-out additional time</li> <li>- ASMA additional time</li> </ul>
	<b>Cost-effectiveness</b>	Addresses the cost of gate-to-gate ATM in relation to the volume of air traffic that is managed	Part of the ATM gate-to-gate flight cost related to the airport segment
Societal Outcome	<b>Safety</b>	Addresses the risk, prevention, occurrence and mitigation of air traffic accidents	Currently universally monitored: <ul style="list-style-type: none"> <li>- Runway incursions</li> <li>- Other airport surface incidents</li> </ul>
	<b>Security</b>	Addresses the risk, prevention, occurrence and mitigation of unlawful interference with airport operations	<ul style="list-style-type: none"> <li>- Unlawful interference within the landside part of the airport (i.e. terminal building)</li> <li>- Unlawful interference within the airside part of the airport</li> </ul>
	<b>Environmental Sustainability</b>	Controls environmental impacts of the airport activity	Currently monitored at many airports: <ul style="list-style-type: none"> <li>- Noise (contours, impacts, taxiing noise...)</li> <li>- Air Quality (gaseous and particulate emissions)</li> <li>- Others areas (water, waste, recycling...)</li> </ul>

1494 **Table 4-2 Key Performance Areas and Indicators for airports**

1495

1496 Primary Project P6.5.1 "AOP definition" has developed the SESAR P6.5.1 D004 Identification of Key  
1497 Performance Areas and Focus Areas, version 00.01.01, 27 May 2010 [8 and SESAR P6.5.1  
1498 D005/D006 Identify Airport KPIs and Performance Drivers for the selected KPAs / Focus Areas,  
1499 version 00.01.00, (6 separate documents) – 30 September 2010 [9] which includes the five bold  
1500 identified KPA's in table 4-3.

1501 Local airport performance targets include a commitment from all the stakeholders through the  
1502 implementation of a Collaborative Airport Management process [**AO-0804**]. This process is owned by  
1503 the "Steer Airport Performance" business service. Together with three other business services tasked  
1504 to Monitor, Manage and Analyse performance from the long-term planning phase to the execution  
1505 phase

1506 When established and agreed, Airport Performance Targets are made available to all relevant actors.

1507 A review process to monitor and feedback the local and wider network key performance indicators will  
1508 usually be owned by the airport on behalf of all stakeholders [**SDM-0101**]

1509 **Output of the Process:**

1510 "Airport Performance Targets"

#### 1511 4.2.3.4 Determine and Review Airport Demand (UC 6 02)

1512 For the Airport operator and the ANSP, the scope for the prediction of future traffic demand stretches  
1513 from the near term (with considerations of new aircraft types, potential new entrants to the fleet, etc.)  
1514 to a horizon years ahead (or even decades ahead for the larger airports) where the drivers will  
1515 change to reflect the aggregate issues of economic growth, national/international infrastructure  
1516 improvements (e.g. high speed rail links) as also price driven changes in customer transportation  
1517 behaviour.

1518 Generally, short term forecasts have an annual cycle to reflect the scheduling seasons. In the long  
1519 term issues such as the expected duration of planning appeals or external constraints imposed by  
1520 outside bodies can greatly vary the forecasting horizon for the airport.

1521 Airport Traffic Forecasts take into account historical data, as well as such variables as:-

- 1522 • the economic/environmental/political context,
- 1523 • the development of Airspace Users' business strategy and planned aircraft procurement,
- 1524 • multi-modal transportation aspects,
- 1525 • major events (e.g. Olympic Games, Military Exercises),
- 1526 • the development of a competitive airport market,
- 1527 • the Airport capacity development program (with their terminal airspace),
- 1528 • Airport long-term plans, as they relate to airport infrastructure expansion as well as airport use  
1529 (hub-and-spoke against point-to-point services, the encouragement of new entrants, traffic mix,  
1530 traffic segmentation between congested and reliever airports...).

1531 The network manager will also have a view as to the growth of airport traffic and generally will be  
1532 supported by an in-house team.

#### 1533 **Output of the Process:**

1534 "Future Airport Traffic Demand for next season and beyond"

#### 1535 4.2.3.5 Establish Preferred Airport Operational Configurations (UC 6 03)

1536 This process will be performed in order to define all Possible Airport Configurations that could be  
1537 applicable during the next season.

1538 The various Possible Airport Configurations are established and updated by the Airport Operator, in  
1539 coordination with the other relevant stakeholders, using the airport infrastructure as an input and  
1540 taking into account as constraints the Airport Resource Usage Rules, the Airport Performance Targets  
1541 and the Network Target Capacity Plan (part of the NOP) [AO-0801].

1542 As result, the Airport Operator lists each possible airport configuration scheme applicable during the  
1543 next season – noting the benefits and dis-benefits:

- 1544 • Usable runway for arrival, departure and/or both traffic, possibly limited to specific aircraft  
1545 categories,
- 1546 • Airport circulations rules taking into account aircraft size as also standard taxi paths / times for  
1547 each possible stand to runway entry (and runway exit to stand) combination,
- 1548 • Stand configurations and relevant pushback procedures,
- 1549 • Proximity to de-icing areas/facilities,
- 1550 • Terminal facilities,
- 1551 • Holding bay areas.

1552 The choice may involve trade-offs between such issues as

- 1553 • Hot spot locations for runway incursion,
- 1554 • Manoeuvring area bottlenecks, and
- 1555 • Environmental constraints.

1556 While the Long Term Planning Phase evolves, new or more accurate data may be available and  
1557 trigger a new iteration for the update of those airport configuration schemes.

#### 1558 **Output of the Process:**

1559 "Airport Configuration Schemes"

#### 1560 4.2.3.6 Review Future Airport Capacities (UC 6 04)

1561 At any point in the Long Term planning cycle, the expected path of future capacity growth at the  
1562 airport when in a particular operating configuration will be available to the airport management. There  
1563 are four sources of this information.

- 1564 • The Existing Masterplan,
- 1565 • Analysis of past operations in known configurations using the archived information from the  
1566 regular output of the “Post Operations Analysis” business service
- 1567 • Expert judgement,
- 1568 • Computer modelling.

1569 The analysis of past operations may be used to validate the computer model. Sensitivity analysis  
1570 through such advanced analysis techniques (e.g. control variation analysis) may also indicate the  
1571 degree to which the level of specific resources contributes to the overall performance.

#### 1572 **Output of the Process:**

1573 “Planned Long Term Future Airport Capacity”

#### 1574 4.2.3.7 Identify the Future Airport Demand Capacity Imbalance (UC 6 05)

1575 The outcome for this process identifies those airport facilities that will require enhancement either to  
1576 achieve new performance targets or achieve the same level of performance under the forecast  
1577 demand for the airport. Note that demand and capacity growth will not normally be in step as the  
1578 outcome of an enhancement at the airport is usually a step change in capacity.

1579 The knowledge of the airport performance under specific operating configurations (obtained from the  
1580 history of Post-Operations analysis), together with the known frequency of occurrence – customarily  
1581 weather conditions but also other potential drivers such as movement limitations on the basis of  
1582 environmental impact, will enable the airport managers to gain insights into the degree of criticality  
1583 associated with particular operating configurations and thus to prioritise potential enhancements.

1584 The timing of any investment decision by the airport will be a matter of commercial judgement. Every  
1585 potential enhancement will need to demonstrate a business case that meets the investment criteria of  
1586 the airport operator. Cost benefit analysis in the airport context is complex and the benefits may not  
1587 arise to the one making the investment.

#### 1588 **Output of the Process:**

1589 “Identification of future potential capacity bottlenecks”

#### 1590 4.2.3.8 Build Airport Plans

1591 The introduction of enablers to support a number of the OIs identified in the subsequent text (e.g.  
1592 [AO-0101] [AO-0103] [AO-0305] [AO-0402], etc.) will require to be integrated into the business plans  
1593 of the airport and ATC provider. Typically those discussed during the long term planning phases are  
1594 concerned with the airfield layout, environmental protection, the terminal facilities, air traffic  
1595 management systems and third party issues.

1596

#### 1597 Propose Airport Infrastructure Enhancement Plans (UC 6 06)

1598 The planning function within the Airport Operator is tasked to prepare revisions and enhancements to  
1599 optimise the performance of the airport:

- 1600 • at a strategic level: by the corporate business plan to enable growth at the airport where this is  
1601 not constrained by external regulation, and
- 1602 • generally, the revision and enhancement cycle as it applies to the infrastructure and supporting  
1603 systems has a time horizon in excess of six months.

#### 1604 **AIRFIELD**

1605 The airfield areas include:

- 1606 • Additional runways or enhancement to existing runways – improved rapid exit taxiways, the  
 1607 provision of Rapid Exit Taxiway Indicator Lights (RETILS) or equivalent markings, runway  
 1608 access, better holding areas,  
 1609 • Upgrades to the taxiway structure,  
 1610 • Additional Apron and Stand Provision, and the provision of new gates when such types as the  
 1611 A380 are expected.

## 1612 **ENVIRONMENTAL PROTECTION**

1613 In addition to capacity enhancements there may also be a concomitant requirement for improved  
 1614 environmental protection. One aspect of this is the introduction of continuous descent approaches  
 1615 and continuous climb departures. Although these initiatives are closely monitored by the airport on  
 1616 behalf of the local community, they fall within the responsibility of WP5 and details are found in the  
 1617 WP5.2 DOD. Similarly the use of RNP procedures to manage flight around noise sensitive local  
 1618 areas is often driven by airport pressures but managed by the AU and ANSP.

## 1619 **LANDSIDE**

1620 The Terminal Capacity can be a constraint to Capacity Declaration. This is further complicated by the  
 1621 schedule where long haul arrivals are bunched around particular times and can overload a terminal  
 1622 allocated to particular airlines or airline groups. Long term planning for terminal development can  
 1623 therefore achieve significant improvements by re-considering the allocation of airlines to terminal  
 1624 buildings in addition to the more obvious solution of adding extra-extensions or new buildings.  
 1625 Associated with the re-allocation of airlines to different terminals may be a need for interior  
 1626 modification – larger gate rooms to accommodate different aircraft types.

1627 Security regulations and requirements may require new passenger handling processes that affect  
 1628 terminal design – for example segregation between arriving and departing passengers or extra-  
 1629 security screening for particular destinations. Schengen and non-Schengen requirements introduce a  
 1630 constraint on the capacity and flexibility of terminal designs. These landside capacity disruptions may  
 1631 be significant in their effect on the processing capacity and planning should aim to mitigate them.

## 1632 **Output of the Process:**

1633 “Airport Resource Enhancement Plan(s)”

1634

## 1635 **Initiate Introduction of new ATM Systems (UC 6 07)**

1636 The improvement to capacity and the reduction of environmental impact can be achieved by the  
 1637 provision of more resources or the greater efficiency in the use of the resources – essentially through  
 1638 revisions to the processes and systems. Some of these initiatives are essentially independent of the  
 1639 airport operator (for example electronic flight strips). Others require provision of support infrastructure  
 1640 (buildings and cabling).

1641 In the context of improving the resilience, delivering economies, or enhancing the ATM service level.

- 1642 • The potential economies in providing stand-by facilities by way of a remote tower potentially  
 1643 shared with other airports with the same requirement, controlled by their common ATM service  
 1644 provider.

1645 The potential service enhancements/economies that might be achieved for small airports by providing  
 1646 a remote tower shared between a number of similar sized airports who might wish to upgrade their  
 1647 service levels e.g. to attract business aviation.

1648 In the context of reductions to the environmental impact on the airspace adjacent to the airports:

- 1649 • The introduction, and continuing support and monitoring, of low environmental impact approach  
 1650 profiles (CDO) and those offering a fully tailored approach from Top of Descent,  
 1651 • Introduction of environmental restrictions at the earliest stage of flight / iSBT planning.

1652 In the context of enhancements to the runway these could include introducing:

- 1653 • An interim application of GLS (GPS only) instead of ILS for precision approach will also bring  
 1654 extra runway capacity,  
 1655 • An ATM Micro-wave systems to detect small objects on the movement area will also enhance  
 1656 safety,

- 1657 • Improvements in layout of taxiway system, signage and markings will reduce the risk of runway  
 1658 incursions and thus improve safety.  
 1659 • Provision of infra-structure enhancements in support of dependent parallel operation (e.g. the  
 1660 dual threshold operation on the southern landing runway of Frankfurt Airport).

1661 In the context of the manoeuvring area these could include:

- 1662 • The introduction of Airport Safety Nets - system safety defences that provide additional safety  
 1663 layers to prevent accidents. Effective introduction requires that the appropriate enablers are  
 1664 present. For example, equipping the airport with an ATM multi-lateration system and airport  
 1665 vehicles with two-way communication means would allow an enhanced ground controller  
 1666 situational awareness in all weather conditions, and thus impacting safety and capacity.  
 1667  
 1668 • Providing the airport ATC with an ATM system to provide optimum routing for all movements  
 1669 (considering the constraints of departure sequencing and environmental impact) with a view to  
 1670 reducing ground movement delays and thus increasing efficiency.

1671 In the overall management function this might include:-

- 1672 • The emerging airport system will require a Data Warehouse capability in order to capture, store  
 1673 and provide access to management information and decision support systems. In a planning  
 1674 process this will be reviewed as, and when, the demand of new processes flags up the need.  
 1675

#### 1676 **Output of the Process:**

1677 “Airport plans for integration with ANSP Enhancement Initiatives”  
 1678

### 1679 [Planning for the Management of External Issues \(UC 6 08\)](#)

#### 1680 **FLIGHT CREW**

1681 The ability of the airport to interact with the flight crews operating at the airport and to influence their  
 1682 behaviour in the context of runway occupancy needs a formal process that ensures that the necessity  
 1683 for good practices to minimise runway occupancy do not become stale and, at intervals, are  
 1684 introduced in new ways. A harmonised approach between airports is also important and processes  
 1685 need to be in place. Parallel mechanisms must support the European Action Plan for the Prevention  
 1686 of Runway incursions.

#### 1687 **ADJACENT AIRPORT OPERATIONS**

1688 In closely coupled TMAs the airport operators may wish to be involved in the trade-offs that naturally  
 1689 occur in the management of congested airspace. These would include the departure management  
 1690 from airports in close proximity and the integration of ATM systems (AMAN and DMAN) where there  
 1691 are potential interferences between adjacent airports.

#### 1692 **THE SURROUNDING COMMUNITY**

1693 Negotiation of any regulatory constraints that might impact on change to mixed mode operation.

#### 1694 **Output of the Process**

1695 “Airport plans managing external issues associated with enhancement plans”  
 1696

### 1697 [Review of and Preparation for the Response to Extraordinary and Emergency 1698 Situations \(UC 6 09\)](#)

1699 Extraordinary and Emergency situations are critical events that create sudden and usually unforeseen  
 1700 circumstances leading to a high drop in airport capacity. This will involve many actors and will require  
 1701 immediate action to minimise consequences and to recover to normal airport operations.

1702 Airports will maintain their contingency plans under continuous review and revise where necessary.  
 1703 One important enabler could be the use of remote towers to act as cost effective solutions for the  
 1704 provision of continuity of coverage by the Air Traffic Service Operations.

1705 **Output of the Process:**

1706 "Airport plans for response and training for Emergency/Disruptive Events"

1707 **4.2.3.9 Pre-Seasonal Capacity Declaration (UC 6 10)**

1708 Given the outcome of any enhancements that have been completed between the seasons, the Airport  
 1709 works with its key stakeholders (airport Slot Coordinator, ANSP, Airlines) in order to define the  
 1710 appropriate capacity declaration for the following season. This capacity declaration profile may vary  
 1711 throughout the airport opening hours to reflect the historical traffic mix and permit the possibility of  
 1712 recovery from demand peaks by incorporating a fire-break in the schedule. Declared capacity is  
 1713 underpinned by assumptions of a seasonal weather norm, operational practices designed to  
 1714 maximise the productivity of the airport infrastructure and recognition of the external constraints.  
 1715 Typically these might embrace

- 1716 • noise and emission constraints,
- 1717 • the loading on and capacity of terminal facilities,
- 1718 • runway capacities,
- 1719 • taxiway capacities,
- 1720 • stand allocation/planning, and
- 1721 • de-icing positions.

1722 For example, taxiway usage rules are defined for all traffic and depend on the runway configurations  
 1723 in use and the weather conditions. Meanwhile, stand allocation usage rules are defined for each type  
 1724 of aircraft and priority criteria could be established depending on the airline or type of cargo. The  
 1725 output of the Pre-seasonal Capacity Declaration is input for the IATA Schedules Conference.

1726 The role of Slot Regulation (Airport Slot Coordinator) is to constrain demand within capacity.

1727 **Output of the Process:**

1728 "Pre-seasonal airport capacity declaration"

1729 **4.2.3.10 Publish Seasonal Schedules (UC 6 11)**

1730 This process allows the Airspace Users, via their Flight Schedule Planner, to finalise their planning  
 1731 and to issue their Shared Business Trajectories (iSBTs). Until the publication of iSBTs through the  
 1732 NOP, any planning information remains confidential. The Long term Planning Phase finishes 6  
 1733 months before operations when detailed winter/summer schedules for the next season are made  
 1734 available. The seasonal schedule for the specific airport is at the end produced and published by the  
 1735 Airport Operator and made available not only to the airport actors but also to the Network Manager for  
 1736 inclusion in the initial NOP [DCB-0103-A].

1737 The seasonal schedule will be used to initiate the AOP which is the OFA05.01.01 use case AOM 01.  
 1738 Although this is formally part of the Medium Term Plan there may be local initiatives which permit a  
 1739 proportion of these actions to be undertaken earlier.

1740 **4.2.3.11 Use Cases Identified**

1741 Use cases describe nominal conditions and topics that deviate from the nominal conditions. These  
 1742 use cases should be assigned to specific WP6 (sub)work packages.  
 1743

Use Case ID	Use Case title	Use Case description
UC 6 01	Establish / Review Local Airport Performance targets	Refer to Section 4.2.3.3 of this Document
UC 6 02	Determine and Review Airport Demand	Refer to Section 4.2.3.4 of this document
UC 6 03	Establish Preferred Airport Operational Configurations	Refer to section 4.2.3.5 of this document
UC 6 04	Review Future Airport Capacities	Refer to section 4.2.3.6 of this document
UC 6 05	Identify the Future Airport demand Capacity Imbalance	Refer to section 4.2.3.7 of this document
UC 6 06	Propose Airport Infrastructure Enhancement Plans	Refer to section 4.2.3.8 of this document

Use Case ID	Use Case title	Use Case description
UC 6 07	Initiate Introduction of new ATM Systems	Refer to section 4.2.3.8 of this document
UC 6 08	Planning for External Issues	Refer to section 4.2.3.8 of this document
UC 6 09	Review of and Preparation for the Response to Extraordinary and Emergency Situations	Refer to section 4.2.3.8 of this document
UC 6 10	Pre-Seasonal Capacity Declaration	Refer to section 4.2.3.9 of this document
UC 6 11	Publish Seasonal Schedules	Refer to section 4.2.3.10 of this document

1744 **Table 4-3 Identified Use Cases for Long Term Planning**1745 **4.2.4 Operational Scenario Medium to Short-Term Planning**1746 **4.2.4.1 Scope of scenario**

1747 This Scenario provides an overview of all the planning activities required for the continuous  
1748 refinement of the AOP during the Medium/Short Term Planning Phase.

1749 The Medium Term planning phase addresses the airport plan evolution from about 6 months before  
1750 the day of operation until one day before start of operations, while the short term planning phases  
1751 addresses the airport plan evolution from one day before operation until and including the execution  
1752 of operations.

1753 In the Medium/Short Term Planning Phase, as the execution of the flight(s) / trajectory(ies) is getting  
1754 closer, more specific data becomes available: accurate traffic demand, links between arrival and  
1755 departure flights, RWY configurations, weather predictions, trajectory planning deviations, etc.

1756 At this stage the en-route to en-route concept can be applied, in other words the seamless ATM can  
1757 be built. The main steps to follow are:

- 1758 • Refine the operational capacity according to the actual situation (i.e. airport configuration,  
1759 weather);
- 1760 • Check if the Performance Targets can be achieved;
- 1761 • Make the airspace user's demand balance with the declared capacity;
- 1762 • Ensure coherence between Airport Operations and Network Operations.

1763 The initial reference for the schedule is performed during the Long Term Planning Phase in terms of  
1764 declared airport capacity. A description of these processes is out of the scope of the present Scenario  
1765 and is covered by the Long Term Operational Scenario.

1766 The scenario starts after the IATA Schedules Conference; approx. 6 months before the day of  
1767 operations. The scenario ends when the flight / trajectory is ready for execution (start of operation).

1768 The focus of the scenario is on the medium term planning activities, especially during the last days  
1769 before the actual operation (execution) of the flight / trajectory, and details the short term activities  
1770 until the actual start of operation.

1771 **4.2.4.2 Scenario text**1772 **4.2.4.2.1 Operations prior to Medium/Short-Term planning**

1773 The Medium and Short Term Planning Phase is a continuation of the previous work developed in the  
1774 Long Term Planning Phase and will take the following on board as inputs:

- 1775 • Declared Airport Capacity for the next season.
- 1776 • Performance framework including the agreed targets.
- 1777 • Strategic plan which includes the airport resources in service for the next season
- 1778 • The airport configuration schemes.
- 1779 • The Environmental regulations and restrictions.

1780 Those inputs form the baseline for the creation of the seasonal operational plan, starting from the  
1781 intentions of the Airspace Users (IATA slot conference) until the day of actual operation.

## 1782 4.2.4.2.2 Medium Term Planning Phase

## 1783 General Description

1784 The Medium Term planning phase addresses the airport plan evolution from about 6 months before  
1785 the day of operation until one day before the start of operation.

1786 There are two main activities in the scenario:

- 1787 • The creation of the AOP is executed some months before the day of operation. The  
1788 characteristics of this activity are the global approach to the demand and capacity balance  
1789 assessment and the generic treatment of resource allocation.
- 1790 • Development of the AOP, including the subsequent updates between the creation of the plan  
1791 until one day before the day of operation when most of the information is (should be) known  
1792 including the aircraft rotations or links between the arrival and departure flight related to the same  
1793 aircraft frame. At this moment the specific resource allocation for every single flight and aircraft  
1794 can be performed, and the AOP is the reference for the execution.

## 1795 Creation of AOP (UC 6 12)

1796 The creation of the AOP starts at the beginning of the mid-term planning phase. At this point the  
1797 results of the IATA Slot Conference are available. This permits an initial airport demand profile to be  
1798 entered into the AOP and allow airport operators to ensure that local decisions achieve the optimum  
1799 performance from aircraft operations at and around airports, through the integration and monitoring of  
1800 Airport Transit Views (Aircraft flows) that describes the functional and technical requirements for  
1801 monitoring aircraft movements at an airport in both the planning and execution timeframe **[AO-0803]**  
1802 and to attain the most appropriate balance between social, economic and environmental imperatives  
1803 **[AO-0703]**. This improvement includes use of noise monitoring systems, flight tracking and air quality  
1804 monitoring systems, **[AO-0706]**

1805 To enhance the planning process, the NOP will use the available information provided by the airports  
1806 (available from the AOP). It will provide information on stakeholders' agreements (Airport Operator,  
1807 Airspace users, ANSP, Ground Handling and De-icing agents as well as the Network Manager) and  
1808 will continuously provide up-to-date information on the Network situation. **[DCB-0103-A]** **[DCB-0102]**.  
1809 Latent capacity is used to relieve bottlenecks through a consolidated capacity planning process based  
1810 on coordination and network synchronisation of ANSPs/airports, enabling the adaptation of the  
1811 capacity delivery where and when required **[DCB-0201]**. Business to Business services to share this  
1812 traffic flow management information (including the capability to fill and validate flight plans) between  
1813 the Regional NM and the APOC will be provided by SWIM **[IS-0901-A]**.

1814 The AOP includes information on critical events like adverse weather conditions (storm, fog, etc.)  
1815 regarding the past, current and future state of the atmosphere **[MET-0101]**., allowing improved  
1816 operations in Low Visibility Conditions through enhanced ATC procedures and/or navigation systems  
1817 **[AO-0502]**, industrial actions (strikes) as also any foreseen special event (like football finals) having  
1818 an impact either on capacity, traffic demand or the airport operational performance. Scenarios for  
1819 dealing with these events will be created during the medium term planning phase based on  
1820 experiences and analysis from past (comparable) events. Experiences are extracted from the Post-  
1821 Operations analysis and scenarios developed in close cooperation with airport actors **[AO-0501]**.

## 1822 Development of the AOP (UC 6 13)

1823 As the Medium Term Planning Phase evolves, the AOP is continuously refined and updated. The Mid  
1824 Term Planning phase will culminate in a reference AOP, committed to by all airport actors the day  
1825 prior to the day of operations, for execution the next day. This plan will be based on iSBT information  
1826 made available, at the latest, the day prior to execution - with possible refinements - by airspace  
1827 users. This extended flight plan will then evolve into the initial iSBT/iSMT. The initial iSBT/iSMT will be  
1828 a partial implementation of the iSBT/iSMT, which is the published business/mission trajectory that is  
1829 available for collaborative ATM planning purposes **[AUO-0203-A]**. At that stage, the plan will include,  
1830 inter-alia, the planned configuration of the airport, allocation of airport resources to flights, etc.

1831 As stated in the previous point, at the first stage the demand is obtained from the IATA Slot  
1832 Coordination Process. The information contained at this early stage is limited and does not include all  
1833 the details of the complete flight plans / iSBTs. Due to business characteristics, some flight plans /



1834 iSBTs, like General Aviation and some Charter flights, will not be identified until the day of operation  
 1835 comes close. Each Airport will develop their own strategy to deal with this lack of schedule information  
 1836 in order to maintain the needed flexibility to allocate them as appropriate **[DCB-0206]**.

1837 The process allows the airspace users, via their AOC Staff, to allocate new flights or to cancel existing  
 1838 ones. This process will be managed by the Airport Operator in coordination with the AOC Staff of the  
 1839 related airspace user. The Network Manager participates at the network level in these refined flight  
 1840 plans / iSBTs. The NOP will provide access to initial network performance objectives and support to  
 1841 network performance assessment in post-operations **[DCB-0103-A] [DCB-0102]**.

1842 The Airport Operator (Airside Operations Control Centre) and ANSP (Airport Tower supervisor) revise  
 1843 the usage rules, possible (runway) configurations, the resource availability and the slot allocation,  
 1844 taking into account the refined traffic demand **[AO-0804]**. They refine their infrastructure and airspace  
 1845 capacity planning, taking into account the most recent traffic updates which will include specific traffic  
 1846 (as charter flights and special event flights) **[DCB-0310]**.

1847 At airport level, the Airport Operator, in coordination with the other actors, continuously refines the  
 1848 AOP as appropriate data becomes available. Foreseen airport capacity changes expected to have a  
 1849 significant impact on the traffic demand at the airport will be communicated by the process owner  
 1850 (ANSP; runway, airspace capacity etc., Airport Operator; stand, terminal capacity etc.). This applies to  
 1851 temporary (e.g. runway maintenance) as well as structural capacity modifications. Decision making  
 1852 will remain with the process owner **[DCB-0310]**.

1853 In case of a critical event, a European Aviation Crisis Coordination Cell (EACCC) has been  
 1854 established to support the activation and coordination of contingency plans at a State level. This  
 1855 process is established for managing critical events such as industrial actions etc, which can be  
 1856 tailored to the needs/requirements of individual countries. This leads to better utilisation of limited  
 1857 available capacity **[DCB-0207]**. It is based on feed-back, experience, and continuous validation of  
 1858 long term traffic forecasts.

1859 The airport performance assessment that identifies the functional and technical requirements required  
 1860 to manage the airport process **[AO-0804]**, in addition to the expected performance of the network, is  
 1861 based on comparing the actual operation (routes flown, usage of allocated airspace, runway  
 1862 utilisation, etc.) against the forecast operation and assessing the adequacy of the capacity provision.  
 1863 **[DCB-0102] [DCB-0103-A] [SDM-0101]**. Consequently, the AOP is continuously refined with the  
 1864 application of local airport CDM processes **[DCB-0310]**.

1865 The Airport Operator and ANSP performs the global resource planning, and maps the traffic demand  
 1866 on to the various airport resources (i.e. runways, taxiways, stands and de-icing pads, APP sectors,  
 1867 passenger facilities). In addition, specific resource allocations for planned special events is performed  
 1868 **[AO-0804]**.

1869 The main characteristic is that predictable events, which may have an impact on the AOP, will be  
 1870 analysed by the European Aviation Crisis Coordination Cell (EACCC) **[DCB-0207]**. The plan is  
 1871 consolidated under supervision of the airport operator through a process of demand and capacity  
 1872 balancing based on the flight plans / iSBTs and known capacity constraints at the airport or in the  
 1873 network and which may directly impact airport operations **[DCB-0309]**.

#### 1874 4.2.4.2.3 Short Term Planning Phase

##### 1875 General Description

1876 One day before the day of operation the short term planning phase starts in which the relevant airport  
 1877 actors (Airport Operator, ANSP, Airspace users, Ground handling and de-icing agents, network  
 1878 manager) continue refining the AOP in an iterative manner all the way through to the iRBT/iRMT  
 1879 which is the reference used by all ATM partners during the flight execution **[AUO-0204-A]**. At this  
 1880 stage, as more reliable data becomes available, more detailed figures can be taken into consideration  
 1881 **[DCB-0103-A] [DCB-0206]**. Convergence is ensured between airport slots and flight plans together  
 1882 with the airport slot monitoring processes in order to improve consistency on a daily basis **[DCB-**  
 1883 **0301]**.

1884 The airport actors consider the AOP as a reference and establish the time schedule for their own  
 1885 activities in the iRBT/iRMT. In addition, the AOC staff allocates airframes (tail numbers) to the  
 1886 validated iSBTs. The iRBT/iRMT corresponds to the EFPL Extended Flight Plan and the iRMT  
 1887 corresponds to the sharing of the improved OAT Flight Plan, which is a harmonised flight plan

- 1888 containing additional specific military information items **[AUO-0204-A]** **[AUO-0203-A]**. At this moment  
 1889 the "visit" of a specific aircraft to the airport (Airport Transit View = ATV) is created as an inbound  
 1890 flight can only be connected to an outbound flight through the tail number **[DCB-0302]**. Flights are  
 1891 assigned to airframes (tail numbers) by the owner of the "flights" (trajectories) and the owner of the  
 1892 airframe (often the same Airspace User but not always by definition). This airframe utilisation scheme  
 1893 is provided by the Airspace User no earlier than 1 to 2 days before the day of operation (Short term  
 1894 planning). The information is included in the AOP and also provided to the network to update the NOP  
 1895 **[DCB-0103-A]**.
- 1896 Aircraft changes in the Medium / Short term planning phase are seen as "just" updates of the AOP.  
 1897 Aircraft changes during execution are described in the turn-round OS where a USE CASE is  
 1898 presented. (UC 6 68).
- 1899 **Revise / Update AOP during day of operation (UC 6 14)**
- 1900 The night before the day of operation the reference AOP will be available for next day execution. As  
 1901 the AOP is a "rolling plan" and deviations from this plan will take place during execution, continuous  
 1902 monitoring and updates of the AOP will need to identify, at a minimum, (1) those elements that are  
 1903 common to the Network Operations Plan (NOP) and (2) the procedures to ensure they are effectively  
 1904 shared and commonly updated within a "Rolling NOP structure" **[AO-0801]**. The first steps of the  
 1905 interactive Rolling NOP have already been implemented through the deployment of the NOP portal  
 1906 **[DCB-0102]**.
- 1907 Shortly before execution (often 12 to 24 hours before operation) the airport operator and the tower  
 1908 supervisor allocate the airport resources to each flight (i.e. runways, taxiways, associated standard  
 1909 taxi routes and APP sectors by the ANSP and stands and de-icing pads, passenger facilities by the  
 1910 airport operator). This process repeats when the execution comes closer and more detailed  
 1911 information becomes available.
- 1912 Based on flight schedule information from the AOP, an initial (pre-) departure sequence is  
 1913 determined. Both users and providers are able to assess the actual operation (routes flown, usage of  
 1914 allocated airspace, runway utilisation, the estimated corresponding taxi time, etc.) against the forecast  
 1915 operation and to assess the adequacy of the capacity provision **[SDM-0101]**.
- 1916 The establishment and maintenance of the pre-departure sequence is a collaborative process  
 1917 involving the tower ground controller and airport CDM partners involved in taking into account agreed  
 1918 principles to be applied for specified reasons (e.g. slot compliance, airline preferences, night curfew,  
 1919 evacuation of stand/gate for arriving aircraft, etc.) who may propose sequence swaps or negotiate a  
 1920 new rank in the sequence **[AO-0602]**. The iSBT/iSMT is published as the iRBT/iRMT at the moment  
 1921 when, due to the proximity of the execution phase, iSBT/iSMT is sufficiently reliable to become the  
 1922 trajectory the Airspace User agrees to fly and the Airspace Service Providers agree to facilitate.  
 1923 **[AUO-0204-A]** **[AUO-0203-A]**.
- 1924 Environmental rules and restrictions are taken into account where applicable. This might be applied  
 1925 on the use of runway combinations, a (temporary) ban on night operations or refusal of late flight plan  
 1926 / iSBT submissions (e.g. business aviation and/or charter flights) as mitigation measures to reduce  
 1927 atmospheric emission and aircraft noise at/around the airport **[AO-0703]**. Those measures are  
 1928 initiated if airports environmental performance reaches the limits set by the local and/or national  
 1929 authority **[AO-0706]**.
- 1930 Automated assistance provides the controller with the best calculated surface movement route by  
 1931 minimising the delay according to planning, ground rules, and potential conflicting situations with other  
 1932 mobiles **[AO-0205]**. When meteorological forecasts are available **[MET-0101]**, the airport operator  
 1933 (Airside Operations Control Centre) and the ANSP (Airport Tower Supervisor) identify the special  
 1934 actions to be taken during the day of operations and take action accordingly **[AO-0501]** **[AO-0502]**.
- 1935 All unforeseen occurrences (such as abrupt changes in weather conditions, emergency repairs, but  
 1936 also the late measures taken to keep the actual operation within the legal environmental boundaries)  
 1937 are identified and analysed for their impact on capacity. The consequences on flight / iSBT planning  
 1938 and execution for the next hours (up to 24 hours) are evaluated and processed in a collaborative way  
 1939 with all relevant actors including the Airspace Users. For managing critical events a pan-European  
 1940 procedure is established **[DCB-0206]** **[DCB-0207]** **[AUO-0203-A]**.
- 1941 Where necessary, flight schedules are adapted to the actual situation and reduced capacity by  
 1942 delaying or even cancelling flights, taking into account the priorities of the Airspace Users. The

1943 iSBT/iRMT is published as the iRBT/iRMT at the moment when, due to the proximity of the execution  
 1944 phase, iSBT/iSMT is sufficiently reliable to become the trajectory the Airspace User agrees to fly and  
 1945 the Airspace Service Providers agree to facilitate [AUO-0204-A] [AUO-0203-A]. The local situation is  
 1946 extended to include interconnected regional destination airports [DCB-0304]. The swapping of  
 1947 regulated flights on departure, arrival, and en-route, which is already possible for the flights of the  
 1948 same Airspace User (AU) sharing the same Most Penalising Regulation (MPR), will be extended to all  
 1949 regulated flights without any constraints due to AU (or MPR if possible) [AUO-0101-A].

1950 The Network Manager allocates TTAs for all regulated flights. For those flights where the allocated  
 1951 constraints will have a negative impact (e.g. disturbing airport/airline operations), the Network shall  
 1952 take this information into account in order to possibly re-allocate TTAs. This results in improved  
 1953 efficiency in the management of Airport and ATFCM Planning [DCB-0310].

1954 The APOC Supervisor (or the Airport Tower Supervisor in an airport with no APOC) performs Demand  
 1955 and Capacity assessments for the next few hours. He pro-actively assess the balance between  
 1956 available airport capacity and scheduled/forecast demand given the prevailing and/or forecast  
 1957 weather and other operational conditions and pro-actively makes suggestions for runway  
 1958 configuration and capacity distribution according to performance management priorities [DCB-0309].  
 1959 Inclusion of outputs from landside processes (passenger and baggage flow) allows for improved  
 1960 accuracy and predictability of the airside operations [AO-0802]. In case of upcoming capacity  
 1961 reductions having a significant impact on the schedules of the airspace users, airspace users should  
 1962 express their preferences and priorities regarding their flights. Next, the new target times are written  
 1963 into the AOP to be exchanged with the NOP and assessed by the Network Manager [AO-0801].

1964 The Airport Tower Supervisor is continuously aware of changes to the aerodrome capacity (e.g. as a  
 1965 result of changes in meteorological conditions, system(s) serviceability etc.) and acts to maintain a  
 1966 constant balance with demand [DCB-0309]. Thus, in the nominal case, changes to the Target  
 1967 Landing Time (TLDT) are minor, reflecting a change in sequence priorities and not as a result of over-  
 1968 demand.

1969 Changing the flight priority between 2 arrival flights where at least one flight is not regulated can  
 1970 occur. The AUs' requests for these changes in flight priority will be introduced at the initiative of the  
 1971 AUs themselves, to the airport authorities or to the Network Management function. The Network  
 1972 Management function may propose ATFM slot exchanges that satisfy the network performance  
 1973 targets [AUO-0101-A].

1974 ATFCM keeps track of changes to the aircraft iSBT/iSMT including route changes and diversions to  
 1975 ensure that a dynamic demand/capacity balance is maintained.

1976 The ATM System updates the arrival sequence and the TLDT. By using fixed arrival-departure  
 1977 patterns (on mixed-mode runways) for defined periods, overall delay can be reduced and  
 1978 predictability of TTOT and TLDT is increased [TS-0308].

1979 During the Medium and short term planning phases, and also during the day of operation, all data  
 1980 (including flight data) will be recorded as input to the Post-Operation Analysis. Based on this data, the  
 1981 Post-Operations Analysis will analyse the pre-defined scenarios / solutions used during the Medium /  
 1982 short term planning phase and also during the execution of operations. Where appropriate, these pre-  
 1983 defined scenarios / solutions are fine-tuned / optimized or even new ones are defined. This is also  
 1984 described in the Operational Scenario "Post-Operations".

## 1985 Use Cases Identified

1986 Use cases describe nominal conditions and topics that deviate from the nominal conditions. These  
 1987 use cases should be assigned to specific WP6 (sub-)work packages.

Use Case ID	Use Case title	Use Case description
UC 6 12	Creation of AOP	Refer to Section 4.2.4.2.2 of this Document
UC 6 13	Development of the AOP	Refer to Section 4.2.4.2.2 of this Document
UC 6 14	Revise / Update AOP during day of operation	Refer to Sections 4.2.4.2.3 and 4.2.5.2 of this Document

Use Case ID	Use Case title	Use Case description
UC 6 69 (from OS "Turn-round")	Change of assigned outbound Business Trajectory to aircraft	The delay of an inbound Business Trajectory (BT) often results in the delay of the allocated outbound BT to that aircraft. If delay of that outbound BT is not desired by the airline (AOC) it could be decided to allocate another aircraft to the outbound BT. This could be a spare aircraft or a swap of previously assigned outbound BT with one (or even more) other aircraft. The AOC shares the information through the system. The iSBT for both outbound flights are accordingly updated and propagated to Airport Operations Plan (AOP) and the Network Operations Plan (NOP).

1988

**Table 4-4 Identified Use Cases for Medium to Short Term Planning**

1989

## 4.2.5 Operational Scenario Execution Phase

1990

### 4.2.5.1 General Description

1991 One day before the day of operation the short term planning phase starts in which the relevant airport  
1992 actors (Airport Operator, ANSP, Airspace users, Ground handling and de-icing agents, network  
1993 manager) continue refining the AOP in an iterative manner all the way through to the actual execution  
1994 of the specific operation. At this stage, as more reliable data becomes available, more detailed figures  
1995 can be taken into consideration. [AUO-0204-A] [DCB-0103] [DCB-0206] [DCB-0301]

1996 The airport actors consider the AOP as a reference and establish the time schedule for their own  
1997 activities. In addition, the AOC staff allocates airframes (tail numbers) to the validated flight plans /  
1998 iSBTs. At this moment the "visit" of a specific aircraft to the airport (Airport Transit View = ATV) is  
1999 created as an inbound flight can be connected to an outbound flight only through the tail number; in  
2000 some cases, the ATV can be created with only one leg (inbound or outbound), for instance when  
2001 there is night stop or maintenance. Flights are assigned to airframes (tail numbers) by the owner of  
2002 the "flights" (trajectories) and the owner of the airframe (often the same Airspace User but not always  
2003 by definition). This airframe utilisation scheme is provided by the Airspace User no earlier than 1 to 2  
2004 days before the day of operation (Short term planning). Nevertheless, the ATV can be known in  
2005 advance in case of non-based airlines (i.e. the most simple case: when there is only one inbound  
2006 flight and one outbound flight during the day for one airline operator). The information is included in  
2007 the AOP and also provided to the network to update the NOP. [AUO-0204-A] [DCB-0103A] [DCB-  
2008 0302]

2009 Aircraft changes in the Medium / Short term planning phase are seen as "just" updates of the AOP.  
2010 Aircraft changes during execution are described in the turn-round OS where a USE CASE is  
2011 presented (UC 6 68).

2012

### 4.2.5.2 Revise / Update AOP during day of operation (UC 6 14)

2013 The night before the day of operation the reference AOP will be available for execution the next day.  
2014 As the AOP is a "rolling plan" and deviations from this plan will take place during execution,  
2015 continuous monitoring and updates of the AOP will be needed.

2016 Shortly before execution (often 12 to 24 hours before operation) the airport operator and the tower  
2017 supervisor allocate the airport resources to each flight (i.e. runways, taxiways, associated standard  
2018 taxi routes and APP sectors by the ANSP and stands, de-icing pads and passenger facilities by the  
2019 airport operator). This process repeats when the execution comes closer and more detailed  
2020 information becomes available, such as the runway configuration in use.

2021 Based on flight schedule information from the AOP, an initial (pre-) departure sequence is  
2022 determined, supported by the Airspace User (FOC) [TS-0202]. Where appropriate, interferences with  
2023 other airports (e.g. in the same or connecting TMA) is taken into account to adhere to the agreed  
2024 airport and network performance. [SDM-0101]

2025 The establishment and maintenance of the pre-departure sequence is a process involving the tower  
2026 ground controller and in some cases also the AOC Staff, who may propose sequence swaps or  
2027 negotiate a new rank in the sequence. [AUO-0102] [AUO-0204-A]

2028 The Tower Supervisor performs Runway Demand and/or Capacity assessments for the next few  
 2029 hours. In case of upcoming capacity reductions having a significant impact on the schedules of the  
 2030 airspace users, airspace users should express their preferences and priorities regarding their flights.  
 2031 Next, the impact of the proposed solutions is then assessed at the Network level by the Network  
 2032 Manager. **[DCB-0207]**

2033 Environmental rules and restrictions are taken into account where applicable. This might be applied in  
 2034 the runway – taxiway – parking stand planning to minimize taxi time / fuel burn / gaseous and  
 2035 particulate emissions but also on the use of runway combinations, (temporary) ban on night  
 2036 operations or refusal of late flight plan / iSBT submissions (e.g. business aviation and/or charter  
 2037 flights) as mitigation measure to ban aircraft noise at/around the airport. **[AO-0703]** Those measures  
 2038 are initiated if airports environmental performance reaches the limits set by the local and/or national  
 2039 authority. **[AO-0706]**

2040 When meteorological forecasts are available, the airport operator (Airside Operations Control Centre)  
 2041 and the ANSP (Airport Tower Supervisor) identify the special actions to be taken during the day of  
 2042 operations and take action accordingly. **[AO-0501] [AO-0502]**

2043 All unforeseen occurrences (such as abrupt changes in weather conditions, emergency repairs, but  
 2044 also late measures taken to keep the actual operation within the legal environmental boundaries) are  
 2045 identified and analysed on their impact on capacity. The consequences on flight / iSBT planning and  
 2046 execution for the next hours (up to 24 hours) are evaluated and processed in a collaborative way with  
 2047 all relevant actors including the Airspace Users. **[DCB-0206] [DCB-0207]** Where necessary, flight  
 2048 schedules are adapted to the actual situation and demand reduced by delaying or even cancelling  
 2049 flights taking into account the priorities of the Airspace Users **[AUO-0103] [AUO-0204-A]** as also the  
 2050 local situation at possibly all the destination airports. **[DCB-0304]**

2051 During the Medium and Short term planning phases, as also during the day of operation, all data  
 2052 (including flight data) will be recorded as input to the Post-Operation Analysis. Based on these data,  
 2053 the Post-Operations Analysis will analyse the pre-defined scenarios / solutions used during the  
 2054 Medium / short term planning phase and also during the execution of operations. Where appropriate,  
 2055 these pre-defined scenarios / solutions are fine-tuned / optimized or even new ones are defined. This  
 2056 is also described in the Operational Scenario “Post-Operations”.

2057 **Use cases Identified**

2058 Use Cases describe nominal conditions and topics that deviate from the nominal conditions. These  
 2059 use cases should be assigned to specific WP6 (sub)work packages.

Use Case ID	Use Case title	Use Case description
UC 6 14	Revise / Update AOP during day of operation	See sections 4.2.4.2.3 and 4.2.5.2 of this Document

2060 **Table 4-5 Identified Use Cases for Execution Phase**

2061 **4.2.5.3 Operational Scenario Execution Phase: Arrival**

2062 **4.2.5.3.1 Scope of scenario**

2063 This Arrival<sup>29</sup> scenario describes the processes and interactions that a flight encounters from the  
 2064 preparation of the landing phase (some 10-15 minutes before Top of Descent) until the aircraft arrives  
 2065 in-block at the parking stand (CDM milestone: AIBT), for SESAR Concept Story Board Step 1.

2066 The scenario assumes a generic airport configuration; scenarios concerning specific configurations,  
 2067 e.g. single runway mixed mode operations, may be developed as an alternative flow.

2068 It is not the purpose of the scenario to identify tools which support specific actions but to generally  
 2069 refer to the “system” (ground or air). However, where there is a specific and unique tool functionality,  
 2070 this may be mentioned.

<sup>29</sup> Although referred in this DOD as “ARRIVAL”, this operational scenario covers the « arrival », « approach », « final approach » and « landing & taxi-in » flight phases as defined in WP B4.2 ConOps.

2071 Where appropriate, Operational Improvement (OI) steps have been cross-referenced in the text to  
2072 verify the feasibility of the scenario.

2073 The Scenario covers all nominal and non-nominal procedures and is applicable from CAVOK to Low  
2074 Visibility Conditions (LVC).

2075

2076 IMPORTANT: In this 6.2 DOD, all processes and interactions described between the start of the  
2077 arrival scenario (some 10-15 minutes before Top of Descent) until touch down will only focus on  
2078 airport-related operations. All other processes and interactions occurring at the same time but relating  
2079 purely to En-Route/TMA operations are not described (as it is assumed that those will be covered by  
2080 the 5.2 DOD).

2081 [4.2.5.3.2 Scenario text](#)

2082 [4.2.5.3.2.1 Preparation of the landing phase](#)

2083 [General \(UC 6 99\)](#)

2084 At a specified time before Top of Descent (10-15 minutes), the Flight Crew initiates their landing  
2085 briefing taking into account the uplinked<sup>30</sup> information to the flight deck of the relevant airport  
2086 operational parameters (ATIS, METAR, OFIS) **[IS-0402]**<sup>31</sup>.

2087 The aircraft being equipped with an Enhanced Braking System, the Flight Crew arms<sup>32</sup> it. This action  
2088 results in a calculation of the AROT (Arrival Runway Occupancy Time) and Airborne Intended (or  
2089 preferred) runway exit taking into account possible ROT (Runway Occupancy Time) requirements  
2090 **[AUO-0701]**. Both AROT and preferred runway exit are automatically downlinked to the Ground  
2091 System to allow the ATC System to confirm or propose a different planned runway exit **[AUO-0703]**  
2092 (taking into account the list of appropriate runway exits **[AO-0305]**). Once the runway exit is agreed,  
2093 the Flight Crew will "trigger and manage" optimum braking all the way through landing in order to  
2094 vacate the runway at the agreed exit.

2095 Taxi-in route information (i.e. aircraft's best routing calculated by minimising the delay according to  
2096 planning, ground rules, and potential conflicting situations with other mobiles and the estimated  
2097 corresponding taxi time **[AO-0205]**) will be uplinked upon request from the aircraft system, which  
2098 occurs at some time between the top of descent and a limit (usually FL100) when flight crews start  
2099 applying sterile cockpit procedures in consistency with the (either assigned or agreed) runway exit  
2100 **[AUO-0308]**.

2101 Any update of the runway exit and/or the ground routing is communicated to the Flight Crew either via  
2102 data link **[AUO-0308]** or via voice communication (R/T)<sup>33</sup>.

2103 During descent until final approach, the Flight Crew will be able to operate in Low Visibility Conditions  
2104 thanks to enhanced ATC procedures and/or navigation systems (e.g. smaller ILS sensitive and critical  
2105 areas in CAT II/III or use of MLS) **[AO-0502]**. The Flight Crew will also be able to use GBAS CATII/III  
2106 based on GPS L1 for precision approaches **[AO-0505-A]**. Advanced RNP transitions with curved  
2107 procedures connecting directly to the final approach can provide improved access in obstacle rich  
2108 environments and can reduce environmental impact **[AOM-0605]**<sup>34</sup>.

<sup>30</sup> It is assumed that, even though the control of the aircraft hasn't been handed over to the airport controllers, the datalink connection, when needed, will be available between the aircraft and the airport ATC services without having to go through the TMA controllers. This issue is recorded in the appropriate section of this DOD Sect 8.

<sup>31</sup> According to B4.2 STEP1 CONOPS, there will be no ATIS via ATN due to already existing via ACARS and no OTIS via ATN in step 1

<sup>32</sup> Should the aircraft not be equipped with an Enhanced Braking System, the Flight Crew will directly request via data-link the expected taxi-in route (computed by the ATC system according to the Planned Taxi route using an assigned runway exit based on statistical recorded data according to aircraft type and operator).

<sup>33</sup> Beyond a certain point in the descent, using datalink might raise safety issues and thus voice communication will be preferred, as long as this communication does not involve the TMA controller or radio interference.

<sup>34</sup> Advanced RNP with transition from RNP procedures in initial and intermediate approaches to "xLS" CAT I/II/III procedures in final approach with "xLS" meaning "ILS", "MLS", "SLS" (Satellite Landing System e.g. GPS/SBAS) or "GLS" (GBAS Landing System)

2109 The Tower Runway Controller monitors the landing runway and adjacent traffic visually and supported  
 2110 by the ATM System [AO-0201-A] [AO-0208-A] to ensure that the traffic complies with instructions,  
 2111 specifically with respect to separation requirements (e.g. Time Based Separations [AO-0303],  
 2112 Weather Dependent Separation [AO-0310], RECAT2 [AO-0306]) and that the runway is clear of  
 2113 potential conflicts [AO-0102]. In addition, the Tower Runway controller is informed by the ground  
 2114 system when debris is detected on the surfaces of the runway or connected taxiways [AO-0202].

2115 The assigned runway can be changed on short notice, e.g. "Swing-over Procedure" in case of parallel  
 2116 or near parallel runways. This can only be done in agreement with the Flight Crew.

2117 During final approach, the Flight Crew is assisted by an on-board system that detects potential and  
 2118 actual risk of collision with other traffic during runway operations and provides the Flight Crew with the  
 2119 appropriate alert [AUO-0605-A].

2120 The Tower Runway Controller communicates the "Landing Clearance" via voice (R/T).

2121 Note: there may be cases where the Aerodrome Control Service or the Aerodrome Flight Information  
 2122 Service is provided from a remote location, i.e. not from a control tower local to the aerodrome [SDM-  
 2123 0201]. This note is applicable to all operations relating to this ARRIVAL scenario.

#### 2124 4.2.5.3.2.2 Landing

##### 2125 General (UC 6 15)

2126 The Flight Crew lands the aircraft on the assigned runway. The Ground System detects touchdown,  
 2127 records the information and makes this information available to other users.

2128 On roll-out the aircraft's automatic braking system manages the deceleration to achieve the planned  
 2129 runway exit [AUO-0703].

2130 In case the Tower Runway Controller has previously made the specific request<sup>35</sup> to the Flight Crew,  
 2131 the later reports that their aircraft has vacated the runway when this manoeuvre is indeed completed.  
 2132 Otherwise, the Tower Runway Controller verifies, either by using the ATM System [AO-0201-A], or  
 2133 visually, that the aircraft has vacated the runway.

2134 The Tower Runway Controller instructs the Flight Crew to contact the Tower Ground Controller,  
 2135 transferring control of the aircraft. The ATM System records the runway exit taken by the aircraft and  
 2136 that it has vacated the runway.

##### 2137 Optional

##### 2138 Touch and go (UC 6 16)

2139 If, for whatever reason, the aircraft has to perform a touch and go, the general landing procedure  
 2140 starts again (or, in exceptional cases, the aircraft might start the execution of a diversion to an  
 2141 alternate airport).

##### 2142 Go Around (UC 6 17)

2143 If, for whatever reason, the aircraft has to perform a go around, the general landing procedure starts  
 2144 again (or, in exceptional cases, the aircraft might start the execution of a diversion to an alternate  
 2145 airport).

##### 2146 Aircraft not leaving the runway as expected (UC 6 18)

2147 The aircraft did not leave the runway at the planned exit for technical reasons, e.g. speed too high  
 2148 (not intended), a new route has to be recalculated and distributed [AO-0205].

<sup>35</sup> This occurs in case of inability of the controller to determine, either visually or via an ATS surveillance system that a vacating or crossing aircraft has cleared the runway.

2149 **Exits not available (UC 6 19)**

2150 Exits might not be available due to blocking by an aircraft / vehicle or short maintenance. That means,  
 2151 aircraft will not be able to exit the runway(s) as usual/ planned, and an alternative route has to be  
 2152 recalculated and distributed [AO-0205]. Also, should the runway still be occupied by the aircraft that  
 2153 could not use the intended runway exit, the downstream runway traffic will have to be re-organised  
 2154 accordingly.

2155 **Violation**2156 **Unplanned blockage of assigned exit (UC 6 20)**

2157 For whatever reason, an assigned exit might be blocked on short notice (on purpose), a new route  
 2158 has to be recalculated and distributed [AO-0205].

2159

2160 **4.2.5.3.2.3 Taxi-In**2161 **General (UC 6 21)**

2162 The Flight Crew contacts the Tower Ground Controller by voice<sup>36</sup>. The Tower Ground Controller  
 2163 informs the flight crew of the assigned / planned stand and provides the taxi-in instructions. The taxi  
 2164 instructions will be issued by the Tower Ground Controller either by using Data link [AUO-0308]  
 2165 capability (provided that the tactical situation permits) or by voice. The taxi routing data is provided by  
 2166 the ATM system [AO-0205], based on the runway exit actually taken by the aircraft, the assigned  
 2167 stand and taxi routes designed to primarily adhere to pre-calculated target times, to minimize the taxi  
 2168 distance or other criteria (e.g. emissions [AO-0703]) in addition to potential conflicting situations with  
 2169 other mobiles.

2170 In detecting potential conflicting situations, the Tower Ground Controller is assisted by a Surface  
 2171 Management function which constantly monitors the overall ground traffic situation [AO-0201-A]. It  
 2172 informs the Tower Ground Controller of any detected deviation from the route/plan [AO-0104-A] and  
 2173 warns the Tower Runway Controller of any potential runway incursion [AO-0102] or infringement of  
 2174 closed / restricted areas [AO-0104-A].

2175 The Flight Crew acknowledges and executes the taxi instructions supported by the on-board display  
 2176 of the airport layout (showing taxiways, runways, fixed obstacles), the own aircraft position and the  
 2177 route to stand as well as ground signs (stop bars, centreline lights, etc.) that are triggered  
 2178 automatically according to the route issued by ATC [AUO-0603-A].

2179 While taxiing, the Flight Crew may have to use an enhanced vision capability in Low Visibility  
 2180 Conditions [AUO-0403] and may have to comply with local rules to minimize aircraft fuel use and  
 2181 gaseous and particulate emissions if such exist [AO-0703]. ADS-B equipped aircraft and vehicles are  
 2182 displayed on the Flight Deck HMI, providing the Flight Crew with graphical information on adjacent  
 2183 surface traffic [AUO-0401]; supplementing visual observations and enhancing see-and-be-seen  
 2184 procedures.

2185 Likewise, the ground vehicles will have a display with dynamic traffic context information, including  
 2186 status of runways, taxiways, obstacles and route (potentially by application of an airport moving map)  
 2187 and ground signs (stop bars, centreline lights, etc.), which are triggered automatically according to the  
 2188 route issued by ATC [AO-0206]. There will also be a possibility to have an automated exchange  
 2189 between Vehicle Drivers and Tower Controllers using Data link for ground-related clearances and  
 2190 information [AO-0215]. The ATM system detects and informs the vehicle driver of any potential and/or  
 2191 actual risk of collision with aircraft as well as any infringement of closed / restricted areas [AO-0105].

2192 The Tower Ground Controller, with the assistance of the ATM System, monitors the traffic situation  
 2193 [AO-0201-A] trying to anticipate potentially hazardous situations (e.g. converging airport traffic,  
 2194 temporary obstructions, etc...).

2195 The Flight Crew correlates the traffic information (provided by an on-board display [AUO-0401]) with  
 2196 the instructions received from the Tower Ground Controller and manoeuvres the aircraft accordingly.

<sup>36</sup> The assumption made in OFA04.02.01 is that the first contact between ATC and an aircraft/vehicle will be performed via voice, while subsequent messages can be done either via voice or data link.



- 2197 Instructions with regard to other aircraft or ground vehicles are issued via voice communication (R/T).
- 2198 The instructed taxi route will extend to the Taxi Clearance limit approved by the Tower Ground  
2199 Controller. If necessary (additional routing, or continuing taxi after a hold) subsequent routing  
2200 information and taxi instructions may be provided [AUO-0308].
- 2201 The Flight Crew stops the aircraft at the stop line/stop bars on the taxiway system or holding point  
2202 presented on the moving map and awaits further clearance/instructions [AUO-0603-A].
- 2203 To prevent runway incursions, the Flight Crew (and Vehicle Drivers) share Improved Procedures and  
2204 Best Practices on the Ground [AO-0101]. They will be directly warned through Runway Status Lights  
2205 when the runway is unsafe to cross or enter (illuminated Runway Entrance Lights) [AO-0209].
- 2206 If the Aircraft proceeds across an illuminated stop bar, the ATM System provides the Tower Ground  
2207 and Tower Runway Controller with an automated alert [AO-0104-A]. In case of potential collision with  
2208 mobiles/obstacles, the ATM System also alerts the concerned mobile(s) (e.g. Vehicle Driver(s) [AO-  
2209 0105]) and the Tower Ground Controller [AO-0102]. A solution (i.e. revised clearances which will then  
2210 be executed by the concerned mobile(s)) is proposed by the Tower Ground Controller, to Flight Crew  
2211 and/or Vehicle Driver.
- 2212 If the aircraft moves from one area of responsibility to another, the accountability for the flight is  
2213 handed over from one control position to another control position. This process is assisted by the  
2214 ATM System. The hand over instruction can be provided by the controller either via data-link or via  
2215 voice communication (R/T).
- 2216 If the Taxi Clearance Limit is an active runway, the Tower Ground Controller instructs the Flight Crew  
2217 to contact the responsible Tower Runway Controller who will issue clearance to cross (or enter) via  
2218 voice communication (R/T).
- 2219 The Tower Runway Controller verifies, either visually or using the ATM System [AO-0201-A] [AO-  
2220 0208-A] that the aircraft is crossing the runway. Once vacated, he instructs the Flight Crew to contact  
2221 the Tower Ground Controller responsible for this ground surface area, again transferring control of the  
2222 aircraft.
- 2223 The Tower Ground Controller supported by ground automation, issues further taxi route clearance(s)  
2224 to the stand via the ATM System to provide the aircraft HMI with further routing information, in order to  
2225 ensure that the aircraft reaches the allocated stand [AUO-0308].
- 2226 The Tower Ground Controller checks visually and uses the ATM System to monitor the aircraft  
2227 movement and track its progress against the issued taxi-in route [AO-0205] and its position with  
2228 respect to other surface traffic [AO-0201-A] [AO-0104-A].
- 2229 **Optional**
- 2230 **Cooling time (UC 6 22)**
- 2231 If for whatever reason an aircraft requires cooling time after touchdown, before being parked at a  
2232 stand, this has to be considered and planned within the taxi routing. Cooling time may be required  
2233 either for brakes or for the engines.
- 2234 **Remote Holding (UC 6 23)**
- 2235 A remote hold can be a planned action, if a parking stand is not yet available and has therefore to be  
2236 planned within the taxi routing. On the other hand, blockage of taxiways or part of the apron can be  
2237 necessary for whatever reason; also technical reasons can be a factor.
- 2238 **Return to stand (UC 6 24)**
- 2239 If for whatever reason, the Flight Crew of an outbound flight requests to return to a stand on the apron  
2240 during the taxi-out procedure, this issue must then be handled as a general arrival process.
- 2241 **Alternative Parallel Taxi routing (UC 6 25)**
- 2242 On several airports, this procedure is in use. Additional lines are marked parallel to an existing taxi  
2243 line, giving the possibility to taxi and/or tow two aircraft on one taxiway up to an specific ICAO-  
2244 Category (e.g. at Munich Airport ICAO Category "C") at the same time.
- 2245 **Towing (UC 6 26)**

2246 An aircraft can also be towed, either from maintenance or from another stand to the final parking  
2247 stand, where the turn-round process will be handled, this issue must then be handled as a general  
2248 arrival process

#### 2249 **Low visibility procedures (UC 6 27)**

2250 In condition of LVP the Tower Ground and Tower Runway Controller will apply appropriate  
2251 procedures, supported by the Tower Supervisor, according to the AIP.

#### 2252 **Violation**

#### 2253 **Deviation from Taxi route (UC 6 28)**

2254 If for whatever reasons an aircraft deviates from its assigned taxi route, the Tower Ground Controller  
2255 is warned by the ATM System [AO-0104-A] and may assign a new taxi route (possibly assisted by the  
2256 ATM System [AO-0205]), or instruct the aircraft to be towed to a position from where it can proceed  
2257 as previously planned. Alternatively, the Tower Ground Controller may assign a new taxi route to  
2258 other potentially conflicting aircraft. Whatever solution is taken, it might create a delay for either the  
2259 affected aircraft or for the potentially conflicting aircraft or both. If one of the aircraft is departing and if  
2260 the delay causes the expected take-off time to go outside the TTOT tolerance band, the system will  
2261 calculate a new TTOT.

#### 2262 **Deadlock situation on Taxiway (UC 6 29)**

2263 If for whatever reasons there is a head-on situation between two aircraft on a taxiway, the Tower  
2264 Ground Controller will instruct one of the aircraft to be towed to a position from where it can proceed.  
2265 He will give a revised taxi instruction and assign a new route to one of the aircraft [AO-0205]. There  
2266 will be a delay while a tow tug reaches the relevant aircraft. Both aircraft will be delayed. If one of the  
2267 aircraft is departing and if the delay causes the expected take-off time to go outside the TTOT  
2268 tolerance band, the system will calculate a new TTOT.

#### 2269 **Holding position overrun (UC 6 30)**

2270 If for whatever reason an aircraft might overrun its assigned holding position, the Tower Ground  
2271 Controller is warned by the ATM System [AO-0104-A] and may instruct the affected aircraft to stop  
2272 and assign a new taxi route (possibly assisted by the ATM System [AO-0205]), or the Tower Ground  
2273 Controller may assign a new taxi route to other aircraft, which is affected by the overrun. Whatever  
2274 solution is taken, it might create a delay for either the affected aircraft or for the obstructing traffic or  
2275 both. If one of the aircraft is departing and if the delay causes the expected take-off time to go outside  
2276 the TTOT tolerance band, the system will calculate a new TTOT.

#### 2277 **Runway incursion (UC 6 31)**

2278 If for whatever reason one or more mobiles (aircraft and/or vehicles) enter the protected area of an  
2279 active runway, the Tower Runway Controller is warned by the ATM System [AO-0102] will take all  
2280 subsequent action to resolve the runway incursion. If no incident or accident has happened, this  
2281 situation at least implies a delay for taxi-out and taxi-in, because the planned traffic has to be re-  
2282 sequenced. If one of the aircraft is departing and if the delay causes the expected take-off time to go  
2283 outside the TTOT tolerance band, the system will calculate a new TTOT.

#### 2284 **4.2.5.3.2.4 Arriving at stand**

#### 2285 **General (UC 6 32)**

2286 As the Aircraft approaches the stand, the Automated Visual Docking system will be activated  
2287 according to local procedures and checks if the allotted stand is free from obstacle. The Flight Crew  
2288 follows the instructions given by the docking system and manoeuvres the aircraft accordingly.

2289 The System detects "in block", records the event and disseminates the information to the ATM  
2290 System. The ATM system updates the AOP.

#### 2291 **Optional (UC 6 33)**

2292 As the Aircraft approaches the stand, ground staff checks if the allotted stand is free from obstacle.  
2293 The Flight Crew follows the instructions given by the "Follow-Me" and manoeuvres the aircraft  
2294 accordingly.

#### 2295 **Violation (UC 6 34)**

2296 Aircraft entering the stand ignoring the docking instructions.

#### 2297 4.2.5.3.3 Use Cases Identified

2298 Use cases describe nominal conditions and topics that deviate from the nominal conditions. These  
2299 use cases should be assigned to specific WP6 (sub)work packages.

Use Case ID	Use Case title	Use Case description
UC 6 99	Preparation of the landing phase	Refer to Section 4.2.5.3.2.1
UC 6 15	Landing	Refer to Section 4.2.5.3.2.2
UC 6 16	Touch and go	If, for whatever reason, the aircraft has to perform a touch and go, the general landing procedure starts again
UC 6 17	Go around	If, for whatever reason, the aircraft has to perform a go around, the general landing procedure starts again
UC 6 18	Aircraft not leaving the runway as expected	The aircraft did not leave the runway at the planned exit for technical reasons, e.g. speed too high (not intended), a new route has to be planned and distributed
UC 6 19	Exit not available	Exits might be on maintenance that means, aircraft will not be able to exit the runway(s) as usual, an alternative route has to be planned and distributed
UC 6 20	Unplanned blockage of assigned exit	For whatever reason, an assigned exit might be blocked on short notice (on purpose), a new route has to be planned and distributed
UC 6 21	Taxi-in	Refer to Section 4.2.5.3.2.3
UC 6 22	Cooling Time	If for whatever reason an aircraft requires cooling time after touchdown, before being parked at a stand, this has to be considered and planned within the taxi routing. Cooling time may be required either for brakes or for the engines
UC 6 23	Remote Holding	A remote hold can be a planned action, if a parking stand is not yet available and has therefore to be planned within the taxi routing. On the other hand, blockage of taxiways or part of the apron can be necessary for whatever reason; also technical reasons can be a factor.
UC 6 24	Return to stand	If for whatever reason, the Flight Crew of an outbound flight requests to return to a stand on the apron during the taxiout procedure, this issue must then be handled as a general arrival process.
UC 6 25	Alternative Parallel Taxi Routing	On several airports, this procedure is in use. Additional lines are marked parallel to an existing taxi line, giving the possibility to taxi and/or tow two aircraft on one taxiway up to an specific ICAO-Category (e.g. at Munich Airport ICAO Category "C") at the same time.
UC 6 26	Towing	An aircraft can also be towed, either from maintenance or from another stand to the final parking stand, where the turn-round process will be handled. This issue must then be handled as a general arrival process
UC 6 27	Low visibility procedures	In LVP conditions the Tower Ground and Tower Runway Controller will apply appropriate procedures, supported by the Tower Supervisor, according to the AIP.
UC 6 28	Deviation from Taxi route	If for whatever reasons an aircraft deviates from its assigned taxi route, the Tower Ground Controller is warned by the ATM System and may assign a new taxi route (possibly assisted by the ATM System, or instruct the aircraft to be towed to a position from where it can proceed as previously planned, or assign a new taxi route to other potentially conflicting aircraft. Whatever solution is taken, it might create a delay for either the affected aircraft or for the potentially conflicting aircraft or both.
UC 6 29	Deadlock situation on Taxiway	If for whatever reasons there is a head-on situation between two aircraft on a taxiway, the Tower Ground Controller will instruct one of the aircraft to be towed to a position from where it can proceed. He will give a revised taxi instruction. There will be a delay while a tow tug reaches the relevant aircraft. Both aircraft will be delayed.
UC 6 30	Holding position overrun	If for whatever reasons an aircraft might overrun its assigned holding position, the Tower Ground Controller may instruct the affected aircraft to stop and assign a new taxi route, or the Tower Ground Controller may assign a new taxi route to other aircraft, which is affected by the overrun. Whatever solution is taken, it might create a delay for either the affected aircraft or for the obstructing traffic or both.

Use Case ID	Use Case title	Use Case description
UC 6-31	Runway incursion	If for whatever reason one or more mobiles (aircraft and/or vehicles) enter the protected area of an active runway, the Tower Runway Controller is warned by the ATM System will take all subsequent action to resolve the runway incursion. If no incident or accident has happened, this situation at least implies a delay for taxi-out and taxi-in, because the planned traffic has to be re-sequenced.
UC 6 32	Arriving at stand	Refer to Section 4.2.5.3.2.4
UC 6 33	Follow me for parking	As the Aircraft approaches the stand, ground staff checks if the allotted stand is free from obstacle. The Flight Crew follows the instructions given by the "Follow-Me" and manoeuvres the aircraft accordingly.
UC 6 34	Aircraft ignoring docking instructions	Aircraft entering the stand ignoring the docking instructions.
Other Use Cases for topics that deviate from the nominal conditions.		
UC 6 35	Runway with middle exit only	The aircraft might have to do a back track to vacate the runway (mostly at civil use of military fields). That implies a larger separation between the actual and the next arrival and therefore eventually produces an inbound delay during unplanned peaks.
UC 6 36	Runway used for opposite departures	Mostly used on airports with obstacles. That implies a larger separation between the departure and the arrival and therefore eventually produces an inbound delay.
UC 6 37	UC 6 38 with only one taxiway connected	Opposite traffic also on the taxiway, that produces either inbound or outbound delay, and results in taxi-in delays.
UC 6 38	Runway change	A change of the landing runway may be initiated caused by closures of taxiways or the dimensions of an aircraft might not allow the use of specific taxiways to the assigned stand. That might cause a delay for succeeding flights.
UC 6 39	Runway Inspection	A runway inspection is done on a regular basis, or if requested by Tower Runway Controller or Airport Tower Supervisor. The movement of the inspection car has to be handled as an aircraft movement as long as it moves on the runway or within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.
UC 6 40	Bird Control on active runway	Bird control is done on a regular basis, or if requested by Tower Runway Controller or Airport Tower Supervisor. The movement of the bird control car has to be handled as an aircraft movement as long as it moves on the runway or within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.
UC 6 41	Aborted Take-off	If a flight aborts its take off, the runway occupancy will be longer than expected. When the flight is clearing the runway, the Tower Runway Controller transfers the flight to the Tower Ground Controller (instructing a frequency change). If the flight is ready to depart, the Tower Ground Controller may re-sequence the affected aircraft into the departures. If not, the flight will taxi back to a stand (assigned by Airport Operations after coordination with Airport Tower Supervisor).
UC 6 42	Aircraft blocking the active runway due to technical reasons	If an aircraft is unable to vacate the runway (e.g. nose wheel steering is unserviceable), there is a major delay expected, because first technicians have to inspect the aircraft, if it can be towed away and a tow tug has to be ordered and make its way to the aircraft.
UC 6 43	Aircraft blocking the active runway with an emergency	Aircraft is blocking the runway, e.g. due to one or more flat tires after touchdown, there is a longer delay expected, because first fire fighters have to secure the aircraft, second technicians have to inspect the aircraft, if it can be lifted up and later be towed away and a tow tug has to be ordered and make its way to the aircraft, etc.
UC 6 44	Major accident on active runway	Aircraft is blocking the runway, e.g. due to one or more flat tires after touchdown, there is a longer delay expected, because first fire fighters have to secure the aircraft, second technicians have to inspect the aircraft, if it can be lifted up and later be towed away and a tow tug has to be ordered and make its way to the aircraft, etc.
UC 6 45	Aircraft blocking a taxiway due to technical reasons	If an aircraft is unable to continue taxi (e.g. nose wheel steering is unserviceable), there is a delay to be expected, because first technicians have to inspect the aircraft, if it can be towed away and a tow tug has to be ordered and make its way to the aircraft.

Use Case ID	Use Case title	Use Case description
UC 6 46	Aircraft blocking a taxiway with an emergency	Aircraft is blocking a taxiway, e.g. due to an engine fire, there is a longer delay expected, because first fire fighters have to secure and maybe evacuate the aircraft, second technicians have to inspect the aircraft, if it can be lifted up and later be towed away and a tow tug has to be ordered and make its way to the aircraft, etc.
UC 6 47	Major accident on a taxiway	Aircraft is/are blocking a taxiway after e.g. a collision.
UC 6 48	Unplanned closure of part of the airport infrastructure	Considered infrastructures in arrival scenario: runway(s), taxiways, aprons and aircraft parking stands Two cases to address: When the closed taxiway/runway(s) is part of the taxi-in route issued to the aircraft. When the closed taxiway/runway(s) is not part of the issued taxi route and the closure generates a concentration of traffic on the taxi route on the considered aircraft.
UC 6 49	"Follow-me" requested by Flight Crew (not for parking)	For whatever reason, the Flight Crew might request guidance by a "Follow-me" after vacating the runway. That implies a delay for the flight or even for succeeding flights, because the aircraft will wait for the arrival of the "Follow-me" and maybe blocking the only available exit of the runway.
UC 6 50	Winter conditions with on-going winter operations (snow/ice removal)	Analysis of a situation of serious winter phenomenon overwhelming winter operations (heavy snow storm, freezing rain) happening on short notice. Analysis of a situation of "medium" winter phenomenon with on-going winter operations triggering restrictions to use certain infrastructures (limitation to some aircraft types) and infrastructures unavailability (intermediate line up taxiway not available, part of taxiways closed, ...) and difficulties to enter parking stand etc.
UC 6 51	Apron Control	Information regarding stand, etc. is transferred to the Flight Crew when entering the apron area, together with a taxi routing to the stand, that shortens the instruction of the Tower Ground Controller and might therefore be more efficient.
UC 6 52	Aircraft arrives at wrong parking stand	Due to whatever reasons the aircraft arrives at a wrong parking stand. The solution can be different, re-planning of the parking stand, if possible, or towing of the aircraft to position it on the planned parking stand. Whatever solution is taken, it might imply a delay for the affected aircraft and also for other traffic.
UC 6 53	Aircraft arrives at engaged parking stand	Due to whatever reasons the aircraft arrives at an engaged parking stand. The solution can be different, re-planning of the parking stand and taxiing to the new assigned parking stand, or waiting until the aircraft blocking the stand is vacating the latter. Whatever solution is taken, it might imply a delay for the affected aircraft and also for other traffic.

Table 4-6 Identified Use Cases for Arrival

2300

2301

2302

#### 4.2.5.4 Operational Scenario Execution Phase: Turn-round

2303

##### 4.2.5.4.1 Scope of scenario

2304 This scenario describes the processes and interactions during the ground handling of an aircraft when  
 2305 parked at the stand as well as the preparation of the aircraft to perform the next part of the trajectory  
 2306 or to start a new trajectory. The scenario assumes a generic aircraft stand configuration; nose in  
 2307 parking position. It is not the purpose of the scenario to identify tools which support specific actions  
 2308 but to generally refer to the "system". However, where there is a specific and unique tool functionality,  
 2309 this may be mentioned.

2310 According to A-CDM<sup>37</sup> the turn-round scenario starts at the moment the aircraft is parked (AIBT -  
2311 Actual In-Block Time) and ends at the moment the aircraft is being pushed back or vacates the  
2312 parking position (AOBT – Actual Off-Block Time).

2313

<b>AIBT</b>	Actual In-Block Time	Time the aircraft stops at the parking position and the chocks are positioned
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2314

<b>AOBT</b>	Actual Off-Block Time	Time the aircraft pushes back / vacates the parking position
-------------	-----------------------	--

2315 The scenario scope is determined based on the physical process. Part of the information related to  
2316 the physical process of turn-round might be available before the start of the physical process. The  
2317 detailed description of the process defining this information is included in preceding scenario(s). This  
2318 will be the planning scenario where the information is made available during the planning of the BT  
2319 but also the scenarios of the preceding flight phase's taxi-out/take-off and climb at origin airport, en-  
2320 route, approach and landing/taxi-in during the execution of the inbound flight.

2321 During the execution of the trajectory, many issues can occur that will have an impact on the planned  
2322 trajectory. Revisions, modifications and updates of the trajectory will take place continuously. As an  
2323 example related to the turn-round scenario, the way Estimated In-Blocks Time (EIBT) is defined and  
2324 updated during the whole execution of all preceding phases can be mentioned, as well as the update  
2325 of the Target Off-Block Time.

2326 Although the determination of EIBT takes place within other phases, it is described as an information  
2327 process in this scenario as the EIBT is a milestone for the preparation of the turn-round process. All  
2328 planning for the events in this scenario has taken place in the medium / short term planning phase.

2329 **4.2.5.4.2 Scenario text**

2330 **4.2.5.4.2.1 Operations prior to Turn-round**

2331 Preparation for the turn-round process takes place before the actual arrival of the aircraft at the  
2332 parking stand. In fact the turn-round process for the ground handler, airspace user and airport  
2333 operator starts while the aircraft is still airborne, or even on the ground at the origin airport.

2334 The ATM system continuously updates the ELDT and EIBT during the progress of the aircraft along  
2335 its trajectory. Progress updates are uploaded through SWIM to the Network and the relevant airport  
2336 **[DCB-0302] [IS-0101] [IS-0901-A]**.

2337 Monitoring of the progress of the aircraft along its trajectory towards the airport is essential to have  
2338 the resources (equipment and staff) timely available as well as having the passengers, baggage  
2339 and/or cargo for the next trajectory of the aircraft “ready into position” at boarding time for the  
2340 execution of the next flight segment of the trajectory or a new trajectory. **[AO-0601] [AUO-0203-A]**

2341 At the first determination of the EIBT the ATM system assesses the expected on-time performance of  
2342 the connected outbound flight segment (be it the continuation of the Trajectory or a new Trajectory  
2343 **[AUO-0203-A]**). If the EIBT plus the Minimum Turn-round Time exceeds the SOBT/EOBT an alert is  
2344 raised to the aircraft operator.

2345 At EOBT (which could still be equal to SOBT) minus a predefined number of hours (e.g. -3 hours), the  
2346 ATM system generates the first Departure Planning information and communicates that information  
2347 through the Network **[DCB-0302]**. If necessary the milestones (TOBT, TSAT and TTOT) for the next  
2348 “outbound” segment of the trajectory (same or new one) are updated and re-planned accordingly. The  
2349 update of the “outbound” segment is uploaded to the network **[TS-0308] [IS-0101] [IS-0901-A]**.

2350 At a predefined number of minutes before the ELDT the Ground Handling Agent (equipment and  
2351 human), the Airport Operator (stand/gate) and the Airspace User / AOC organise their resources to  
2352 match the plan **[IS-0101]**.

<sup>37</sup> Airport Collaborative Decision Making (A-CDM) processes are introduced to assure the best overall system outcome while paying due attention to the business goals of the airport and of individual aircraft operators.

2353 4.2.5.4.2.2 In-block

2354 General (UC 6 54)

2355 The AOC/Aircraft Operator or its Ground Handling Agent determines an estimate of the turn-round  
2356 time [IS-0101]. The feasibility of the Target Off-Block Time (TOBT) is checked and where necessary  
2357 updated in the system. [DCB-0302]

2358 The integration and exploitation of new ATC functions such as virtual stop bars during Low Visibility  
2359 Procedures will result in enhanced situational awareness for ATCOs and flight crews, improved safety  
2360 nets and will integrate the Tower with external units [AO-0208-A].

2361 Based on the available TOBTs a pre-departure sequence (TSATs) and a TTOT is  
2362 determined/updated, taking into account local constraints at the airport (on apron, taxiways and/or  
2363 runways) [TS-0308] [AO-0205]. Next to local aspects (like the expected departure runway, the taxi  
2364 routing and traffic situation), possible constraints at the destination airport (like the NMOC slots) are  
2365 also taken into account in updating TSAT [TS-0202] [IS-0101] [DCB-0302].

2366 At every milestone, the ATM-system propagates the updated outbound trajectory (iSBT) information  
2367 to the Network [AO-0601] [AUO-0203-A] [IS-0101] [IS-0901-A].

2368 4.2.5.4.2.3 Aircraft Handling

2369 General (UC 6 55)

2370 After placing blocks, connecting ground power supply and engine shutdown the Ground Handling  
2371 Agent further executes the aircraft handling process to complete the inbound business trajectory and  
2372 to prepare for the next outbound business trajectory [AUO-0203-A]. Main actions of the Ground  
2373 Handling Agent during the turn-round process include:

Ground handling of a passenger aircraft	Ground handling of a full freighter aircraft
<ul style="list-style-type: none"> <li>Placing blocks,</li> <li>Connecting ground power systems,</li> <li>Positioning stairs / boarding bridge,</li> <li>Opening doors,</li> <li>De-boarding passengers,</li> <li>Crew (de-boarding) services,</li> <li>Unloading baggage (and cargo / mail),</li> <li>Waste water services,</li> <li>Catering services,</li> <li>Fresh water service,</li> <li>Re-fuelling,</li> <li>Loading baggage (and cargo / mail),</li> <li>Crew (boarding) services,</li> <li>Boarding passengers,</li> <li>Closing doors ,</li> <li>Reposition stairs and boarding bridge,</li> <li>Disconnect ground power systems (after engine or APU start-up),</li> <li>Connecting Tow Tug (in case of a parking position that require a pushback operation),</li> <li>Removing blocks.</li> </ul>	<ul style="list-style-type: none"> <li>Placing blocks,</li> <li>Connecting ground power systems,</li> <li>Positioning stairs,</li> <li>Opening doors,</li> <li>Crew (de-boarding) services,</li> <li>Unloading cargo / mail,</li> <li>Waste water services,</li> <li>Catering services,</li> <li>Fresh water service,</li> <li>Re-fuelling,</li> <li>Loading cargo / mail,</li> <li>Crew (boarding) services,</li> <li>Closing doors,</li> <li>Reposition stairs,</li> <li>Disconnect ground power systems (after engine or APU start-up),</li> <li>Connecting Tow Tug (in case of a parking position that require a pushback operation),</li> <li>Removing blocks.</li> </ul>

2374 **Table 4-7 Ground Handling actions during Turn-round**

2375

2376 Within the turn-round process the boarding process is an important element. A boarding status is  
2377 included in the turn-round process to monitor the synchronism performance of the major airport  
2378 processes: the passenger process (check-in, security, etc.), baggage/cargo process (sorting,  
2379 transport to stand, etc.) and the aircraft process (loading, refuelling, etc.) [AO-0601].

2380 **Optional**2381 **Use of remote parking stand (UC 6 56)**

2382 In case of an open stand at a remote distance from the terminal, passengers will be transported  
2383 between aircraft and terminal (and vice versa) with the use of apron busses. Active taxiways may  
2384 need to be crossed by ground handling vehicles [AO-0601].

2385 **Violation**2386 **Unable to respect TOBT (UC 6 57)**

2387 Missing passengers, late boarding of passengers and/or late loading of baggage and cargo may  
2388 result in not achieving the TOBT. Close monitoring of the handling process must assure that in case  
2389 of late boarding / loading the impact on TOBT is recognized in an early stage and when necessary an  
2390 updated TOBT determined, the AOP updated and a new TSAT provided [DCB-0302]. In case of a  
2391 new TSAT, an updated pre-departure sequence and TTOT is determined, taking into account local  
2392 constraints at the airport (on apron, taxiways and/or runways) [TS-0202] [TS-0308] [IS-0101].

2393 **4.2.5.4.2.4 Pre-departure**2394 **General (UC 6 58)**

2395 The pre-departure sequence refers here only to the organisation of flights from the stand/parking  
2396 position. Pre-departure sequences are established collaboratively with the concerned airport CDM  
2397 partners taking into account agreed principles to be applied for specified reasons (e.g. slot  
2398 compliance, airline preferences, night curfew, evacuation of stand/gate for arriving aircraft, etc.). The  
2399 resulting pre-departure list is used by ATC while sequencing departing aircraft, and when feasible  
2400 [AO-0602] [IS-0101].

2401 Based on the TOBT of the Reference Business Trajectory (iRBT) [AUO-0203-A], the ATM System  
2402 updates the Target Take-Off Time (TTOT). The TTOT takes into consideration the NMOC slot or,  
2403 when available, the Target Time of Arrival (TTA) at the destination airport. With knowledge of the  
2404 NMOC slot (or TTA), the elapsed time derived from the trajectory, the expected departure runway and  
2405 the departure and arrival demand for the runway(s) (coupled AMAN/DMAN) [DCB-0302] [TS-0308].  
2406 The local departure management process will calculate backwards from the TTOT the associated  
2407 start-up/ push-back time and taxi routing [TS-0202] [IS-0101].

2408 In case of mixed mode runway operations, the ATM System also considers the dependency between  
2409 pre-departure management (TSAT sequence) and arrival metering so that arrival and departure flows  
2410 are efficiently integrated (coupled AMAN/DMAN) [TS-0308].

2411 The ATM System issues the Target Start-up Approval Time (TSAT) and the relevant TTOT, taking  
2412 into consideration the taxi route from the flight's stand to the holding point and the associated taxi time  
2413 [AO-0205] [TS-0202]. Based on the last iteration of the TTOT and TSAT, the AOC updates the  
2414 iRBT/iRMT [IS-0101] and will contain target times (TTO/TTA) when they are deemed necessary  
2415 [AUO-0204-A].

2416 Once on board, the Flight Crew establishes a data link D-OTIS contact to receive ATIS, weather and  
2417 NOTAM updates [IS-0402] [IS-0201].

2418 The Tower Ground Controller uses the ATM System to provide the "Departure Clearance" including  
2419 updated departure time (i.e. TSAT) and planned taxi route [AO-0205]. According to local procedures,  
2420 Start-up Approval and Departure clearance can be issued together [AUO-0103] [AUO-0308].

2421 .

2422 The Flight Crew uploads the constituting elements (routes, constraints) of the iRBT/iRMT into the  
2423 ATM system (aircraft FMS) as well as the aircraft parameters (gross weight, cost index, etc.) and  
2424 forecast weather data (winds/temperatures) [AUO-0204-A]. [IS-0101].

2425 The Flight Crew may transmit their preference/capabilities limitations for his take off. These data are  
2426 being considered by the controller and the ATM System during its optimisation process [AUO-0101-  
2427 A] [AUO-0103].

2428 The Tower Clearance Delivery Controller uses the ATM System (AMAN/DMAN) to determine push-  
2429 back and taxiing priorities in order to optimise runway throughput [TS-0202] [AO-0205].



2430 The Flight Crew requests “Departure Clearance” from the ATM System via data link [AUO-0103]. The  
 2431 Flight Crew acknowledges receipt of the clearance using the ATM System [AUO-0308] [AUO-0101-  
 2432 A].

#### 2433 **Optional**

2434 Adverse conditions like fog, snow or runway blockage, will have a significant impact on runway  
 2435 capacity [IS-0402]. Outbound traffic will be delayed not only due to reduced departure capacity but  
 2436 also due to late arrival of the inbound flight. Special procedures need to be in place to facilitate the  
 2437 planning and sequencing of (outbound) flights [AO-0501].

2438 Continuous updates of the (pre-) departure sequence are required based on the actual conditions and  
 2439 the most up to date airport and network process information [AO-0501] [AO-0601] [IS-0101] [IS-  
 2440 0402].

#### 2441 **De-icing on stand (UC 6 59)**

2442 De-icing on stand [IS-0402], is managed through CDM procedures enabling airport and ANSP to  
 2443 know the flights to de-ice and establish sequences accordingly [AO-0603]. The TOBT shall take into  
 2444 account the required process time to de-ice the aircraft. This process time shall be provided by the  
 2445 de-icing agent to the ground handling agent or the AOC in order to update the TOBT accordingly  
 2446 [DCB-0302].

#### 2447 **Prioritization of outbound flights (UC 6 60)**

2448 UDPP (User Driven Prioritization Process) will allow the Airspace Users to change (via the pre-  
 2449 departure management process) the priority order of flights in the pre-departure sequence among  
 2450 themselves. [AUO-0103]. In coordination with ATC and the Airport Operator, flight / iSBT planning is  
 2451 refined / adjusted according to the collaboratively agreed scenario to deal with the capacity shortage  
 2452 [IS-0101].

2453 The expectations of UDPP, however, are limited due to conflicting commercial interest. The  
 2454 prioritization of outbound flights / trajectories may only be possible within the operations of a single  
 2455 Airspace User (airline) or a group of users (e.g. Skyteam, Star Alliance etc.).

#### 2456 **Violation**

##### 2457 **Aircraft is not ready or not foreseen ready at TOBT (UC 6 61)**

2458 If for whatever reason (e.g. de-icing on stand takes longer) the aircraft is not ready at TOBT a new  
 2459 TOBT and TSAT has to be determined [IS-0101].

#### 2460 **4.2.5.4.2.5 Off-blocks**

##### 2461 **General (UC 6 62)**

2462 At the TSAT window, the Flight Crew contacts the Tower Ground Controller<sup>38</sup> (or Tower Clearance  
 2463 Controller) and requests Start-Up via data link. The Tower Ground Controller (Tower Clearance  
 2464 Delivery Controller) identifies the aircraft and checks the Start-Up request prior to providing the Start-  
 2465 Up approval to the Flight Crew via data link [AO-0208-A]. The Flight Crew acknowledges the Start-Up  
 2466 clearance [AUO-0308] and may start up the engines with the assistance of the Ground Handling  
 2467 Agent according to local procedures. At a fixed time before off-block, the iSBT/iSMT would have been  
 2468 updated and converted to the iRBT/iRMT, becoming the reference used by all ATM partners during  
 2469 the flight execution [AUO-0204-A] [IS-0101].

2470 The Clearance Delivery Controller will instruct the flight crew to contact the Tower Ground Controller  
 2471 (or Apron Manager at some airports) for Push Back instructions [AUO-0308].

2472 The Flight Crew contacts the Tower Ground Controller (or Apron Manager) and requests a Push-back  
 2473 approval via data link. The Tower Ground Controller (or Apron Manager) provides the Push-back  
 2474 approval via data link or via voice [AUO-0308].

<sup>38</sup> Sometimes the control of the activities and the movement of aircraft and vehicles on an apron rests with the Apron Manager instead of the Tower Ground Controller. When there is an Apron Manager and the activities of the aircraft and vehicles take place within the boundaries of the apron area, then the Tower Ground Controller mentioned in the text shall be read as Apron Manager.

2475 The Flight Crew acknowledges the push-back clearance and gives instructions for the push back  
2476 procedure to the Ground Handling Agent.

2477 **Optional**

2478 **Open stands (UC 6 63)**

2479 Open stands often require no push-back operation. Forward taxiing of the aircraft from the stand to  
2480 the taxi lane / taxiway on its own power is applied without the need for a push back tug. However  
2481 guidance by ground staff is still required to assure that the stand and the taxi lane is clear of  
2482 obstacles. The ATM System recognises the start of the aircraft movement and AOBT is recorded  
2483 [AO-0601].

2484 **Power back (UC 6 64)**

2485 At a limited number of airports the backwards taxing of aircraft from the stand by using engine reverse  
2486 power is allowed for dedicated aircraft and aircraft operators. Even though there is no need for a push  
2487 back tug, guidance by staff of the ground handler is still mandatory. Although no push back tug is  
2488 involved, the procedure is in general not different than a push back operation. The ATM System  
2489 recognises the start of the aircraft power back operation and AOBT is recorded [AO-0601].

#### 2490 4.2.5.4.3 Use Cases Identified

2491 Use cases describe nominal conditions and topics that deviate from the nominal conditions. These  
2492 use cases should be assigned to specific WP6 (sub)work packages.

Use Case ID	Use Case title	Use Case description
UC 6 54	In-Block	Refer to Section 4.2.5.4.2.2 of this document
UC 6 55	Aircraft Handling	Refer to Section 4.2.5.4.2.3 of this document
UC 6 56	Use of remote parking stand	In case of an open stand at remote distance from the terminal, passengers will be transported between aircraft and terminal (and vice versa) with the use of apron busses. The timely availability of a sufficient number of busses needs to be planned based on TOBT / TSAT.
UC 6 57	Unable to respect TOBT	Missing passengers, late boarding of passengers and/or late loading of baggage and cargo may result in not achieving the TOBT. Close monitoring of the handling process must assure that in case of late boarding / loading the impact on TOBT is recognized in an early stage and an updated TSAT is requested.
UC 6 58	Pre-departure	Refer to Section 4.2.5.4.2.4 of this document
UC 6 59	De-icing on stand	In case of de-icing on stand, the TOBT shall take into account the required process time to de-ice the aircraft. This process time shall be provided by the de-icing agent to the ground handling agent or the AOC in order to update the TOBT accordingly.
UC 6 60	Prioritization of outbound flights	Through UDPP (User Driven Prioritization Process) the user can prioritize its outbound trajectories in case of severe capacity shortages at the airport or en-route.
UC 6 61	Aircraft is not ready or not foreseen ready at TOBT	If for whatever reason (e.g. de-icing on stand takes longer) the aircraft is not ready at TOBT a new TOBT and TSAT have to be determined.
UC 6 62	Off Blocks	Refer to Section 4.2.5.4.2.5 of this document
UC 6 63	Open stands	Open stands often require no push-back operation. Forward taxiing of the aircraft from the stand to the taxi lane / taxiway on its own power is applied without the need for a push back tug. However guidance by ground staff is still required to assure that the stand and the taxi lane is clear of obstacles. The ATM System recognises the start of the aircraft movement and AOBT is recorded.
UC 6 64	Power back	At a limited number of airports the backwards taxing of aircraft from the stand by using engine reverse power is allowed for dedicated aircraft and aircraft operators. There is no need for a push back tug however guidance by staff of the ground handler is still mandatory. Although no push back tug is involved, the procedure is in general not different than a push back operation. The ATM System recognises the start of the aircraft power back operation and AOBT is recorded.
Other Use Cases for topics that deviate from the nominal conditions		

Use Case ID	Use Case title	Use Case description
UC 6 65	Late arrival at parking stand	<p>Late arrival at the parking position is identified by a large difference between Actual In-Blocks Time (AIBT) and planned (Scheduled) In-Blocks Time (SIBT).</p> <p>The next Business Trajectory (iSBT) allocated to the aircraft will, due to the late arrival of the aircraft, also be delayed. During the Turn-round process some of the delay may be recovered. The ground handler, in coordination with the airline (AOC) may decide to shorten the turn-round process by eliminated / cancelling specific activities (e.g. cabin cleaning) or allocate more resources and staff to the handling of the specific aircraft. The airline (AOC) may even decide to change the outbound BT assigned to the aircraft (see UC 6 73)</p> <p>For the next Business Trajectory a new Target Off-Block Time (TOBT) and Target Take-Off Time (TTOT) are determined based on a revised Target Time of Arrival (TTA) at the destination airport. The iSBT is updated by the Airline (AOC) based on the new TTA and TTOT. An updated TSAT is assigned as well as a revised initial departure sequence.</p>
UC 6 66	Late boarding of passengers / late loading of cargo	<p>Late boarding of passengers (or late loading of cargo) may result in not achieving the previous agreed Target Off Block Time (TOBT). In that case a new TOBT will be determined as well and the Target Start-up Approval Time (TSAT) &amp; Target Take Off Time (TTOT) will be recalculated based on a revised Target Time of Arrival (TTA) at destination.</p>
UC 6 67	Unloading baggage of not/late shown passengers	<p>If not all passengers show up at the gate for boarding, the departure may be delayed if those passengers have checked-in luggage. For security reasons this luggage has to be unloaded. This unloading takes time with a result that the Target Off-Block Time (TOBT) as well as the Target Start up Approval Time (TSAT), if already assigned, will not be achieved. In that case a new TOBT, TSAT and Target Take-Off Time (TTOT) must be determined based on a revised Target Time of Arrival (TTA) at the destination airport. The iSBT is update by the Airline (AOC) based on the new TTA and TTOT. An updated TSAT is assigned as well as a revised initial departure sequence.</p>
UC 6 68	Change of assigned outbound Business Trajectory to aircraft	<p>The delay of an inbound Business Trajectory (BT) often results in the delay of the allocated outbound BT to that aircraft. If delay of that outbound BT is not desired by the airline (AOC) it could be decided to allocate another aircraft to the outbound BT. This could be a spare aircraft or a swap of previously assigned outbound BT with one (or even more) other aircraft.</p> <p>The AOC shares the information through the system. The iSBT for both outbound flights are accordingly updated and propagated to Airport Operations Plan (AOP) and the Network Operations Plan.</p>
UC 6 69	Delayed start-up approval	<p>Even if the Target Off-Block Time (TOBT) is achieved the Target Start-up Approval Time (TSAT) can still be delayed or even cancelled. Unplanned and sudden reduction in capacity could be the reason for re-planning the outbound sequence based on the new capacity situation. New TTOT will be determined based on the new capacity situation as well on the acceptance capabilities at the destination airports (TTAs).</p>
UC 6 70	Change in allocated parking position	<p>The Airport Operator may decide for a change in parking position even at a late moment when the inbound aircraft has already landed. This parking position change may take place in order to minimize sequential delay for other flights as due to late arrival the planned stand may not be available anymore for the total duration of the turn-round</p> <p>The airline / AOC and the Ground Handler are informed and the system is updated. The ground handler relocates or re-allocates its resources (equipment and staff) to allow for the change in parking position. The inbound iRBT and the linked outbound iSBT are updated in the system.</p>

Use Case ID	Use Case title	Use Case description
UC 6 71	Linked outbound Trajectory is ground movement Trajectory (towing) or a long period of inactivity	Preparation of aircraft ground processes. Preparation of this turn-round is equal to basic turn-round process (two business trajectories linked) be it that no immediate resources (equipment and humans) are required for the preparation and loading of the aircraft for the next trajectory. Start execution of the aircraft ground processes. This scenario in execution of the aircraft ground process is equal to the basic turn-round process, except that the turn-round ends at the moment the aircraft is unloaded, being towed to a remote parking stand / maintenance area or placed idle for night stop or long period of inactivity.
UC 6 72	Linked inbound Trajectory is ground movement Trajectory (towing) or a long period of inactivity	Preparation of aircraft ground processes. Preparation of this turn-round process is not based on target landing and block-in times but on the planned arrival time of the towed aircraft at the parking position or based at a predefined number of minutes/hours before planned departure time and/or the agreed Target Off-blocks Time (TOBT) if the aircraft is already at the parking position and has been placed idle for night stop or a period of inactivity. Start execution of the aircraft ground processes. This scenario in execution of the aircraft ground process is equal to the previous described departure segment of the base turn-round scenario description. The scenario starts when the aircraft, being towed from the maintenance area or remote parking, arrives at the parking stand or, in case of a night stop, when the ground handler "awakes" the aircraft. At start of execution a Target Off-Blocks Time (TOBT) is determined and uploaded in the system.
UC 6 73	De-icing on parking position	If weather conditions require de-icing of the aircraft to take place shortly before take-off. De-icing activity knows two different scenario's; 1. De-icing at the parking position, shortly before push-back, and 2. De-icing at a centralized and dedicated position where the aircraft has to taxi to or to be towed to. In the last scenario de-icing takes place during the taxi-out where in the first scenario de-icing takes place as an extension of the turn-round process as the ground handler activities are only finished when the aircraft has been pushed back and disconnected.
UC 6 74	Adverse Weather Conditions	Adverse weather conditions can have a negative impact on the ground handling of an aircraft. Extreme wind conditions may require the aircraft being positioned with its nose into the wind, possibly limiting the possibilities for boarding passengers and loading baggage and cargo. Thunderstorm conditions near or at/above the airport will result in a halt of the ground handling activities due to safety regulations.
UC 6 75	Early arrival	Early arrival of the aircraft may be problematic for the ground handler and as well for the airport resources (e.g. stands). At congested airports stands are often scarce items and the availability for an early arrival may not be guaranteed. Holding the aircraft at a remote parking position (which may be a position on the taxiway system) until its assigned stand is available might be necessary. Handling the aircraft at another stand will have ground handling implications, not only in relocation of handling equipment and staff but also for the handling of the outbound flight. (relocation of outbound passengers and baggage / cargo of towing the aircraft to its original assigned stand later on.

Table 4-8 Identified Use Cases for Turn-round

2493

2494

2495

#### 4.2.5.5 Operational Scenario Execution Phase: Departure

2496

##### 4.2.5.5.1 Scope of scenario

2497 The Departure<sup>39</sup> scenario describes the processes and interactions that an aircraft encounters from  
2498 the time the aircraft is off block (CDM milestone: AOBT) till the aircraft is airborne (CDM milestone:  
2499 ATOT) as anticipated for SESAR Concept Story Board Step 1, Service Level 2.

2500 The Scenario covers all nominal and non-nominal procedures and is applicable for both VMC and  
2501 Low Visibility Conditions (LVC).

2502 The scenario assumes a generic airport configuration; scenarios concerning specific configurations,  
2503 e.g. single runway mixed mode operations, may be developed as required.

2504 It is not the purpose of the scenario to identify tools which support specific actions but to generally  
2505 refer to the "ATM System" (ground or air). However, where there is a specific and unique tool  
2506 functionality, this may be mentioned.

2507 Where appropriate, Operational Improvement (OI) steps for SL2 have been cross-referenced in the  
2508 text to verify the feasibility of the scenario.

2509 The definition of AOBT and ATOT according to Airport CDM Implementation – The Manual", version  
2510 4, April 2012[3] are:

<b>AOBT</b>	Actual Off-Block Time	Time the aircraft pushes back / vacates the parking position
-------------	-----------------------	--

2511

<b>ATOT</b>	Actual Take Off Time	The time that an aircraft takes off from the runway.
-------------	----------------------	--

## 2512 4.2.5.5.2 Scenario text

### 2513 4.2.5.5.2.1 Pushback

#### 2514 General Procedures (UC 6 76)

2515 The Ground Handling Agent, after visually verifying that there are no vehicles or other objects in  
2516 proximity, communicates to the flight crew that no obstacles are present in the critical area for the  
2517 pushback. The flight crew acknowledge and instructs the ground handler to start the pushback after  
2518 checking the on-board Traffic Situational Awareness display **[AO-0206-A]**. The ATM System  
2519 recognizes the start of the aircraft pushback operation and AOBT is recorded **[AO-0601]**.

2520 With the AOBT, the ATM System updates the planned pre-departure sequence and TTOT, taking into  
2521 account the aircraft type mix, runway in use and the departure route of each flight in order to  
2522 maximise efficiency **[TS-0202]**. This pre-departure sequence is indicative for the Tower Runway  
2523 Controller and is not the runway sequence. The Tower Runway Controller remains responsible for the  
2524 safe and efficient runway use and will therefore create an appropriate runway sequence based on the  
2525 actual situation.

2526 An A-DPI message is sent when the aircraft progresses and gets off-blocks, serving to supply the  
2527 NMOC with a more accurate Target Take-Off Time (TTOT). AOBT always triggers an A-DPI message  
2528 by the ATM system to NMOC or in the case of remote holding at a defined time prior to TTOT. After  
2529 the first A-DPI is sent, NMOC is only informed with a new A-DPI if updates of the TTOT are outside a  
2530 certain TTOT tolerance band.

2531 The ATM System (Airport Safety Nets) shall raise a non-conformance alert when the ATM System  
2532 detects potential conflicting situations/incursions involving aircraft and vehicles on the airport  
2533 manoeuvring area. **[AO-0104-A]**

2534 Potentially, the aircraft can then be transferred from the Apron Manager to the Tower Ground  
2535 Controller

### 2536 Violations

#### 2537 Deviation from pushback route (UC 6 77)

<sup>39</sup> Although referred in this DOD as "DEPARTURE", this operational scenario covers the « pre-departure », « taxi-out » and « take-off » flight phases as defined in WP B4.2 ConOps; the WP6 is not impacted by the "climb" flight phase.

2538 If for whatever reason an aircraft deviates from its assigned push back route, there may be a number  
2539 of solutions. The Tower Ground Controller may assign a new push-back route, or clear the aircraft to  
2540 a position from where it can proceed as previously planned, or assign a new taxi route to other  
2541 obstructing traffic **[AO-0205]**. Whatever solution is taken, it might create a delay for either the affected  
2542 aircraft or the obstructing traffic or both. If the delay causes the expected take-off time to go outside  
2543 the TTOT tolerance band, the system will calculate a new TTOT.

#### 2544 **Deviation from expected pushback moment (UC 6 78)**

2545 Pushback time deviation occurs when an aircraft starts the push-back later than expected. The Tower  
2546 Ground Controller may instruct the Flight Crew to stop the push-back in case and/or may contact the  
2547 Flight Crew to find out why the push-back was started too late. Such a situation creates a delay for  
2548 either the affected aircraft or the obstructing traffic or both. If the delay causes the expected take-off  
2549 time to go outside the TTOT tolerance band, the system will calculate a new TTOT.

#### 2550 4.2.5.5.2.2 Taxi-out

##### 2551 **General Procedures (UC 6 79)**

2552 The Flight Crew requests the taxi clearance from the Tower Ground Controller by data link. The ATM  
2553 System displays a proposed routing to the Tower Ground Controller **[AO-0205]**.

2554 The Tower Ground Controller checks the planned route created by the ATM System, assesses the  
2555 tactical situation and, if needed, may update the taxi routing through the ATM System **[AO-0208-A]**.  
2556 This may include holding and / or intermediate stops.

2557 The Tower Ground Controller issues a taxi clearance<sup>40</sup> to the Flight Crew, by data link (D-TAXI) or  
2558 voice. The Flight Crew acknowledges the taxi instructions<sup>41</sup> and the related routing is depicted on the  
2559 aircraft's Airport Moving Map.

2560 The Flight Crew proceeds to taxi following the designated route displayed on-board the Aircraft HMI  
2561 and using visual navigation aids (e.g. taxiway lighting) **[AUO-0603-A]**. While taxiing, the Flight Crew  
2562 may have to use an enhanced vision capability in Low Visibility Conditions **[AUO-0403]** as well as  
2563 may have to comply with local rules for minimization of aircraft fuel use and gaseous / particulate  
2564 emissions if such exist. On-board avionic systems will provide alert for conflicting surface traffic **[AUO-**  
2565 **0605]**.

2566 During taxi-out, the Airport Tower Supervisor or Tower Runway Controller will create an appropriate  
2567 runway sequence taking into account the actual traffic situation at/near the departure runway **[TS-**  
2568 **0202]**. The ATM System (AMAN/DMAN) may update the TTOT accordingly.

2569 The Tower Ground Controller, possibly in response to a request from the Tower Runway controller,  
2570 may alter at any moment the ground routing **[AO-0205]** **[AO-0208-A]** to prepare for the line-up  
2571 sequence and, with the support of the ATM System, uplink the new taxi routing instruction to the  
2572 Flight Crew. Once acknowledged by the Flight Crew, the routing is updated on the aircraft HMI **[AUO-**  
2573 **0603-A]** and confirmed within the ATM System.

2574 The Flight Crew may transmit through data link, at any moment during the taxi routing, his  
2575 preference/capabilities limitations for the take-off distance required and thus the runway access point.  
2576 The Tower Ground Controller with the support of the ATM System may consider them and issue an  
2577 updated ground routing instruction if required to modify the arrival sequence at the runway hold or  
2578 vary the departure point on the runway **[AUO-0302-A]**.

2579 The aircraft (ADS-B in and out) and ground vehicles (ADS-B out) are displayed, on the on-board  
2580 display of the Flight Crew, providing information on adjacent surface traffic, supplementing visual  
2581 observations and enhancing see-and-avoid procedures **[AUO-0401]**. The status of runways,  
2582 taxiways, obstacles and route to runway are displayed on-board **[AUO-0603-A]**<sup>42</sup>.

2583 Likewise the ground vehicles will have a display with dynamic traffic context information, including  
2584 status of runways, taxiways, obstacles and airport moving map **[AO-0206][AO-0105]**. Information of  
2585 related clearances and other relevant issues will be automatically transferred to vehicles **[AO-0215]**.

<sup>40</sup>The taxi instructions part of the taxi uplink message is limited to the first point at which the Tower Ground Controller requires the aircraft to stop, unless flight crew has received its next taxi or crossing runway clearance.

<sup>41</sup> If datalink is used, then the acknowledgement is also provided via datalink.

<sup>42</sup> Refer to footnote above

2586 The Tower Ground Controller continually monitors the aircraft movement, either visually or from the  
 2587 ATM System display [AO-0208-A][AO-0102][AO-0201-A] and tracks its progress against the issued  
 2588 taxi-out route and its position with respect to other surface traffic [AO-0205]. Ground signs (stop bars,  
 2589 centreline lights, etc.) are triggered automatically according to the route issued by ATC [AUO-0603-  
 2590 A].

2591 The Tower Ground Controller detects and resolves potentially hazardous situations for the aircraft  
 2592 (e.g. conflict with fixed and mobile obstructions, incursion into protected areas or movement on a  
 2593 closed taxiway) by giving instructions to Flight Crew.

2594 The ATM System automatically alerts the Tower Ground Controller if the aircraft proceeds across a  
 2595 clearance limit or an illuminated stop bar [AO-0104-A].

2596 When the aircraft moves from one area of responsibility to another, the Tower Ground Controller will  
 2597 either give an instruction to the flight crew or there will be a silent frequency change according to the  
 2598 instructions in the AIP. In case of a runway crossing, the flight crew requests a clearance to cross the  
 2599 runway to the Tower Runway Controller.

2600 When the clearance limit is an active runway, the Tower Ground Controller transfers the control of the  
 2601 flight (he instructs frequency change to the flight crew via data link [AUO-0308] or voice) to the Tower  
 2602 Runway Controller who issues the runway crossing clearance by R/T.

2603 To prevent runway incursions, the Flight Crew (and Vehicle Drivers) share Improved Procedures and  
 2604 Best Practices on the Ground [AO-0101]. They also might be directly warned through Runway Status  
 2605 Lights when the runway is unsafe to cross (illuminated Runway Entrance Lights [AO-0209]. With the  
 2606 support of the ATM System (A-SMGCS), the Tower Runway Controller detects that the aircraft has  
 2607 crossed and cleared the active runway [AO-0208-A] and transfers the control of the flight back to the  
 2608 Tower Ground Controller in charge of related area on the airport.

2609 An aircraft waiting at an intermediate hold must await further taxi instructions from the Tower Ground  
 2610 Controller.

2611 At any time the Tower Controller may choose to re-sequence the departure traffic to optimise the flow  
 2612 rate subject to wake-vortex [AO-0304], speed differential and immediate routing constraints in  
 2613 addition to en-route restrictions.

2614 The aircraft reaches the assigned departure runway holding position (or at a point before the holding  
 2615 position) and the Tower Ground Controller transfers control to the Tower Runway Controller and  
 2616 provides a frequency change to the flight crew, using R/T.

2617 The ATM system provides the Tower Ground Controller with information on Foreign Object Debris  
 2618 (FOD) detected on the movement area [AO-0202] [AO-0208-A].

## 2619 **Optional**

### 2620 **Remote de-icing (UC 6 80)**

2621 Remote de-icing is handled as a holding procedure. The Tower Ground Controller instructs the Flight  
 2622 Crew to taxi to the appropriate remote de-icing point and, at some point, gives instruction to the flight  
 2623 crew to contact the De-icing agent (via data link [AUO-0308] or voice) and transfers the aircraft to the  
 2624 latter's control. After de-icing, the Agent transfers the aircraft back to the Tower Ground controller  
 2625 using the appropriate transfer protocol.

## 2626 **Violations**

### 2627 **Deviation from taxi route (UC 6 28)**

2628 If for whatever reason an aircraft deviates from its assigned taxi route, the Tower Ground Controller is  
 2629 warned by the ATM System [AO-0104-A] and may assign a new taxi route (possibly assisted by the  
 2630 ATM System [AO-0205]), or instruct the aircraft to be towed to a position from where it can proceed  
 2631 as previously planned, or assign a new taxi route to other potentially conflicting aircraft [AO-0205].  
 2632 Whatever solution is taken, it might create a delay for either the affected aircraft or for the potentially  
 2633 conflicting aircraft or both. If one of the aircraft is departing and if the delay causes the expected take-  
 2634 off time to go outside the TTOT tolerance band, the system will calculate a new TTOT.

### 2635 **Deadlock situation on Taxiway (UC 6 29)**

2636 If for whatever reason there is a head-on situation between two aircraft on a taxiway, the Tower  
 2637 Ground Controller will instruct one of the aircraft to be towed to a position from where it can proceed.  
 2638 He will give a revised taxi instruction. There will be a delay while a tow tug reaches the relevant  
 2639 aircraft. Both aircraft will be delayed. If one of the aircraft is departing and if the delay causes the  
 2640 expected take-off time to go outside the TTOT tolerance band, the system will calculate a new TTOT.

#### 2641 **Holding position overrun (UC 6 30)**

2642 If for whatever reason an aircraft might overrun its assigned holding position, the Tower Ground  
 2643 Controller may instruct the affected aircraft to stop and assign a new taxi route, or the Tower Ground  
 2644 Controller may assign a new taxi route to other aircraft, which is affected by the overrun. Whatever  
 2645 solution is taken, it might create a delay for either the affected aircraft or for the obstructing traffic or  
 2646 both. If one of the aircraft is departing and if the delay causes the expected take-off time to go outside  
 2647 the TTOT tolerance band, the system will calculate a new TTOT.

#### 2648 **Runway incursion (UC 6 31)**

2649 If for whatever reason one or more mobiles (aircraft and/or vehicles) enter the protected area of an  
 2650 active runway, the Tower Runway Controller is warned by the ATM System **[AO-0102]** and will take all  
 2651 subsequent actions to resolve the runway incursion. If no incident or accident has happened, this  
 2652 situation at least implies a delay for taxi-out and taxi-in, because the planned traffic has to be re-  
 2653 sequenced. If one of the aircraft is departing and if the delay causes the expected take-off time to go  
 2654 outside the TTOT tolerance band, the system will calculate a new TTOT.

#### 2655 **Aircraft blocking a taxiway (UC 6 85)**

2656 If an aircraft is unable to continue taxi (e.g. due to technical, emergency, accident reasons), delay is  
 2657 to be expected. In case of emergency, fire fighters have to secure and maybe evacuate the aircraft.  
 2658 Technicians have to inspect the aircraft, if it can be towed away and a tow tug has to be ordered and  
 2659 make its way to the aircraft. The Tower Ground Controller will coordinate the temporary closure of the  
 2660 taxiway. If the delay causes the expected take-off time to go outside the TTOT tolerance band, the  
 2661 system will calculate a new TTOT.

### 2662 4.2.5.5.2.3 Take-off

#### 2663 **General Procedures (UC 6 86)**

2664 The Tower Runway controller is provided with the necessary tools to enable the application of Time  
 2665 Based wake turbulence radar Separation rules (TBS), Weather Dependant Separation reduction  
 2666 (WDS) and/or Pair Wise Separation (RECAT2) through taking into account aircraft characteristic of  
 2667 the leader and the follower aircraft so as to aid towards minimizing the overall time spacing between  
 2668 departing aircraft and optimising the runway usage **[AO-0303]** **[AO-0304]** **[AO-0306]**.

2669 The Tower Runway Controller may optimize the line-up sequence thanks to multiple runway entries.

2670 The Tower Runway Controller checks that the departing aircraft can comply with its TTOT **[TS-0202]**  
 2671 and that the runway approach area is clear **[AO-0208-A]** prior to providing by R/T the line-up  
 2672 instruction to the aircraft. In case of entry to the departure runway through an intersection, the runway  
 2673 controller checks of no other aircraft is in take-off or has been issues a take-off clearance on that part  
 2674 of the runway before the intersection.

2675 The airport safety net will trigger an alert in case conflicting clearances are input by the controller (e.g.  
 2676 Cleared to Line-Up versus Land)" **[AO-0104-A]**. Additionally, to prevent runway incursions, the Flight  
 2677 Crew and Vehicle Drivers might be directly warned though Runway Status Lights when the runway is  
 2678 unsafe to enter or take-off on (Runway Entrance Lights, Take-Off Hold Lights).

2679 The Flight Crew confirms the line-up instruction. If the Flight Crew sees illuminated red Runway  
 2680 Entrance Lights (RWSL system), they hold short of the runway and contacts ATC for further  
 2681 instructions" **[AUO-0603-A]**. Otherwise, they taxi the aircraft to the line-up position.

2682 The flight crew will not unduly delay their response to either line-up or take-off clearances in view of  
 2683 the importance of safely minimising the runway occupancy time (ROT) **[AUO-0701]**

2684 The Vehicle Drivers will get an alert directly on board the vehicle (dedicated equipment) in case a risk  
 2685 of conflict with the aircraft is detected, or in the case of infringement of restricted/closed areas **[AO-**  
 2686 **0104-A]**.



2687 By visual reference and using the ATM system, the Tower Runway Controller verifies that the runway  
 2688 is clear of other aircraft, ground traffic and FOD [AO-0202] and the aircraft will meet departure  
 2689 separation requirements [AO-0304][AO-0306]. The Tower Runway Controller issues the take-off  
 2690 clearance to the Flight Crew using R/T.

2691 The Flight Crew acknowledges the take-off clearance, and if the Take-off Hold Lights from the RWSL  
 2692 system are not illuminated they initiate the take-off roll and lift-off. The ATM System detects the  
 2693 wheels-off and records the ATOT.

2694 The initial climb away from the airport into the immediate TMA completes the Airport Transit View.

#### 2695 **Optional**

#### 2696 **Runway Inspection (UC 6 39)**

2697 A runway inspection is done on a regular basis, or if requested by the Tower Runway Controller. The  
 2698 movement of the inspection car has to be handled as an aircraft movement as long as it moves on the  
 2699 runway or within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.

#### 2700 **Handle bird control on an active runway (UC 6 40)**

2701 Bird control is done on a regular basis, or if requested by Tower Runway Controller. The movement of  
 2702 the bird control car has to be handled as an aircraft movement as long as it moves on the runway or  
 2703 within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.

#### 2704 **Violations**

#### 2705 **Aircraft blocking an active departure runway (UC 6 89)**

2706 If for whatever reason (e.g. technical, emergency, accident) an aircraft blocks an active departure  
 2707 runway, intervention is required - technicians, fire fighters - before being towed away, implying delay  
 2708 for taxi-out. The Tower Controller will coordinate the temporary closure of the departure RWY.

#### 2709 **Aborted take-Off (UC 6 90)**

2710 If a flight aborts its take off, the runway occupancy will be longer than expected. When the flight is  
 2711 clearing the runway, the Tower Runway Controller transfers the flight to the Tower ground Controller  
 2712 (instructing a frequency change). If the flight is ready to depart, the Tower Ground Controller may re-  
 2713 sequence the affected aircraft into the departures. If not, the flight will taxi back to a stand (assigned  
 2714 by Airport Operations after coordination with Airport Tower Supervisor).The result could be an  
 2715 unplanned and inefficient usage of the airport infrastructure and consequently produces delay.

#### 2716 **4.2.5.5.3 Use Cases Identified**

2717 Use cases describe nominal conditions and topics that deviate from the nominal conditions. These  
 2718 use cases should be assigned to specific WP6 (sub)work packages. A number of use cases are  
 2719 shared between Arrival and Departure scenarios.

Use Case ID	Use Case title	Use Case description
UC 6 76	Pushback	This use case describes how The Ground Handling Agent handles the aircraft push-back.
UC 6 77	Deviation from Pushback Route	Pushback route deviation occurs when an aircraft deviates from its assigned push back route. In such cases The Tower Ground Controller may assign a new push-back route, clear the aircraft to a position from where it can proceed as previously planned, or assign a new taxi route to other obstructing traffic. This might create a delay for either the affected aircraft or the obstructing traffic or both.
UC 6 78	Deviation from expected Pushback moment	Pushback time deviation occurs when an aircraft starts the push-back later than expected. The Tower Ground Controller may instruct the Flight Crew to stop the push-back in case and/or may contact the Flight Crew to find out why the push-back was started too late. Such a situation creates a delay for either the affected aircraft or the obstructing traffic or both.

Use Case ID	Use Case title	Use Case description
UC 6 79	Taxi-Out	This use case describes how the Tower Ground Controller, with the support of the flight crew, assures safe movements of aircraft from the aircraft stand to the runway holding point, prior to take-off.
UC 6 80	Remote de-icing	Remote de-icing is handled as a holding procedure, where The Tower Ground Controller hands over the aircraft to the De-icing Agent, then the De-icing Agent hands over the aircraft to the Tower Ground Controller after de-icing.
UC 6 28	Deviation from Taxi Route	If for whatever reason an aircraft deviates from its assigned taxi route, the Tower Ground Controller is warned by the ATM System and may assign a new taxi route (possibly assisted by the ATM System, or instruct the aircraft to be towed to a position from where it can proceed as previously planned, or assign a new taxi route to other potentially conflicting aircraft. Whatever solution is taken, it might create a delay for either the affected aircraft or for the potentially conflicting aircraft or both.
UC 6 29	Deadlock situation on taxiway	If for whatever reason there is a head-on situation between two aircraft on a taxiway, the Tower Ground Controller will instruct one of the aircraft to be towed to a position from where it can proceed. He will give a revised taxi instruction. There will be a delay while a tow tug reaches the relevant aircraft. Both aircraft will be delayed.
UC 6 30	Holding position overrun	If for whatever reason an aircraft might overrun its assigned holding position, the Tower Ground Controller may instruct the affected aircraft to stop and assign a new taxi route, or the Tower Ground Controller may assign a new taxi route to other aircraft, which is affected by the overrun. Whatever solution is taken, it might create a delay for either the affected aircraft or for the obstructing traffic or both.
UC 6 31	Runway incursion	If for whatever reason one or more mobiles (aircraft and/or vehicles) enter the protected area of an active runway, the Tower Runway Controller is warned by the ATM System will take all subsequent action to resolve the runway incursion. If no incident or accident has happened, this situation at least implies a delay for taxi-out and taxi-in, because the planned traffic has to be re-sequenced.
UC 6 85	Aircraft blocking a taxiway	If an aircraft is unable to continue taxi (e.g. due to technical, emergency, accident reasons), delay is to be expected. In case of emergency, fire fighters have to secure and maybe evacuate the aircraft. Technicians have to inspect the aircraft, if it can be towed away and a tow tug has to be ordered and make its way to the aircraft. The Tower Ground Controller will coordinate the temporary closure of the taxiway.
UC 6 86	Take-Off	This Use Case describes how a Tower Runway Controller uses the System to control that the aircraft takes off in a safe manner and according to the departure sequence.
UC 6 39	Runway Inspection	A runway inspection is done on a regular basis, or if requested by Tower Runway Controller. The movement of the inspection car has to be handled as an aircraft movement as long as it moves on the runway or within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.

Use Case ID	Use Case title	Use Case description
UC 6 40	Bird Control on active runway	Bird control is done on a regular basis, or if requested by Tower Runway Controller. The movement of the bird control car has to be handled as an aircraft movement as long as it moves on the runway or within the safety boundaries of it. This therefore implies a delay on succeeding air-traffic.
UC 6 89	Aircraft blocking an active departure runway	If for whatever reason (e.g. technical, emergency, accident) an aircraft blocks an active departure runway, intervention is required (e.g. by technicians, fire fighters) before being towed away, implying delay for taxi-out. The Tower Controller will coordinate the temporary closure of the departure RWY.
UC 6 90	Aborted Take-off	If a flight aborts its take off, the runway occupancy will be longer than expected. When the flight is clearing the runway, the Tower Runway Controller transfers the flight to the Tower ground Controller (instructing a frequency change). If the flight is ready to depart, the Tower Ground Controller may re-sequence the affected aircraft into the departures. If not, the flight will taxi back to a stand (assigned by Airport Operations after coordination with Airport Tower Supervisor).

Table 4-9 Identified Use Cases for Departure

2720

2721

## 2722 4.2.6 Operational Scenario Post-Operations Analysis Phase

### 2723 4.2.6.1 Scope of scenario

2724 The Airport Post-Operations analysis phase is seen as the means to capture performance based  
 2725 information to examine if agreed local performance targets have been achieved and to provide feed-  
 2726 back to the planning (both mid and short term) as well to the actual operations, enabling a learning  
 2727 cycle.

2728 Airport Post-Operations analysis is designed to support other Operational Scenarios – within the  
 2729 Airport DOD – in achieving their objectives in terms of Operational Improvements.

2730 The main purpose of Airport Post-Operations analysis is two-fold. First, to support the creation and  
 2731 maintenance of the AOP based on locally defined agreements (e.g. periodically or format of reporting)  
 2732 and, second, to ensure that superior reporting, e.g. required by the European Commission or the  
 2733 Performance Review Body, is appropriately facilitated.

2734 After the execution of the flight, Airport Post-Operations analysis will be performed to measure the  
 2735 achieved performance with the objective to improve local airport and overall network performance.  
 2736 **[AO-0804], [DCB-0103-A], [SDM-0101]**

2737 Within the Airport Post-Operations analysis phase, key performance indicators are assessed.  
 2738 Evaluations will be performed and opportunities for further improvements and quality enhancements  
 2739 from local to European level will be identified over all stakeholders. Airport Post-Operations analysis  
 2740 for inbound flights may be carried out once the Reference Business Trajectory (iRBT) has been  
 2741 terminated (= Actual In-Block Times) which is also defined as the period after the conclusion of the  
 2742 flight (on block) and, for outbound flights, once the flight has left the TMA at Departure Fix. All data  
 2743 and events related to the iRBT are stored for Airport Post-Operations analysis by a data & event  
 2744 recording function.

2745 Once the performance analysis has been carried out, a process reengineering function should provide  
 2746 refinements of performance framework, monitoring, impact assessment, scenarios or decision making  
 2747 rules.

2748 

## 4.2.6.2 Scenario text

2749 

### 4.2.6.2.1 General

2750 The Operational Scenario describes, as anticipated in 2013 for SESAR Service Level 2 (SESAR  
2751 Concept Story Board Step 1), the processes and interactions among airport actors during the Airport  
2752 Post-Operations analysis phase.

2753 It covers the performance analysis of all processes belonging to the airport segment of the Business  
2754 Trajectory, known as the “Airport Transit View” (ATV). This scenario aims at being able to assess the  
2755 effectiveness of each of the related processes within the ABT.

2756 

### 4.2.6.2.2 Phase 1: Data Collection and Aggregation.

2757 All data related to existing reference planning (AOP), maintenance and its execution, including all  
2758 updates for historiography and related events regarding resources, BT, etc. shall be recorded for  
2759 analysis purposes. Agreed local performance targets as determined for Airport Post-Operations  
2760 analysis phase will be analysed in a collaborative process and any non-achieved target may generate  
2761 specific corrective actions regarding any of the previous planning phases. Prior to Airport Post-  
2762 Operations analysis, the Medium and Short-term planning and the respective execution phases have  
2763 to be executed and finalised. Data and events from these phases are retrieved and captured by  
2764 Airport Post-Operations analysis for further analysis. Although data aggregation may take place,  
2765 storage of all raw data is required for any unforeseen analysis in the future.

2766 In order to carry out Airport Post-Operations analysis, an appropriate analysis service has to be  
2767 established. Among other things, this service should be capable of:

- 2768 • receiving information (data & events),
- 2769 • enabling historiography (save all updates without overwriting previous values),
- 2770 • automatically creating pre-defined reports to assess effectiveness of ATM flight phases  
2771 concerned.

2772 

### 4.2.6.2.3 Phase 2: Data Analysis and Presentation

2773 The Post-Operations analysis service should also be capable of:

- 2774 • offering templates available in a report repository,
- 2775 • developing new templates,
- 2776 • allowing additional manual reporting (eventually including special remarks),
- 2777 • distributing reports periodically (e.g. daily/weekly/monthly, etc. basis),
- 2778 • distributing reports ad-hoc/on-demand,
- 2779 • measuring airport-related KPAs/KPIs/PDIs.

2780 If necessary, a process reengineering function will develop and propose additional pre-defined  
2781 scenarios which should be used by other operational scenarios for further process improvement.

2782 The main purpose of Post-Operations is to provide the airport actors with analysis to:

- 2783 • measure actual operational ANS performance at airports,
- 2784 • measure operational ANS performance at airports – post season,
- 2785 • provide the reporting according to EC requirements IR691/2010,
- 2786 • provide input to the network management function (network manager),
- 2787 • develop and propose new pre-defined operational scenarios,
- 2788 • support ATM business reference models.

2789 

## Trajectory level (UC 6 91)

2790 The following table might be used as an example for an airport oriented view on Airport Post-  
2791 Operations analysis of the trajectory of an individual flight at the airport level. Any deviations (e.g.  
2792 actual to schedule or target to schedule) can be detected and analysed in further detail. At the  
2793 trajectory level, each individual flight can be analysed along the different ATM-flight phases to see if  
2794 actual process times (for instance taxi times) differ from default values used for planning.

ATM flight phase	Descent	Landing	Taxi-In	Turn-round	Taxi-Out	Climb
Description	Out of scenario scope. Terminates when the aircraft crosses the Initial Approach Fix (IAF) – or any other pre-defined point within the TMA (e.g. TMA entry point)	Terminates when the aircraft has landed on the runway	Terminates at In-block	Terminates at Off-block	Terminates at “take-off” (airborne)	Out of scenario scope when the aircraft has reached its respective departure fix
Reference	Initial Approach Fix – or any other pre-defined point within the TMA (e.g. TMA entry point)	Landing Runway Threshold	Position	Position	Departure Runway	Departure Fix
Scheduled /Shared Times	Scheduled Initial Approach Fix Time (SIAT)	Scheduled Landing Time (SLDT)	Scheduled in-Block Time (SIBT)	Scheduled Off-Block Time (SOBT)	Scheduled Take-off Time (STOT)	Scheduled Departure Fix Time (SDFT)
Estimated Times	EIAT	ELDT	EIBT	EOBT	ETOT	EDFT
Target Times	TIAT	TLDT	TIBT	TOBT / TSAT	CTOT / TTOT	TDFT
Actual Times	AIAT	ALDT	AIBT	AOBT	ATOT	ADFT

#### 2795 **Table 4-10 Post-Operations Analysis on Trajectory Level - ATM Flight Phases**

2796 In addition, future systems may enable detailed surface movement tracking to provide other measures  
2797 of interest, e.g. additional inbound taxi time due to lack of inbound stand capacity.

#### 2798 Implementing Environmentally Sustainable Operations

2799 Airport Post-Operations analysis records environmental performance data from various sources,  
2800 analyses actual emissions alongside the Airport Transit View and compares actual data to commonly  
2801 agreed performance targets or European-wide standards.

- 2802 • Aircraft noise emissions on the ground **[AO-0703]**, provided by appropriate noise measurement  
2803 infrastructure,
- 2804 • Aircraft fuel usage and gaseous / particulate emissions management at Airports **[AO-0704]**,  
2805 provided by aircraft performance data or data retrieved from an airport operational data base.

#### 2806 Planning the Shared Business Trajectory (iSBT)

2807 All data changes or events with regard to Agreed Reference Business / Mission Trajectory through  
2808 Collaborative Flight / iSBT Planning **[AUO-0204-A]** are retrieved and recorded by Airport Post-  
2809 Operations analysis. This service also analyses the number of updates per iRBT/iRMT and compares  
2810 iRBT/iRMT-stability to commonly agreed KPIs or European-wide standards.

#### 2811 Management/Revision of Reference Business Trajectory (iRBT)

2812 All controller’s clearances and pilot’s request for the Successive Authorisation of the iRBT Segments  
2813 using Datalink **[AUO-0308]** are retrieved and recorded by Airport Post-Operations analysis.

#### 2814 Improving Flight Data Consistency and Interoperability

2815 Any inconsistency between airport slots, flight plan / iSBT and ATFM-slots **[DCB-0301]** is retrieved  
2816 and recorded. It is assumed that CDM-airports will generate automated alerting and warning  
2817 messages once an imbalance has been detected and that Airport Post-Operations analysis can easily  
2818 store these messages.

#### 2819 **Period level (UC 6 92)**

2820 After the day of operation data will be analysed from a performance oriented perspective.

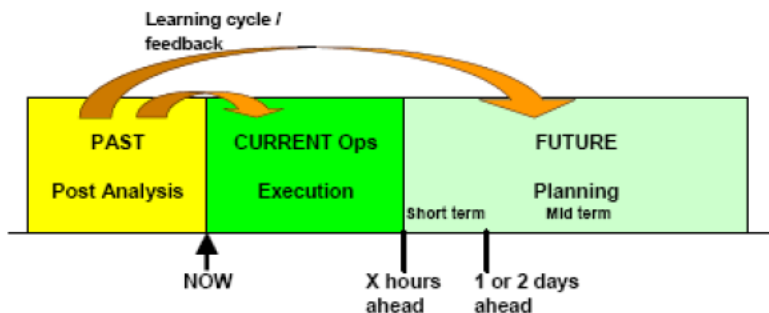


Figure 4.6: Phases of an operational airport planning

2821  
2822  
2823

2824 Implementing Environmentally Sustainable Operations

2825 Airport Post-Operations analysis, at period level, aggregates data from trajectory level analysis in  
2826 order to determine if commonly agreed KPIs or European-wide standards have been reached.

2827 Local Monitoring of Environmental Performance [AO-0706] facilitates a continuous improvement  
2828 process by measuring the environmental performance at an airport and the determination of the  
2829 amount of airport related versus external pollution.

2830

2831 Management/Revision of Reference Business Trajectory (iRBT)

2832 Airport Post-Operations analysis will monitor the current utilisation level of automatically transmitted  
2833 clearances and requests [AUO-0308]

2834 Collaborative Layered Planning Supported by Network Operations Plan

2835 All transactions between AOP and the SWIM enabled NOP [DCB-0103-A] as well as respective data  
2836 content exchanged are retrieved and recorded.

2837 Improving Network Capacity Management Process

2838 Capacity shortfall occurrences at airport level and the respective responses [DCB-0206] are retrieved  
2839 and recorded in order to facilitate a continuous improvement process.

2840 Occurrence of critical events and their management, either pro-active (known events) or reactive  
2841 (unplanned, but prepared) [DCB-0207], are retrieved and recorded in order to facilitate a continuous  
2842 improvement process.

2843 Monitoring airport-performance in the network (ATM-system)

2844 Within the Network Performance Assessment [SDM-0101], Airport Post-Operations analysis monitors  
2845 respective KPIs to determine how effective the total ATM system in general and in particular airports,  
2846 are meeting users' demands and to facilitate a continuous improvement process. Airport Post-  
2847 Operations analysis will act as a trigger to develop new or alternative scenarios with regard to airport  
2848 configurations, system efficiency, etc.

2849 The results will have an influence on the long-term and medium/short-term planning phases to  
2850 improve processes related to AOP, ensuring a feed-back life cycle service.

2851 It can also have an influence on the long-term planning by stating some requests to the concerned  
2852 stakeholder. In addition, the impact of mitigation actions should be analysed in order to improve the  
2853 pro-active management. Other possible scenarios raised during operations can be identified in order  
2854 to improve the airport operations management, too.

2855 **4.2.6.3 Associated Use Cases**

Use Case ID	Use Case title	Use Case description
UC 6 91	Trajectory level	Analysis of Trajectories may include any segment of the en-route to en-route process, when all necessary data is available.

UC 6 92	Period level	Period level analysis usually starts after the day of operation and analyses the performance of a determined traffic period by both aggregating individual flight performance and taking existing operational conditions into consideration, e.g. weather or disruptions which have occurred during the period under analysis.
UC 6 93	Support ATM Business Reference Model	As part of the Performance Management, a Performance Analysis service analyses performance compliance with KPIs and KPAs, reporting on a regular basis.
UC 6 94	Measuring Operational ANS Performance at Airports	According to [5]: The following three indicators Capacity, Predictability and (Flight) Efficiency – incl. punctuality – are addressed for “Measuring Operational ANS Performance at Airports” Four of the ATMAP flight efficiency indicators have been adopted as airport capacity indicators for Reference Period 1 (2012 – 2014) in the SES II performance scheme: -ATC local Pre-departure delay -ATFM Arrival delay -Taxi-out additional time -ASMA additional time
UC 6 95	Measuring Operational ANS Performance at Airports – post season	After the season is over, a post-season analysis will reveal the highest throughput value that the airport has been able to accommodate. This can be determined by analysing all actual traffic during the season, and looking at the traffic levels during the busiest hours. This indicator is called the peak service rate.  The peak airport operational capacity is the highest throughput the airport can achieve, assuming there is sufficient demand, i.e. during periods of congestion. In other words: at airports which are congested at least some time during the year, the peak airport operational capacity is equal to the peak service rate.
UC 6 96	IR 691/2010	According to [11], airport operators providing services at community airports with more than 150,000 commercial air transport movements per year and to all coordinated and facilitated airports with more than 50,000 commercial air transport movements per year. -Voluntary reports at any time -Flight by flight data monthly basis -Capacity and coordination parameters twice a year See: Airport Operator data set specification using csv.file or txt.file is mailed to IR691@eurocontrol.int
UC 6 97	Network Management Function	Contribution to Consolidated Forecast and Analysis of the Operational Performance of the Network [7] by providing airport operational performance figures.
UC 6 98	Develop and Propose new pre-defined scenarios	Triggered by the Process Reengineering Function and based on the result from the Performance Analysis Function, new pre-defined scenarios will be developed in accordance with existing pre-defined scenarios leading to an increased set of pre-defined scenarios for various flight phases.

2856

**Table 4-11 Identified Use Cases for Post-Operations Analysis Phase**

## 2857 5 Processes and Services (P&S)

2858 This chapter lists the high level Airport Processes. In this DOD, the methodology developed by B4.1  
2859 and described in “European ATM Architecture (EATMA) Guidance Material” has been followed and  
2860 applied.

2861 Airport Processes are partly based on the ATM Top Level Processes from the 7<sup>th</sup> release of the B4.2  
2862 models. Detailed modelling of the Airport Processes is available at the EATMA portal  
2863 (<https://www.atmmasterplan.eu/architecture/>). The EATMA structure is based upon the NAF v3.0  
2864 meta-model. The most important part of the Airport Operational Architecture is developed into the  
2865 NAF views NOV-2, NOV-3 and NOV-5.

2866 Operational Services are not part of this DOD. Their development is still under discussion and will  
2867 probably be led by WP8.

### 2868 5.1 Operational Nodes

2869 The EATMA NOV-2 view describes the organization of the operational nodes of the ATM system. In  
2870 this DOD, we will use different operational nodes, which are sub-nodes of the four B4.2 nodes.

- 2871 • Airspace User Operations
  - 2872 ○ Flight Deck (FD). It performs all the on-board Airspace User (AU) operations including  
2873 flight execution/monitoring according to agreed trajectory, compliance with ATC  
2874 clearances/instructions, etc. The main related actor is Flight Crew.
  - 2875 ○ Airspace User Ops Operations (AUOO). It performs all the necessary activities to  
2876 support AU ops, including the strategic and tactical planning of AU operations,  
2877 participation to related CDM processes and UDPP, update of AOP with AU  
2878 information, ground handling.
- 2879 • Airport Airside User Operations
  - 2880 ○ Airport Ops Support (AOS). It performs all the airport ops support activities, including  
2881 analysis of airport resources, long term planning of infrastructures, coordination of  
2882 airport slots, management of airport resources on the day of operation (gates,  
2883 vehicles, stands, de-icing...), information sharing and CDM, etc.
  - 2884 ○ Airport Vehicle (AV). It performs all the operational activities related to a support  
2885 vehicle (not aircraft) in the airport manoeuvring area.
- 2886 • Network Operations
  - 2887 This node is not listed in the Airport Processes.
- 2888 • Air Traffic Services Operations (ATS)
  - 2889 ○ Aerodrome ATS (AATS). It performs all the aerodrome ATS operations. This node is  
2890 associated to the actors Tower Runway Controller or Tower Ground Controller.
  - 2891 ○ En-route/Approach ATS (EAATS). It performs all the en-route and approach ATS  
2892 operations.

### 2893 5.2 Operational Processes

2894 The following sub-sections present the high-level airport operational processes. For each process, we  
2895 present a table with the following data:

- 2896 • Process: name of the high level airport operational process;
- 2897 • Node: node which is responsible for the activities in the process;
- 2898 • Activity: sub-process called to realize a part of the process;
- 2899 • Description: description of the activity;
- 2900 • OI step: OI step addressed by the activity or associated (only Step 1);



2901 • Associated Use Cases: Use Cases associated to the current activity.

2902 For the moment, the tables only present the processes for the OFAs under the responsibility of 6.2. In  
 2903 a future update of this DOD and after alignment with 5.2 and 7.2, they should also refer processes  
 2904 from other OFAs and related to Airport.

## 2905 5.2.1 Manage Airport Operations

2906 The following table lists the processes to manage airports all along its life cycle.

Process	Node	Activity	Description	OI step	Associated Use Cases
Plan over Long Term horizon	AOS	Establish the Airport Performance Targets	Establish the operational and performance framework, determine the performance targets and associated levels and publish them.		UC 6 01
		Forecast Airport Demand	Forecast the future traffic demand.		UC 6 02
		Establish Airport Operational Configuration	Define all the possible Airport Configurations (runway uses, airport circulations...) that could be applied during the next season.		UC 6 03
		Forecast Airport Capacity			UC 6 04
		Determine Airport Demand & Capacity Imbalance	Considering the future airport demand, identify the enhancements that will be necessary to achieve new performance targets or achieve the same level of performance.	DCB-0309	UC 6 05
		Revise Airport Plan	Prepare revisions and enhancements to optimise the performance of the airport.		UC 6 06
		Revise ATM systems plan	Ensure improvement of the airport performance by facilitating the installation of new ATM systems.		UC 6 07
		Identify external issues associated with enhancement plans			UC 6 08
		Define and update response to emergency			UC 6 09
		Declare pre-seasonal capacity	Define the appropriate capacity for the next season (rules for taxiway usage, stand allocation...).		UC 6 10
		Publish seasonal schedule via NOP			UC 6 11
		Create AOP		AO-0801 AO-0803 AO-0804 AUO-0801	UC 6 12
		Revise AOP		AO-0801 AO-0802 AO-0803 AO-0804 AUO-0801 DCB-0304 DCB-0310	UC 6 13
Manage Airport Operations Plan	AOS	Update AOP	Update AOP during the day of operation	AO-0801 AUO-0801 DCB-0310	UC 6 14 UC 6 32 UC 6 57 UC 6 65 UC 6 66 UC 6 67 UC 6 68
Monitor Airport Performance	AOS	Record Airport Data			Too many Use Cases to be listed here
Manage Post-Operations	AOS	Collect Airport Data			
		Analyse data			UC 6 91 UC 6 92 UC 6 93 UC 6 94 UC 6 95
		Create reports			

Process	Node	Activity	Description	OI step	Associated Use Cases
		Distribute reports			UC 6 96 UC 6 97
		Develop new predefined operational scenarios			UC 6 98

## 2907 5.2.2 Manage Runway

2908 The following table lists the processes providing guidance to aircraft or vehicles in the runway volume.

Process	Node	Activity	Description	OI step	Associated Use Cases
Prepare and Execute Landing	FD	Prepare Runway Exit	Send preferred runway exit to ATC or check if exit given by ATC is applicable.	AUO-0702 AUO-0703	UC 6 99
		Execute final approach		AO-0505-A	UC 6 99
		Execute Landing	Land.		UC 6 15 UC 6 35
		Execute Touch and Go	Touch and go.		UC 6 16
		Execute Go Around	Perform a go around.		UC 6 17
	Execute roll-out and vacate runway.	Brake to vacate the runway at the intended runway exit.	AUO-0702 AUO-0703	UC 6 15 UC 6 18 UC 6 19	
	EAATS	Negotiate Runway Exit	Receive preferred runway exit, accept it or propose another exit. Publish agreed exit.	AUO-0702 AUO-0703	UC 6 99
	AATS	Record and distribute landing information	Record ALDT and publish aircraft position on airport surface.		UC 6 15
		Plan and provide taxi-in route	If the aircraft does not vacate the runway at another exit, recalculate a new surface route and distribute it.	AO-0205 AO-0208-A SDM-0201	UC 6 18 UC 6 19
Provide tactical instruction		Give instruction during final approach.	AO-0310	UC 6 99	
Prepare and Execute Take-Off	AATS	Manage runway sequence	Optimize sequence, provide line-up clearance, check that the runway is clear and provide take-off clearance.	AO-0304 AO-0306 TS-0308	UC 6 79 UC 6 86 UC 6 90
	AOS	Inspect runway	Inspect runway.		UC 6 39 UC 6 40
	FD	Execute Line-Up			UC 6 86
		Execute Take-Off			UC 6 41 UC 6 86 UC 6 90

## 2909 5.2.3 Manage Turn-round

Process	Node	Activity	Description	OI step	Associated Use Cases
Prepare and execute in-block	ATS	Monitor aircraft trajectories	Monitor the progress of the aircraft through its ATV and update EIBT. Generate an alert if EOBT can not be respected.		-
		Provide Departure Planning information	Some time before EOBT, generate and publish departure planning information.		-
	AATS	Manage in-block	Determine a pre-departure sequence, update TTOT and propagate iSBT.	TS-0202 AUO-0203	UC 6 54 UC 6 57
	AOS	Manage airport resources	Organise resources (equipment and operators) to handle arriving aircraft.		-
	AUOO	Execute handling	Execute the different ground handling actions (de-board, unload, refuel, board...).		UC 6 55 UC 6 56 UC 6 66 UC 6 67
	FD	Manage airline resources	Organise resources (equipment and operators) to handle arriving aircraft.		-

Process	Node	Activity	Description	OI step	Associated Use Cases
		Execute in-block	Determine turn-round time and update TOBT.	AUO-0203-A	UC 6 54
Prepare and execute off-block	AATS	Manage pre-departure	Compute TSAT, issue TSAT and TTOT, publish the iRBT/iRMT, determine priorities and provide departure clearance.	TS-0202 AUO-0204-A AUO-0308	UC 6 58 UC 6 59 UC 6 61
		Provide start-up instruction	Check start-up and provide push-back clearance.	AUO-0308 AO-0208-A SDM-0201	UC 6 62
	FD	Plan departure	Receive take-off information, uploads the aircraft part of the iRBT/iRMT and requests departure clearance.	AUO-0308 AUO-0204-A IS-0402	UC 6 58
		Execute start-up	Start-up and request push-back clearance.	AUO-0308	UC 6 62
		Prioritize flights	Adjust iSBT planning for its own flights.	AUO-0103	UC 6 60

## 2910 5.2.4 Manage Movement on Airport Surface

2911 The following table lists the processes providing guidance to aircraft or vehicles on the airport surface.

Process	Node	Activity	Description	OI step	Associated Use Cases
Prepare and execute taxi-in routing	AOS	Provide guidance on apron			UC 6 32
	FD	Prepare taxi-in route		AUO-0308 AUO-0603-A	UC 6 99
		Execute taxi-in	Manoeuvre the aircraft from the runway exit point to the stand following the taxi in guidance, using taxi aids and following the route displayed in the cockpit.	AUO-0403 AUO-0603-A	UC 6 21
		Park aircraft			UC 6 32 UC 6 33 UC 6 34
	EAATS	Provide taxi-in route	Provide a taxi-in route to the aircraft during the approach phase.	AUO-0308 SDM-0201	UC 6 99
	AATS	Plan Taxi-in route	Plan a taxi-in route for an aircraft.	AO-0205 AO-0208-A	
		Provide taxi-in routing guidance	After vacating the runway, guide the aircraft until it reaches a stand. The taxi route may be revised.	AO-0205 AUO-0308 AUO-0603 AO-0208-A SDM-0201	UC 6 21 UC 6 22 UC 6 23 UC 6 24 UC 6 25 UC 6 27
Prepare and execute taxi-out routing	AOS	Facilitate push-back execution		AUO-0308	UC 6 76
	FD	Prepare taxi-out route		AUO-0308 AUO-0603-A	UC 6 76 UC 6 77 UC 6 78
		Execute start-up and exit from the stand	Execute start-up. Execute push back. In some cases, aircraft may forward to exit from an open stand or use engine reverse power.	AUO-0308	UC 6 63 UC 6 64 UC 6 69 UC 6 76 UC 6 77 UC 6 78
		Execute taxi-out		AUO-0308- AUO-0603-A AUO-0403	UC 6 79
		Execute runway crossing		AUO-0603-A AUO-0403	UC 6 21 UC 6 79
	AUOO	De-ice aircraft			UC 6 80
	AATS	Plan and provide taxi-out route	Plan and provide a taxi-out route to the aircraft during the turn-round phase.	AO-0205 AUO-0308 AO-0208-A SDM-0201	UC 6 76 UC 6 77 UC 6 78

Process	Node	Activity	Description	OI step	Associated Use Cases
		Provide instruction to exit from the stand	Provide instruction for push-back. In some cases, guide aircraft out of an open stand.	AUO-0308 AO-0208-A SDM-0201	UC 6 63 UC 6 64 UC 6 76 UC 6 77 UC 6 78
		Manage remote de-icing			UC 6 80
		Provide taxi-out routing guidance	Guide the aircraft until it reaches the holding point for take-off. The taxi route may be revised.	AO-0205 AUO-0308 AUO-0603 AO-0208-A SDM-0201	UC 6 79
		Provide runway crossing		AO-0208-A SDM-0201	UC 6 21 UC 6 79
Plan and provide routing for a vehicle	AV	Execute runway crossing			UC 6 21 UC 6 79
		Execute vehicle route	Execute a route on the airport surface.	AO-0206	UC 6 21 UC 6 40
		Plan ground movement	Plan the movement of a ground vehicle (aircraft excluded).		UC 6 26
		Execute ground movement	Execute a planned route (aircraft towing manoeuvre for example).	AO-0206	UC 6 26
	AATS	Plan Vehicle route	Plan a route for the movement of a ground vehicle (aircraft excluded).	AO-0205	UC 6 40
		Provide vehicle routing guidance	Guide a ground vehicle (aircraft excluded) on the airport surface.	AO-0206 AO-0208-A AO-0215 SDM-0201	UC 6 21 UC 6 39 UC 6 40 UC 6 79
		Provide runway crossing clearance		AO-0208-A AO-0215 SDM-0201	UC 6 21 UC 6 79

2912

## 2913 5.2.5 Manage Safety at Airport

2914 The following table lists the processes ensuring the safety of the aircraft on the airport surface as well  
 2915 as the airport vehicles.

Process	Node	Activity	Description	OI step	Associated Use Cases
Perform Conformance Monitoring	AATS	Monitor Airport-related Conformance	The system detects any non-conformance to procedures or clearances for traffic on airport surface.	AO-0104-A	UC 6 76 UC 6 79 UC 6 28 UC 6 29 UC 6 30 UC 6 31 UC 6 85
		Manage Airport Conformance Alert	Do everything which is necessary to cancel a non-conformance alert.	AO-0104-A AO-0208-A SDM-0201	UC 6 76 UC 6 79 UC 6 28 UC 6 29 UC 6 30 UC 6 31 UC 6 85 UC 6 89
Manage safety nets systems for airport vehicles	AV	Manage Alert for Vehicle Drivers	When an alert is triggered, vehicle drivers must do everything which is necessary to cancel it.	AO-0105	UC 6 76 UC 6 31
	AATS	Provide Alert to Vehicle Drivers	If alerts are not triggered onboard, they may be provided by ATS.	AO-0105	UC 6 76 UC 6 31
Manage safety on flight deck	FD	Monitor surrounding traffic		-	UC 6 99
		Manage traffic alert for pilots		AUO-0605-A	UC 6 79
		Provide Traffic Indication		-	-

Process	Node	Activity	Description	OI step	Associated Use Cases
		Provide Runway Status Indication		-	-
Perform RWSL Operations	AATS	Provide RWSL lights	Determine REL, RIL or THL lights to be lit or not.	AO-0209	UC 6 86
		Manage RWSL issues	Solve conflicting clearances or any issues with the system.	AO-0209 AO-0208-A SDM-0201	UC 6 86
		Disable RWSL	In some cases (bad weather conditions, malfunctioning...), RWSL may be disabled and airport users must be informed.	AO-0209	-
	FD	Manage clearance conflicting with RWSL lights	The flight crew or the vehicle drivers report any contradiction with RWSL.	AO-0209	UC 6 86
	AV				

2916

## 2917 5.2.6 Operational Architecture

2918 Once completed, the High Level Airport Operational Processes should be fully detailed on the EATMA  
2919 portal (<https://www.atmmasterplan.eu/architecture/>).

2920 They are each described in the context of an OFA. To browse through the different models of an  
2921 OFA, you can follow the following instructions. They will guide you to a root operational model.

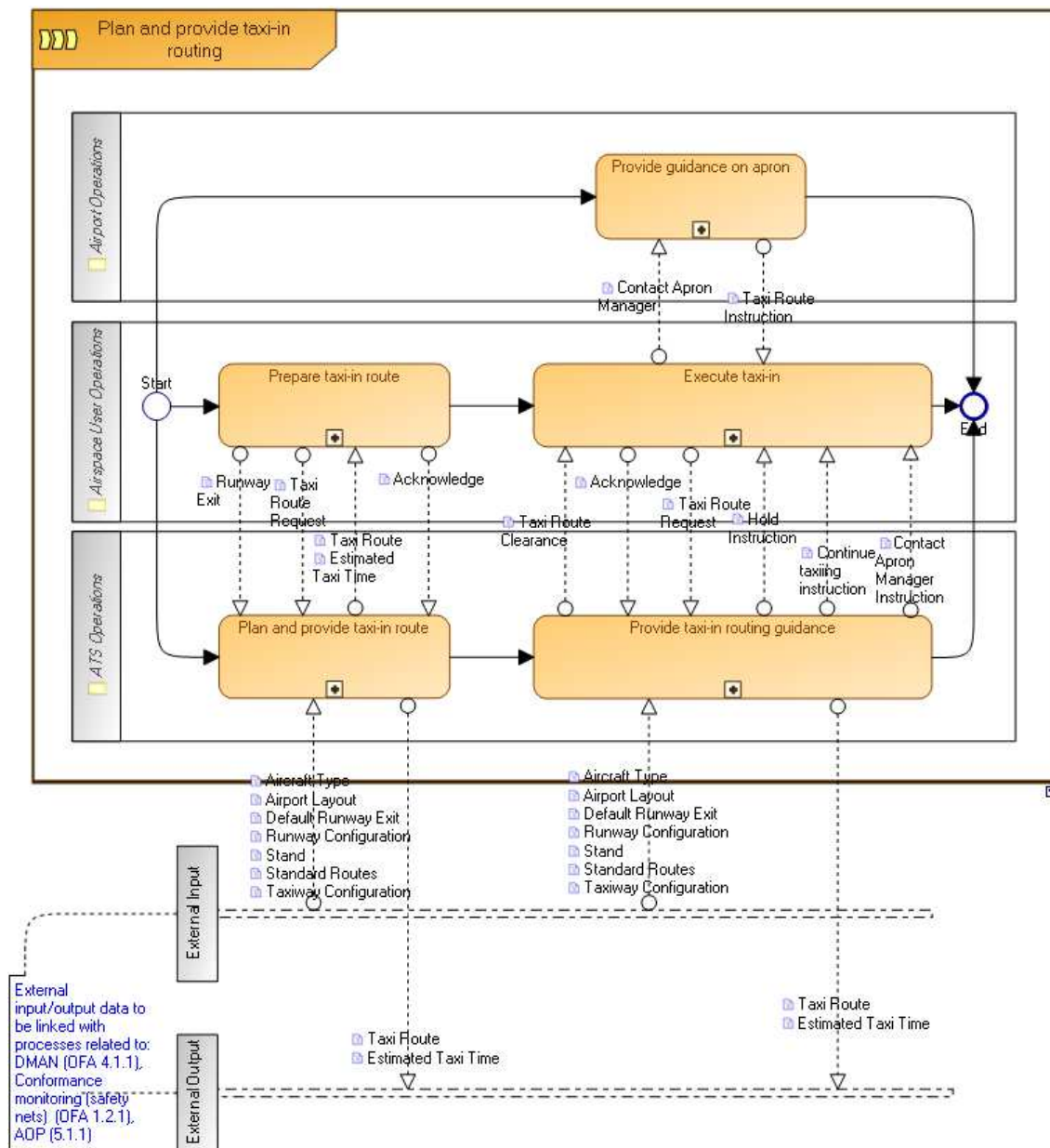
2922 1. Sign in the portal (<https://www.atmmasterplan.eu/architecture/signin>). You can use your  
2923 OneSky account or the generic login/password eatmatest/eatma,

2924 2. Click on "Views",

2925 3. Select an OFA for which the type is ACT (ACTivities),

2926 4. Click on the table view.

2927 Below is an example of Operational Process ("Plan and provide taxi-in routing") that can be found on  
2928 the portal. Each Operational Activity of this process (e.g. "Provide guidance on apron") is mapped to  
2929 an ATM Top Level Process. On the portal, you can see the mapping by clicking on an activity: one of  
2930 the parent activities of this activity should be an ATM Top Level Process.



2931

2932

2933 The main BPMN (Business Process Model and Notation) elements used in the operational models  
 2934 are presented in Appendix B.

2935 The basic BPMN modelling Rules can be found in the BPMN specification document available at the  
 2936 following website address: <http://www.bpmn.org/>.

2937

2938

2939

2940

## 5.3 Operational Services Identification and Definition (optional)

2941

2942

2943

Operational Services are not part of this DOD. Their development is still under discussion and will probably be led by WP8.

2944

## 2945 6 Requirements

### 2946 6.1 Introduction

2947 The development and introduction of the future Airport Step 1 operational concept should seek  
2948 substantial benefits within a range of Key Performance Areas (KPA). This chapter describes a set of  
2949 high level quantitative Operational and Performance requirements for Step 1.

2950 The aim of the airport concept is to fulfil the SESAR expectations for the future ATM system as  
2951 closely as possible. The targets that have been set require a 3-fold increase in capacity whilst  
2952 reducing delays; improving safety by factor 10; at least a 10% reduction of the aviation environmental  
2953 impact per flight and an ATM cost reduction for the airspace users of 50%. The airport concept will  
2954 focus on the total process in which the airport stakeholders are involved. This is not only the flight's  
2955 ground movement and ground handling process but also includes the part of the flight being executed  
2956 within the airspace around the airport (TMA). For this the airport concept and its objectives include:

- 2957 • Increased surface and runway safety,
- 2958 • Optimum surface management and arrival and departure sequence planning,
- 2959 • Accurate arrival and departure times and separation,
- 2960 • Optimum use of existing airport infrastructure and available capacity,
- 2961 • Reducing noise pollution and gas and particulate emission through operational improvements,
- 2962 • Better relations with neighbours,
- 2963 • Improved collaborative work between ANSP, users and Airport on environmental issues,
- 2964 • Additions and changes to airport infrastructure,
- 2965 • Optimum use of on-board devices / systems,
- 2966 • Improved efficiency by shared information and collaborative decision making,
- 2967 • Improved weather forecasts.

2968 While the above are essentially issues local to the airport they will be implemented to support the  
2969 system wide goals and benefits.

#### 2970 Requirement Identifier Convention

2971 The requirements must be written and identified according to general rules. General rules to write  
2972 requirements and identify them into the SESAR program have been developed. Each requirement  
2973 must be uniquely labelled and expressed with respect to the other requirements so you can refer to it  
2974 unambiguously.

2975 The adoption of a standard for naming requirements is necessary to avoid ambiguities while referring  
2976 to requirements. The naming convention is the following:

2977 **[Object\_type]-[Project\_code]-[Document\_code]-[Reference number 1]- [Reference number 2],**

2978 where:

- 2979 • Object Type will be a fixed text indicating requirement (REQ),
- 2980 • Project\_code will be 06.02, indicating that the requirements specified are associated to P6.2,
- 2981 • Document\_code: according to Requirements and V&V guidelines v1.0, the document code can  
2982 take 26 values, one of them being DOD (Detailed Operational Description),
- 2983 • Reference number is a sequence of digits split between reference number 1 and reference  
2984 number 2. In the case of our project, the reference number 1 will indicate the section where the  
2985 requirement is placed and the reference number 2 will be a sequence number identifying the  
2986 requirement into the section.

2987 For example, the identifier REQ-06.02.DOD-6300.0001 refers to a requirement written by the 06.02  
2988 project, reported inside the DOD document section 6.3 with the reference 0001.

2989



2990 

## 6.2 Operational Requirements

2991 This section presents the high-level requirements that correspond to the operational concept  
 2992 elements (Operational Services or Processes) addressed inside this DOD, including the requirements  
 2993 trace. OI steps that are predecessors have been given Operational Requirements in order that their  
 2994 validation activities can link to a requirement.

2995 Some requirements based on Development Baseline OI Steps have been retained because it has not  
 2996 been determined yet if any project has referred to them when building their scenarios or use cases.  
 2997 Deleting these requirements without making that check might lead to incompatibility problems, so for  
 2998 the moment, they have been kept. This will be addressed within the next update cycle.

2999

Identifier	REQ-06.02-DOD-6200.0001
Requirement	ECAC Airports and Aircraft Operators shall develop and apply recommendations contained in the European Action Plan for the prevention of runway incursions.

3001

3003

3004

Identifier	REQ-06.02-DOD-6200.0064
Requirement	The Tower Runway Controller and Tower Ground Controller shall be provided with alerts of conflicts for runway incursion and intrusion into restricted areas (also temporarily restricted or forbidden – e.g. closed taxiway, ILS or MLS critical area).
	Provision of a safety net for runway operations, capable of detecting and preventing most dangerous hazards resulting from deviations or errors

3006

Identifier	REQ-06.02-DOD-6200.0003
Requirement	The Tower Runway Controller and Tower Ground Controller shall be able to detect conflicting ATC clearances during operations and non-conformance to procedures or clearances for traffic in their area of responsibility.

3009

Identifier	REQ-06.02-DOD-6200.0005
Requirement	The Vehicle Driver shall be able to detect if they are involved in a potential or actual risk of collision with an aircraft or infringement into restricted or closed areas.

3012

Identifier	REQ-06.02-DOD-6200.0006
Requirement	The Flight Crew shall be able to detect if involved in potential or actual risk of collision with other traffic during runway operations.

3015

Identifier	REQ-06.02-DOD-6200.0066
Requirement	The Tower Controllers shall be provided with position and automatic identity of all relevant aircraft and vehicles on the movement area, with the use of ADS-B applications.

3018

Identifier	REQ-06.02-DOD-6200.0007
Requirement	The Controller shall be able to detect the FOD presence on the movement area to avoid accidents.

3021

Identifier	REQ-06.02-DOD-6200.0008
Requirement	The Vehicle Driver shall have the awareness of surrounding traffic situation (vehicles and aircraft) on ground taxi and runway by displayed information in the vehicle driver's cockpit.

3024

Identifier	REQ-06.02-DOD-6200.0009
Requirement	The Tower Clearance Delivery, Ground and Runway Controllers shall be provided with the most operationally relevant surface route available for any

	aircraft.	
3027	Identifier Requirement	REQ-06.02-DOD-6200.0011 The Vehicle Driver shall have the awareness of traffic context information including at least the status of runways and taxiways, obstacles, and an airport moving map displayed on a vehicle's driver cockpit.
3030	Identifier Requirement	REQ-06.02-DOD-6200.0014 The situational awareness of The Tower Runway Controller / Ground/Apron Manager and of the flight crew shall be improved with the integration and exploitation of new ATC functions with current elements into an Advanced - Controller Working Position (A-CWP):
3033	Identifier Requirement	REQ-06.02-DOD-6200.0067 Runway usage awareness of Flight Crews and Vehicle Drivers shall be improved thanks to the presence of airfield lights that visually indicate when it is unsafe to enter the runway
3036	Identifier Requirement	REQ-06.02-DOD-6200.0074 The final approach controller and Tower Runway Controller shall be able to reduce separations by 0.5 NM for arrivals under defined crosswind conditions.
3039	Identifier Requirement	REQ-06.02-DOD-6200.0075 The final approach controller and Tower Runway Controller shall be able to reduce separations by 0.5 NM for arrivals under specified headwind conditions.
3042	Identifier Requirement	REQ-06.02-DOD-6200.0015 The final approach controller and the Tower runway controller shall be able to use reduced aircraft separations using consistent and accurate TBS (time based wake turbulence radar separation) rules on final approach.
3045	Identifier Requirement	REQ-06.02-DOD-6200.0016 The Tower Runway Controller shall be able to take reduced or suspended WT separations into account thanks to stable weather conditions that either ensures transport of the WT away from the path of following a/c or ensures rapid decay of the WT.
3048	Identifier Requirement	REQ-06.02-DOD-6200.0077 The Tower Runway Controller shall be able to take into account reduced or suspended WT separations for departures for the initial common path, thanks to stable weather conditions that either ensure the transport of the WT away from the path of following a/c or ensures rapid decay of the WT.
3051	Identifier Requirement	REQ-06.02-DOD-6200.0017 The Tower Runway Controller shall be able to use appropriate runway exits in order to optimise the ROT.
3054	Identifier Requirement	REQ-06.02-DOD-6200.0078 The approach controller and Tower Runway Controller shall apply pair wise separation for arrivals on final approach, and for departures on initial common departure path, taking into account aircraft characteristics of the lead and follower aircraft.
3057	Identifier Requirement	REQ-06.02-DOD-6200.0018 The Tower Runway Controller shall be able to use appropriate multiple runway entries and a wide holding area to optimize the sequencing process for departing aircraft.

3060

Identifier	REQ-06.02-DOD-6200.0020
Requirement	Tools and more accurate surveillance techniques shall assist the Tower Runway Controller to enlarge the capabilities of existing (and dependent) runway combinations.

3063

Identifier	REQ-06.02-DOD-6200.0021
Requirement	All Involved partners shall agree and apply systematic strategies exchanging and sharing information to improve the sequencing of operations (e.g. de-icing) in the Pre-Departure Phase.

3066

Identifier	REQ-06.02-DOD-6200.0022
Requirement	The Tower Runway/Ground Controller shall use adequate LVP (Low Visibility Procedures) implemented at applicable airports involving in particular a harmonised application across airports and the use of optimised separation criteria.

3069

Identifier	REQ-06.02-DOD-6200.0023
Requirement	The landing procedure shall be improved by tuning of ILS to increase runway capacity during already limiting visibility conditions.

3072

Identifier	REQ-06.02-DOD-6200.0024
Requirement	The capacity of the airport in Low Visibility Conditions shall be improved by using MLS and/or interim application of GLS (GPS only) instead of ILS for precision approaches during landing procedures.

3075

Identifier	REQ-06.02-DOD-6200.0025
Requirement	The Flight Crew shall be able to perform precision approaches in Low Visibility Conditions using GBAS CAT II/III (based on GPS L1)

3078

Identifier	REQ-06.02-DOD-6200.0026
Requirement	All Involved partners shall share information on the progress of turn-round, not only at the airport concerned but also in other relevant units such as the NMOC and destination airport to support the Departure/Arrival management.

3081

Identifier	REQ-06.02-DOD-6200.0027
Requirement	Progress of turn-round shall be made available to all involved partners not only at the airport concerned but also in other relevant units such as the NMOC and destination airport to support the Departure/Arrival management.

3084

Identifier	REQ-06.02-DOD-6200.0028
Requirement	Aircraft Environmental Impact Management and Mitigation shall be taken into account during all airport operations in order to guarantee optimum environmental performance

3087

Identifier	REQ-06.02-DOD-6200.0030
Requirement	The De-icing Agent shall be able to improve the anti-icing treatment on aircraft at the stands with technical solutions for the bio-degradation of de-icing fluids.

3090

Identifier	REQ-06.02-DOD-6200.0031
Requirement	The Airport Operator shall be able to access to the environmental performance of the ATM stakeholders in support of continuous improvement process.

3093

Identifier	REQ-06.02-DOD-6200.0081
Requirement	The Airport stakeholders shall make the relevant information through time

3096		available to the AOP.
	Identifier	REQ-06.02-DOD-6200.0082
	Requirement	Airport Operators shall make the outputs of landside (passenger and baggage flow) process that can affect ATM performances available through A-CDM in both planning and execution phase.
3099	Identifier	REQ-06.02-DOD-6200.0083
	Requirement	Airport Operators shall be able to monitor the aircraft movements at an airport in both the planning and execution timeframe.
3102	Identifier	REQ-06.02-DOD-6200.0084
	Requirement	Airport stakeholders shall be provided with Decision Support tools capable to propose tactical changes to operational inputs, rules and procedures that facilitate the collaborative decision making during both planning and execution timeframes.
		Collaborative Airport Performance Management
		Airport Performance is directly impacted by the stakeholders operating at the airport in order to improve airport performance in line with EU ATM Network Performance Objectives.
3105	Identifier	REQ-06.02-DOD-6200.0032
	Requirement	The flight crew shall be able to follow simple descent profiles in order to optimise the performance in case of low density traffic.
3108	Identifier	REQ-06.02-DOD-6200.0037
	Requirement	The Airline Operations Centre shall be able to refine iteratively the iSBT using new and more accurate information in order to increase the accuracy of the Business Trajectory
3111	Identifier	REQ-06.02-DOD-6200.0038
	Requirement	The Tower Clearance Delivery, Ground and Runway Controllers shall be able to send information to aircraft through data link on expected route and clearances related to DCL, start-up, push back and taxi (D-TAXI service)
3114	Identifier	REQ-06.02-DOD-6200.0039
	Requirement	The Flight Crew shall be able to send requests for information on expected route and for clearances related to DCL, start-up, push back and taxi (D-TAXI service) to controllers through data link
3117	Identifier	REQ-06.02-DOD-6200.0069
	Requirement	The Tower Runway/Ground/delivery controllers shall be able to send the ground-related clearances and information to vehicles through datalink.
3120	Identifier	REQ-06.02-DOD-6200.0070
	Requirement	The vehicle driver shall be able to send the ground-related clearance requests to Tower Controllers though datalink.
3123	Identifier	REQ-06.02-DOD-6200.0042
	Requirement	The pilot shall be aware regarding the surrounding traffic (incl. both aircraft and airport vehicles) during taxi and runway operations, provided with information on moving map display.
3126	Identifier	REQ-06.02-DOD-6200.0043
	Requirement	The pilot shall be assisted by visual enhancement technologies in Low Visibility Conditions.
3129	Identifier	REQ-06.02-DOD-6200.0044
	Requirement	The pilots shall be provided with (dynamic) traffic context information

3132		including status of runways and taxiways, obstacles, route to runway or stand according to the route issued by Tower Runway/Ground/Delivery Controller.
	Identifier	REQ-06.02-DOD-6200.0045
	Requirement	Airport operations design shall take into account not only braking distance or runway/taxiway design but also pilot's awareness of ROT requirements, pilot's reaction times to line-up/departure clearances, pre-departure actions in order to reduce the Runway Occupancy Time (ROT).
3135		
	Identifier	REQ-06.02-DOD-6200.0079
	Requirement	The Tower Ground Controller shall be able to coordinate by voice automated braking to vacate at a pre-selected runway exit, based on avionic BTV.
3138		
	Identifier	REQ-06.02-DOD-6200.0046
	Requirement	The Tower Ground Controller shall be able to coordinate automated braking to vacate at a pre-selected runway exit through datalink, based on avionic BTV.
3141		
	Identifier	REQ-06.02-DOD-6200.0047
	Requirement	For the execution and planning of the business trajectories of aircraft operators the Aircraft Operator and Airport Operator shall take into account environmental restrictions in the early phase of flight / iSBT planning.
3144		
	Identifier	REQ-06.02-DOD-6200.0048
	Requirement	The Airport stakeholders, via the appropriate applications, shall be able to view an image of the state of the ATM environment for past, present and future, moving the window along the timeline and focusing on any particular aspect or aspects he or she is interested in.
	Identifier	REQ-06.02-DOD-6200.0063
	Requirement	shall be able to access
3150		
3151		
	Identifier	REQ-06.02-DOD-6200.0049
	Requirement	Relationship and processes between all involved stakeholders shall be improved especially during the anticipating and reacting phases to optimise capacity throughput in sector groups based upon current improvement of ATFM activities.
3154		
3155		
	Identifier	REQ-06.02-DOD-6200.0050
	Requirement	In case of critical events, involved stakeholders shall take immediate action to minimise consequences and to retrieve network stability.
		Critical events refers to a sudden and usually unforeseen event leading to a high drop in ATFCM capacity.
3158		
3159		
	Identifier	REQ-06.02-DOD-6200.0051
	Requirement	The Airport Slot Coordinator shall be assisted by monitoring processes to assure Convergence between airport slots, ATFM slots, and flight plan / iSBT to improve consistency on a daily basis.
3162		
3163		
	Identifier	REQ-06.02-DOD-6200.0052
	Requirement	Air Traffic Control, Aircraft Operators and Airport Operators shall collaborate with ATFCM in a genuine partnership.
3166		

3167

Identifier	REQ-06.02-DOD-6200.0054
Requirement	The Airport Operations shall take into account information from airports at a regional level to improve the estimated time of arrival for all flights bound to the region.

3170

3171

Identifier	REQ-06.02-DOD-6200.0085
Requirement	The airport operator shall be provided with available airport capacity and scheduled/forecast demand given the prevailing and/or forecast weather and other operational conditions.
	Airport Demand-Capacity Balancing
	The objective is to enhance the monitoring and management of demand at an individual airport given the real available capacity. Through incorporating METEO forecast and actual data, along with other airport resource levels, actual achievable airport capacity levels can be determined with greater accuracy.

3174

3175

Identifier	REQ-06.02-DOD-6200.0086
Requirement	Airport stakeholders shall continuously refine airport planning to improve local airport CDM process and consequently overall network planning.
	Airport Demand-Capacity Balancing
	The overall network planning proposes CTOT / TTA for all regulated flights. For those flights where the allocated constraints will have a negative impact (e.g. disturbing airport/airline operations), the Network shall take into account CDM information in order to possibly re-allocate CTOT / TTA. This results in an improved efficiency in the management of Airport and ATFCM Planning.

3178

3179

Identifier	REQ-06.02-DOD-6200.0076
Requirement	a consistent view of the filed flight plan including late updates until departure.
	Improved Flight Plan Consistency Pre-Departure

3182

3183

Identifier	REQ-06.02-DOD-6200.0073
Requirement	the data required during the pre-flight phase in an integrated and flexible manner.
	Integrated Pre-Flight Briefing
	The user can access various/information sources such as AIS, ARO, MET and ATFM which provide NOTAM, SNOWTAM, MET messages, FPL and related messages or network management messages.

3186

3187

Identifier	REQ-06.02-DOD-6200.0072
Requirement	aeronautical information supported by electronic publication (eAIP). Updates to the aeronautical information are disseminated in electronic/digital form.

3190

Identifier	REQ-06.02-DOD-6200.0071
Requirement	data available from the FOC/WOC to improve the performance.
	Provision and use of FOC/WOC data to enhance ATM ground system performance

3193

3194

Identifier	REQ-06.02-DOD-6200.0068
Requirement	improvement in ATC operations and in the performance of ground-based

	systems subject to quick variations and/or frequent updates related the use of ADD.
3197	
3198	
	Identifier REQ-06.02-DOD-6200.0055
	Requirement The pilot shall be provided with easy access to the widest possible range of meteorological and operational information derived from ATIS, METAR and NOTAMs/SNOWTAMs, specifically relevant to the departure, approach and landing flight phases to support the decision making process .
3201	
3202	
	Identifier REQ-06.02-DOD-6200.0056
	Requirement The users and providers shall be able to assess the actual operation (routes flown, usage of allocated airspace, runway utilisation, etc.) against the forecast operation and to assess the adequacy of the capacity provision.
3205	
3206	
	Identifier REQ-06.02-DOD-6200.0057
	Requirement The Tower Runway and Ground controllers and AFISO shall be provided with the information collected from remote tower sensor systems in order to perform Air Traffic Services from a facility located elsewhere than at the relevant airport.
3209	
3210	
	Identifier REQ-06.02-DOD-6200.0080
	Requirement The Tower Clearance Delivery Controller shall be provided with a pre-departure sequence (TSAT sequence), built having taken into account accurate taxi time forecasts, to issue start-up approval.
3213	
3214	
	Identifier REQ-06.02-DOD-6200.0060
	Requirement Tower controllers shall be able to choose arrival-departure patterns for a defined period, coordinating with Approach controller and considering arrival and departure flows on the same or dependent runways.
	Identifier REQ-06.02-DOD-6200.0061
	Requirement The Tower Runway Controller shall be provided with Arrival and Departure sequences calculated by a fixed arrival-departure pattern for defined periods to integrate Arrival and Departure flows to the same runway (or for dependent runways).
3219	
3220	
	Identifier REQ-06.02-DOD-6200.0062
	Requirement The Tower Runway Controller shall have the possibility to choose a fixed arrival-departure pattern for defined periods to integrate Arrival and Departure flows to the same runway (or for dependent runways).
3222	
3224	

## 3225 6.3 Performance Requirements

### 3226 Introduction

3227 The Validation targets come from B4.1 and are aligned with DS10. Currently, there is no plan to  
3228 update the targets to DS11; that can lead to some discrepancies in the Performance Requirements  
3229 with the other sections of the document. This issue is being addressed at the SJU level.

3230 The KPIs that should be used to measure the performance associated with these targets are detailed  
3231 in the Airport Step 1 VALSE**Error! Reference source not found.**

### 3232 6.3.1 Safety

3233 Airport Safety Requirements address means to reduce the risk and the occurrence of air traffic  
3234 accidents.

Identifier	REQ-06.02-DOD-SAF1.0112
Requirement	Improve Safety in OFA01.01.02 by 2,50%

3236

Identifier	REQ-06.02-DOD-SAF1.0121
Requirement	Improve Safety in OFA01.02.01 by 4,92%

3239

Identifier	REQ-06.02-DOD-SAF1.0122
Requirement	Improve Safety in OFA01.02.02 by 1,62%

3242

Identifier	REQ-06.02-DOD-SAF1.0421
Requirement	Improve Safety in OFA04.02.01 by 1,24%

3245

Identifier	REQ-06.02-DOD-SAF1.0411
Requirement	Improve Safety in OFA04.01.01 by 0,05%

3248

Identifier	REQ-06.02-DOD-SAF1.0611
Requirement	Improve Safety in OFA06.01.01 by 0,96%

3251

### 3253 6.3.2 Security

3254 Airport Security requirements address the risk, the prevention, the occurrence and mitigation of  
3255 unlawful interference with flight operations of civil aircraft and other critical performance aspects of the  
3256 ATM system.

Identifier	REQ-06.02-DOD-SEC1.0001
Requirement	The security of airport operations shall be maintained at or above the current level.  preserve the business continuity of the air transport industry by reducing the risk of unauthorised access to and disclosure of ATM information.

3258

3260

### 3261 6.3.3 Environment Sustainability

Identifier	REQ-06.02-DOD-ENV1.0001
Requirement	Airports shall respect both the local and European standards set for noise, local air quality, emissions and contaminants at and around airports.

3263

3265



3266 **6.3.4 Cost effectiveness**

3267 Airport Cost Effectiveness requirements address the cost of gate-to-gate ATM in relation to the  
 3268 volume of air traffic that is managed. They cover the total direct gate-to-gate ATM costs incurred by  
 3269 ATM stakeholders (regulatory and governmental authorities, intergovernmental organisations, service  
 3270 providers, airspace users, Airport Operators etc.). This includes ATM/CNS costs, MET costs,  
 3271 payments made to regulatory and governmental authorities, and European ATM design function costs  
 3272 (e.g. EUROCONTROL today). From an organisational perspective they include staff costs,  
 3273 infrastructure, equipment (ground, air and space based), software, maintenance, training etc.

Identifier	REQ-06.02-DOD-CEF1.0611
Requirement	in OFA06.01.01 by 0,27%
	Through progressive implementation of new procedures the European gate-to-gate ATM costs shall reduce.

3275

Identifier	REQ-06.02-DOD-CEF1.0631
Requirement	in OFA06.03.01 by 0,27%
	Through progressive implementation of new systems and procedures the European gate-to-gate ATM costs shall reduce.

3278

3280

3281 **6.3.5 Capacity**

Identifier	REQ-06.02-DOD-CAP1.0111
Requirement	in OFA01.01.01
	Runway Throughput shall be increased by new procedures, technology and, where ever possible, infrastructure.

3283

Identifier	REQ-06.02-DOD-CAP1.0131
Requirement	in OFA01.03.01 by 5,99%
	Runway Throughput shall be increased by new procedures, technology and, where ever possible, infrastructure.

3286

Identifier	REQ-06.02-DOD-CAP1.4111
Requirement	in OFA04.01.01 by 0,84%
	Runway Throughput shall be increased by new procedures, technology and, where ever possible, infrastructure.

3289

Identifier	REQ-06.02-DOD-CAP1.4112
Requirement	in OFA04.01.01 by 2,96%
	TMA capacity shall be increased by reducing the need for and length of all buffer times.

3292

Identifier	REQ-06.02-DOD-CAP1.4113
Requirement	in OFA04.01.01 by 1,63%
	capacity shall be increased by reducing the need for and length of all buffer times.

3295

Identifier	REQ-06.02-DOD-CAP1.0421
Requirement	in OFA04.02.01 by 0,54%
	Runway Throughput shall be increased by new procedures, technology and, where ever possible, infrastructure.

3298

Identifier	REQ-06.02-DOD-CAP1.5111
Requirement	in OFA05.01.01 by 0,22%
	TMA capacity shall be increased by reducing the need for and length of all buffer times.

3301

Identifier	REQ-06.02-DOD-CAP1.5112
Requirement	in OFA05.01.01 by 0,332%
	capacity shall be increased by reducing the need for and length of all buffer times.

3304

### 3306 6.3.6 Airport Fuel Efficiency

3307

Identifier	REQ-06.02-DOD-EFF1.0131
Requirement	in OFA01.03.01 by 0,22%

3309

3311

3312

Identifier	REQ-06.02-DOD-EFF1.0411
Requirement	in OFA04.01.01 by 0,01%

3314

3316

3317

Identifier	REQ-06.02-DOD-EFF1.0421
Requirement	in OFA04.02.01 by 0,14%

3319

3321

3322

Identifier	REQ-06.02-DOD-EFF1.0511
Requirement	in OFA05.01.01 by 0,02%

3324

3326

### 3327 6.3.7 Flexibility

3328 These requirements cover the ability of the ATM system and airports to respond to “sudden” changes  
 3329 in demand and capacity: rapid changes in traffic patterns, last minute notifications or cancellations of  
 3330 flights, changes to the iRBT (pre-departure changes as well as in-flight changes, with or without  
 3331 diversion), late aircraft substitutions, sudden airport capacity changes, late airspace segregation  
 3332 requests, weather, crisis situations, etc.

3333 These requirements also cover the ability of the ATM system and airports to accommodate airspace  
 3334 user requests for iRBT updates of scheduled and non-scheduled flights, ranging from simple time  
 3335 translation (depart/arrive earlier/later) to full iRBT redefinition (changes to aircraft, route, vertical  
 3336 profile, destination, etc.).

3337 The initial indicative Flexibility design targets are:

- 3338 •Of the scheduled flights requesting a change in departure time, no more than 2% (European-  
 3339 wide annual average) will suffer a delay penalty of more than 3 minutes (with respect to  
 3340 their requested time) as a consequence of the request.
- 3341 •The average delay (European-wide annual average) of such scheduled flights (with a delay  
 3342 penalty of more than 3 minutes) will be less than 5 minutes.
- 3343 •At least 95% (European-wide annual average) of the (valid) requests for full iRBT redefinition  
 3344 of scheduled and non-scheduled flights will be accommodated, albeit possibly with a time  
 3345 penalty (i.e., departure and/or arrival delay).
- 3346 •Of the scheduled and non-scheduled flights with a successfully accommodated request for  
 3347 full Reference BT redefinition, no more than 10% (European-wide annual average) will  
 3348 suffer a delay penalty (i.e., departure and/or arrival delay) of more than 3 minutes (with  
 3349 respect to their requested time) as a consequence of the request.
- 3350 •The average delay of such scheduled and non-scheduled flights with a successfully  
 3351 accommodated request for full Reference BT redefinition (with a delay penalty of more  
 3352 than 3 minutes) will be less than 5 minutes.

- 3353 •At least 98% (European-wide annual average) of the non-scheduled flight departures will be
- 3354 accommodated with a delay penalty less than 3 minutes.
- 3355 •The average delay (European-wide annual average) of such non-scheduled flight departures
- 3356 (with a delay penalty of more than 3 minutes) will be less than 5 minutes.
- 3357 •At least 98% (European-wide annual average) of the VFR-IFR change requests will be
- 3358 accommodated without penalties.

3359 Flexibility targets at the OFA level have not yet been developed by SESAR. The targets listed above  
3360 are at the Program level and apply to all phases of flight. As these targets cannot be easily allocated  
3361 to individual OFAs, there are listed here in the introduction to this section. However, one could  
3362 assume that they are shared between the airport and network. As such a general requirement,  
3363 without numerical targets, could be assigned to airport OFAs.

Identifier	REQ-06.02-DOD-FLX1.0001
Requirement	Airspace Users shall maintain the ability to make amendments to filed requests without suffering excess delays or route changes.

3365

### 3367 6.3.8 Predictability

3368 Airport Predictability requirements cover the variability of the flight operation: departure (off-block) and  
3369 arrival (on-block) punctuality, and the variability of flight phase durations (turnaround time, taxi time,  
3370 airborne time).

Identifier	REQ-06.02-DOD-PRE1.0131
Requirement	in OFA01.03.01 by 2,77%

3372

Identifier	REQ-06.02-DOD-PRE1.0411
Requirement	in OFA04.01.01

3375

Identifier	REQ-06.02-DOD-PRE1.0421
Requirement	in OFA04.02.01 by 4,95%

3378

Identifier	REQ-06.02-DOD-PRE1.0511
Requirement	in OFA05.01.01 by 0,27%

3381

3383

### 3384 6.3.9 Access and Equity

3385 Airport Access and Equity requirements address whether or not access rights to airspace and airports  
3386 are solely based on the class of airspace user. In other words, is shared use by classes of airspace  
3387 user allowed, and how much advance notice of this accessibility is provided.

Identifier	REQ-06.02-DOD-ANE1.0001
Requirement	Shared use of airports by different classes of airspace users will be significantly improved
	Classes of airspace users defined by type of user, type of aircraft, type of flight rule

3389

Identifier	REQ-06.02-DOD-ANE1.0002
Requirement	Where shared use is conflicting with other performance expectations, viable airport alternatives will be provided to satisfy the airspace users' needs, in consultation with all affected stakeholders.
	safety, security, capacity, etc.

3392

Identifier	REQ-06.02-DOD-ANE1.0003
Requirement	Priority management, will not be based on just the 'first come first serve' rule.

3395

3396

Identifier	REQ-06.02-DOD-ANE1.0004
Requirement	Priority rules will always be applied in a transparent, correct manner.

3399

### 3401 6.3.10 Participation

3402 Airport Participation requirements address the aim of how to achieve a balanced approach to ATM  
3403 community involvement.

Identifier	REQ-06.02-DOD-PRT.0001
Requirement	Participation by the ATM community shall be improved during all ATM phases:
	planning, development, deployment, operation and evaluation.

3405

Identifier	REQ-06.02-DOD-PRT.0002
Requirement	Participation by the ATM community shall be improved through collaborative decision-making and consensus building.

3408

### 3410 6.3.11 Interoperability

3411 Airport Interoperability requirements address the facilitation of homogeneous and non-discriminatory  
3412 global and regional traffic flows.

Identifier	REQ-06.02-DOD-INT1.0001
Requirement	Interoperability of airport systems shall be increased through the application of standards and uniform principles, together with improved technical and operational interoperability of aircraft and ATM Systems

3414

## 3416 7 Operational Focus Areas and OSED mapping

3417 The goal of this section is to provide all required information concerning the scope and elements of  
3418 this Airport Step 1 DOD and their allocation to the *Operational Focus Areas* that will develop the  
3419 corresponding detailed operational material.

3420 Hence, this section:

- 3421 • Identifies the Operational Focus Areas (OFAs) that should be addressed in the scope of this  
3422 **Airport Step 1 DOD** and the corresponding OI Steps
- 3423 • Allocates Environment Definition, Scenarios and Processes and Services inside the DOD to  
3424 each relevant Operational Focus Area.

3425

### 3426 7.1 Mapping of Operational Focus Areas to OI Steps and other 3427 X.2

3428 The reference material for establishing the list of OI Steps to consider in the Step 1 DOD is the official  
3429 ATM roadmap maintained by WP B1 through SESAR D79-WPB.01-Integrated Roadmap Dataset 11-  
3430 release Note-00.01.00 – 11/10/2013[4].

3431 The eligible **OI steps** for the **Airport Step 1 DOD** hold the following characteristics:

- 3432 ○ The **Airport DB OI steps** that are still applicable in Concept Step 1;
- 3433 ○ The **STEP 1 OI Steps** (shown in colour in the table below).

Operational Focus Area name / identifier	OI Step (coming from the Integrated Roadmap)	OI step title	Story Board Step	Other X.02
ENB02.01.01 SWIM	IS-0101	Improved Flight Plan Consistency Pre-Departure	DB	
ENB02.01.01 SWIM	IS-0102	Improved Management of Flight Plan After Departure	DB	
ENB02.01.01 SWIM	IS-0201	Integrated Pre-Flight Briefing	DB	
ENB02.01.01 SWIM	IS-0901-A	SWIM for Step1	S1	5.2 7.2
ENB02.01.02 AIM/MET	IS-0402	Extended Operational Terminal Information Service Provision Using Datalink	S1	5.2
ENB02.01.02 AIM/MET <sup>43</sup>	MET-0101	Enhanced operational planning decisions through MET information integration	S1	11.2
OFA01.01.01 LVPs using GBAS	AO-0403	Optimised Dependent Parallel Operations	DB	
OFA01.01.01 LVPs using GBAS	AO-0502	Improved Operations in Low Visibility Conditions	DB	
OFA01.01.01 LVPs using GBAS	AO-0505-A	Improved Low Visibility Operations Using GBAS CATII/III based on GPS L1	S1	
OFA01.01.02 Pilot enhanced vision	AUO-0403	Enhanced Vision on Head-Up display for the Pilot in Low Visibility	S1	

<sup>43</sup> OFA assignment to be confirmed (no assignment in Integrated Roadmap version DS10)

Operational Focus Area name / identifier	OI Step (coming from the Integrated Roadmap)	OI step title	Story Board Step	Other X.02
		Conditions		
OFA01.02.01 Airport safety nets	AO-0101	Reduced Risk of Runway Incursions through Improved Procedures and Best Practices on the Ground	DB	
OFA01.02.01 Airport safety nets	AO-0102	Automated Alerting of Controller in Case of Runway Incursion or Intrusion into Restricted Areas	DB	
OFA01.02.01 Airport safety nets	AO-0104-A	Airport Safety Nets for Controllers in Step 1	S1	
OFA01.02.01 Airport safety nets	AO-0105	Airport Safety Net for Vehicle Drivers	S1	
OFA01.02.01 Airport safety nets	AO-0202	Detection of FOD (Foreign Object Debris) on the Airport Surface	DB	
OFA01.02.01 Airport safety nets	AO-0209	Enhanced Runway Usage Awareness	S1	
OFA01.02.01 Airport safety nets	AUO-0605-A	Airport Safety Nets for Pilots in Step 1	S1	
OFA01.02.02 Enhanced situational awareness	AO-0201-A	Enhanced Ground Controller Situational Awareness in all Weather Conditions for Step 1	S1	
OFA01.02.02 Enhanced situational awareness	AUO-0401	Airborne Traffic Situational Awareness on the Airport Surface (ATSA-SURF)	DB	
OFA01.03.01 Enhanced Runway Throughput	AO-0303	Time Based Separation for Final Approach - Full Concept	S1	
OFA01.03.01 Enhanced Runway Throughput	AO-0304	Weather Dependent Reduced Wake Turbulence Separations for Departure	S1	
OFA01.03.01 Enhanced Runway Throughput	AO-0305	Additional Rapid Exit Taxiways (RET) and Entries	DB	
OFA01.03.01 Enhanced Runway Throughput	AO-0306	Wake Turbulence Separations based on Static Aircraft Characteristics	S1	
OFA01.03.01 Enhanced Runway Throughput	AO-0310	Weather-dependent Reduced Wake Turbulence Separations for Final Approach	S1	
OFA01.03.01 Enhanced Runway Throughput	AUO-0701	Use of Runway Occupancy Time (ROT) Reduction Techniques	DB	
OFA01.03.01 Enhanced Runway Throughput	AUO-0703	Optimised braking to vacate at a pre-selected runway exit coordinated with Ground ATC by Datalink	S1	
OFA02.02.04 Approach Procedures with Vertical Guidance	AOM-0605	Enhanced terminal operations with automatic RNP transition to XLS/LPV	S1	5.2

Operational Focus Area name / identifier	OI Step (coming from the Integrated Roadmap)	OI step title	Story Board Step	Other X.02
OFA03.01.04 Business and Mission Trajectory	AUO-0201	Enhanced Flight Plan Filing Facilitation	DB	
OFA03.01.04 Business and Mission Trajectory	AUO-0203-A	Shared Business / Mission Trajectory (iSBT) in Step 1	S1	7.2
OFA03.01.04 Business and Mission Trajectory	AUO-0204-A	Agreed Reference Business / Mission Trajectory (RBT/iRMT) in Step 1	S1	7.2
OFA04.01.01 Integrated Arrival/Departure Management at Airports <sup>44</sup>	TS-0202	Pre-Departure Sequencing supported by Route Planning	S1	
OFA04.01.01 Integrated Arrival/Departure Management at Airports	TS-0308	Flow based Integration of Arrival and Departure Management	S1	
OFA04.02.01 Integrated Surface Management	AO-0205	Automated Assistance to Controller for Surface Movement Planning and Routing	S1	
OFA04.02.01 Integrated Surface Management	AO-0206	Enhanced Guidance Assistance to Airport Vehicle Driver Combined with Routing	S1	
OFA04.02.01 Integrated Surface Management	AO-0215 <sup>45</sup>	Airport ATC provision of ground-related clearances and information to vehicle drivers via datalink	S1	
OFA04.02.01 Integrated Surface Management	AUO-0308	Datalink services used for provision of ground related clearances and information	S1	
OFA04.02.01 Integrated Surface Management	AUO-0603-A	Enhanced Guidance Assistance to Aircraft on the Airport Surface Combined with Routing in Step 1	S1	
OFA05.01.01 Airport Operations Management	AO-0501	Improved Operations in Adverse Conditions through Airport Collaborative Decision Making	DB	
OFA05.01.01 Airport Operations Management	AO-0601	Improved Turn-round Process through Collaborative Decision Making	DB	
OFA05.01.01 Airport Operations Management	AO-0602	Collaborative Pre-departure Sequencing	DB	
OFA05.01.01 Airport Operations Management	AO-0603	Improved De-icing Operation through Collaborative Decision Making	DB	
OFA05.01.01 Airport Operations Management	AO-0703	Aircraft Environmental Impact Management and Mitigation at and around	DB	

<sup>44</sup> New OFA name (as anticipated for Integrated Roadmap version DS11 – October 2013)

<sup>45</sup> In anticipation of Integrated Roadmap version DS11 (October 2013)

Operational Focus Area name / identifier	OI Step (coming from the Integrated Roadmap)	OI step title	Story Board Step	Other X.02
		Airports		
OFA05.01.01 Airport Operations Management	AO-0705	Reduced Water Pollution	DB	
OFA05.01.01 Airport Operations Management	AO-0706	(Local) Monitoring of Environmental Performance	DB	
OFA05.01.01 Airport Operations Management	AO-0801	Collaborative Airport Planning Interface	S1	
OFA05.01.01 Airport Operations Management	AO-0802	A-CDM process enhanced through integration of landside (passenger and baggage) process outputs	S1	
OFA05.01.01 Airport Operations Management	AO-0803	Integration of Airports into ATM through Monitoring of Airport Transit View (Extension of Performance Monitoring building on A-CDM)	S1	
OFA05.01.01 Airport Operations Management	AO-0804	Collaborative Airport Performance Management	S1	
OFA05.01.01 Airport Operations Management	AUO-0801	Environmental Restrictions Accommodated in the Earliest Phase of Flight Planning	S1	
OFA05.01.01 Airport Operations Management	DCB-0301	Improved Consistency between Airport Slots and Flight Plans	DB	
OFA05.01.01 Airport Operations Management	DCB-0304	Airport CDM extended to Regional Airports	S1	
OFA05.01.01 Airport Operations Management	DCB-0309	Airport Demand-Capacity Balancing	S1	
OFA05.01.01 Airport Operations Management	DCB-0310 <sup>46</sup>	Improved Consistency between Airport and ATFCM Planning	S1	7.2
OFA05.03.04 Enhanced ATFCM processes	DCB-0206	Coordinated Network Management Operations Extended Within Day of Operation	DB	
OFA05.03.04 Enhanced ATFCM processes	DCB-0207	Management of Critical Events	DB	
OFA05.03.06 UDPP	AUO-0101-A	ATFM Slot Swapping for STEP1	S1	7.2
OFA05.03.06 UDPP	AUO-0103	UDPP-Departure	S1	7.2
OFA05.03.07 Network Operations Planning	DCB-0101	Enhanced Seasonal NOP Elaboration	DB	
OFA05.03.07 Network Operations Planning	DCB-0102	Interactive Rolling NOP	DB	
OFA05.03.07 Network Operations Planning	DCB-0103-A	Collaborative NOP for Step 1	S1	7.2
OFA05.03.07 Network Operations Planning	DCB-0201	Interactive Network Capacity Planning	DB	
OFA05.03.07 Network Operations Planning	DCB-0302	Collaborative Management of Flight	DB	

<sup>46</sup> In anticipation of Integrated Roadmap version DS11 (October 2013)



Operational Focus Area name / identifier	OI Step (coming from the Integrated Roadmap)	OI step title	Story Board Step	Other X.02
		Updates		
OFA05.03.07 Network Operations Planning	SDM-0101	Network Performance Assessment	DB	
OFA06.01.01 CWP Airport	AO-0208-A	Advanced Information Management and System Integration in the ATC Tower for Step1	S1	
OFA06.03.01 Remote Tower	SDM-0201	Remotely Provided Air Traffic Service for Single Aerodrome	S1	

3434 **Table 7-1 Mapping of Operational Focus Areas to OI Steps and other X.02**

3435

3436 **7.2 Allocation of DOD elements to Operational Focus Areas**3437 **7.2.1 Allocation of Environment to Operational Focus Areas**

3438 (cf. chapter 3.1.2 which already provides a mapping from environment elements to OFAs)

3439

3440 **7.2.2 Allocation of Scenarios to Operational Focus Areas**

3441

Scenario identification	Use Case Identification	Operational Focus Areas allocation
Long-Term Planning	UC 6 01	OFA05.01.01 Airport Operations Management
	UC 6 02	
	UC 6 11	OFA05.03.07 Network Operations Planning
Medium/Short-Term Planning	UC 6 12	OFA01.01.01 LVPs using GBAS
	UC 6 14	
	UC 6 13	OFA03.01.04 Business and Mission Trajectory
	UC 6 14	
	UC 6 14	OFA04.01.01 Integrated Arrival/Departure Management at Airports
	UC 6 14	OFA04.02.01 Integrated Surface Management
	UC 6 12	OFA05.01.01 Airport Operations Management
	UC 6 13	
	UC 6 14	
Execution Phase	UC 6 13	OFA05.03.04 Enhanced ATFCM processes
	UC 6 14	
	UC 6 14	OFA05.03.06 UDPP
	UC 6 12	OFA05.03.07 Network Operations Planning
	UC 6 13	
	UC 6 14	
	UC 6 14	
Arrival	UC 6 14	OFA01.01.01 LVPs using GBAS
	UC 6 99	OFA01.01.02 Pilot enhanced vision

Scenario identification	Use Case Identification	Operational Focus Areas allocation	
	UC 6 21 UC 6 28 UC 6 30 UC 6 31 UC 6 99	OFA01.02.01 Airport safety nets	
	UC 6 15 UC 6 21 UC 6 99	OFA01.02.02 Enhanced situational awareness	
	UC 6 15 UC 6 99	OFA01.03.01 Enhanced Runway Throughput	
	UC 6 99	OFA02.02.04 Approach Procedures with Vertical Guidance	
	UC 6 18 UC 6 19 UC 6 20 UC 6 21 UC 6 28 UC 6 29 UC 6 99	OFA04.02.01 Integrated Surface Management	
	UC 6 21	OFA05.01.01 Airport Operations Management	
	UC 6 21 UC 6 99	OFA06.01.01 CWP Airport	
	UC 6 99	OFA06.03.01 Remote Tower	
	Turn round	UC 6 54 UC 6 55 UC 6 58	OFA03.01.04 Business and Mission Trajectory
		UC 6 54 UC 6 57 UC 6 58	OFA04.01.01 Integrated Arrival/Departure Management at Airports
UC 6 54 UC 6 58		OFA04.02.01 Integrated Surface Management	
UC 6 54 UC 6 55 UC 6 56 UC 6 58 UC 6 59 UC 6 63 UC 6 64		OFA05.01.01 Airport Operations Management	
UC 6 58 UC 6 60		OFA05.03.06 UDPP	
UC 6 54 UC 6 57 UC 6 58 UC 6 59		OFA05.03.07 Network Operations Planning	
UC 6 54 UC 6 62		OFA06.01.01 CWP Airport	
Departure		UC 6 79	OFA01.01.02 Pilot enhanced vision
	UC 6 28 UC 6 31 UC 6 79 UC 6 86	OFA01.02.01 Airport safety nets	
	UC 6 79	OFA01.02.02 Enhanced situational awareness	
	UC 6 79 UC 6 86	OFA01.03.01 Enhanced Runway Throughput	
	UC 6 76 UC 6 79 UC 6 86	OFA04.01.01 Integrated Arrival/Departure Management at Airports	
	UC 6 76 UC 6 79 UC 6 86	OFA04.02.01 Integrated Surface Management	
	UC 6 76 UC 6 79	OFA05.01.01 Airport Operations Management	
	UC 6 79		

Scenario Identification	Use Case Identification	Operational Focus Areas allocation
	UC 6 79 UC 6 86	OFA06.01.01 CWP Airport
Post Flight Phase	UC 6 91	OFA03.01.04 Business and Mission Trajectory
	UC 6 91 UC 6 92	OFA04.02.01 Integrated Surface Management
	UC 6 91 UC 6 92	OFA05.01.01 Airport Operations Management
	UC 6 92	OFA05.03.04 Enhanced ATFCM processes
	UC 6 92	OFA05.03.07 Network Operations Planning

3442

**Table 7-2: List of Associated Scenarios and Use Cases to OFA.**

3443

3444

### 7.2.3 Allocation of Processes and Services to Operational Focus Areas

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3446

At the moment of writing:

3447

- the process identification is still underway,

3448

- the service identification has not started.

3449

As a consequence, the table below only presents the list of processes currently known. When new / additional information becomes available within the lifecycle of this DOD Step 1, the allocation of Processes and Services will be completed.

3450

3451

3452

Besides, the following activities are not presented in the table since they are considered irrelevant for this STEP1 Airport DOD:

3453

3454

- activities that do not relate to any OI step or relate to DB OI steps,

3455

- activities that relate to OFAs that are not federated/managed by WP 6.2.

DOD Element Category / Title	Elements identification	Elements <i>short</i> description	Reference to DOD section where it is described	OFA allocation	
Process	Steer Airport Performance	(All activities)	5.2.1	05.01.01	
	Manage Airport Performance	Update AOP	5.2.1	05.01.01	
	Monitor Airport Performance	Record Airport Data	5.2.1	05.01.01	
	Manage Post Operations	(All activities)	5.2.1	05.01.01	
	Prepare and Execute Landing	Prepare Runway Exit		5.2.2	01.03.01
		Execute Approach		5.2.2	01.01.01 01.03.01
		Execute roll-out and vacate runway		5.2.2	01.03.01
		Negotiate Runway Exit			
	Plan and provide taxi-in route		5.2.2	04.02.01	
	Prepare and Execute Take-Off	Manage Runway Sequence		5.2.2	01.03.01 04.01.01
	Prepare and Execute In-Block	Manage In-Block		5.2.3	04.01.01
	Prepare and Execute Off-Block	Manage Pre-departure		5.2.3	04.01.01

DOD Element Category / Title	Elements identification	Elements <i>short</i> description	Reference to DOD section where it is described	OFA allocation	
		Provide start-up instruction	5.2.3	04.02.01	
		Plan Departure			
		Execute start-up			
	Prepare and execute taxi-in routing		Provide guidance on apron	5.2.4	04.02.01
			Prepare taxi-in route		
			Plan and provide taxi-in route		
			Provide taxi-in routing guidance		
		Execute taxi-in	5.2.4	04.02.01 01.01.02	
	Prepare and execute taxi-out routing		Facilitate push-back execution	5.2.4	04.02.01
			Prepare taxi-out route		
			Execute start-up and exit from the stand		
			Plan and provide taxi-out route		
			Provide instruction to exit from the stand		
			Provide taxi-out routing guidance		
			Execute taxi-out		
		Execute runway crossing	5.2.4	04.02.01 01.01.02	
	Plan and provide routing for a vehicle	(all activities)	5.2.4	04.02.01	
Perform Conformance Monitoring	(all activities)	5.2.5	01.02.01		
Manage safety net systems for airport vehicles					
Manage safety on flight desk					
Perform RWSL operations					

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**Table 7-3: List of the associated Processes and Services to OFA**

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Note: OFA06.01.01 and 06.03.01 are transversal OFAs and applicable to all processes involving ATS.

## 3459 8 Issues

3460 This chapter is used to describe issues that appeared during the development of the Operational  
3461 Scenario.

### 3462 Actors

3463 It has to be clarified with WP B4.2 how the function "Follow-me" should be integrated. Is it a new  
3464 actor, or should it be handled as being a part of "Vehicle Driver", "Ground Handler" or "Airport  
3465 Operator/ Airport Duty Officer"? For modelling continuity, it has been decided to handle "Follow-me"  
3466 as part of "Vehicle Driver".

### 3467 iRBT Definition in Step 1

3468 The D66-B4.2 – SESAR Concept of Operations Step 1 ed 2013 – 01.01.00-22/11/2013 [11] states  
3469 that the iRBT is defined as being between of- blocks to in-blocks. While the moment of transition from  
3470 an iSBT to an iRBT is still being debated, from an airport point of view, the iRBT starts with the start-  
3471 up approval and ends with the on-blocks (engines off). This includes A-CDM milestones that would  
3472 otherwise be left out by using the definition currently in the CONOPS. A clear definition of the start of  
3473 the iRBT is required to prevent misunderstandings and possible gaps.

### 3474 B4.1 targets

3475 In the yearly update process, the X.2s are scheduling their updates to take into consideration the  
3476 latest Release results. This implies using the odd numbered DS set (11, 13, etc.). The B4.1 target  
3477 updates, however, are scheduled to be delivered in the summer. This implies using the evenly  
3478 numbered DS sets (10, 12, etc.). This causes an inherent misalignment between the B4.1 Validation  
3479 targets and the performance requirements in the DODs. This issue has been escalated to the SJU.

3480 In addition, various OFAs have stated that OI Steps, or the entire OFA, will not contribute to the  
3481 performance requirements that they have been allocated. As the performance requirements are  
3482 referencing the B4.1 OFA targets, 6.2 feels that they should stay as they are until there are new  
3483 targets. This issue will be taken into account in B4.1 and the future update to the DOD. The affected  
3484 OFAs are: OFA01.01.01, OFA04.01.01 and OFA04.02.01

3485 OFA 01.01.01 does not have an Airport Capacity target associated with this requirement. This is  
3486 deliberate as there is no expectation that Low Vis procedures will increase the declarable capacity  
3487 and best-in-class airports. However, it is recognised that this OFA (OI Step AO-0505-A) has the  
3488 potential to increase capacity in degraded conditions, but this is a resilience point and something  
3489 B.4.1 is currently developing. We will send an initial version of the influence diagrams and proposed  
3490 expression of the Resilience and Flexibility areas early in the new year for your input.

### 3491 Airport Services

3492 Currently, the modelling activity within 6.2 has been limited to processes. Work to define and develop  
3493 Airport Services is ongoing with WP8.

### 3494 Datalink Issues

3495 There is an on-going issue in SESAR to determine the appropriate time (before landing) at which the  
3496 taxi routing will be uplinked to the Flight Crew. It is assumed that the datalink connection, when  
3497 needed, will be available between the aircraft and the airport ATC services so that the taxi routing  
3498 information - as well as the appropriate runway exit - can be transmitted to the flight crew, without  
3499 involving the TMA controller. The specifics of how to achieve this are yet to be determined.

3500

## 3501 9 References

3502 This section identifies the documents (name, reference, source project) the DOD has to comply with  
3503 or those that are used as sources of additional inputs for the DOD.

### 3504 9.1 Applicable Documents

3505 This DOD complies with the requirements set out in the following documents:

- 3506 [1] IS SESAR Template Toolbox Latest version
- 3507 [2] IS SESAR Requirements and V&V Guidelines Latest version

### 3508 9.2 Reference Documents

3509 The following documents provide input/guidance/further information/other:

- 3510 [3] Airport CDM Implementation – The Manual”, version 4, April 2012
- 3511 [4] SESAR D79-WPB.01-Integrated Roadmap Dataset 11-release Note-00.01.00 – 11/10/2013
- 3512 [5] ATMAP ANS\_Airport\_Indicators\_v0-7\_clean.doc
- 3513 [6] European Commission Implementing Rule 691/2010
- 3514 [7] NMF IR SSC 40 item 2
- 3515 [8] SESAR P6.5.1 D004 Identification of Key Performance Areas and Focus Areas, version  
3516 00.01.01, 27 May 2010
- 3517 [9] SESAR P6.5.1 D005/D006 Identify Airport KPIs and Performance Drivers for the selected  
3518 KPAs / Focus Areas, version 00.01.00, (6 separate documents) – 30 September 2010
- 3519 [10] EUROCONTROL Challenges of Growth 2013
- 3520 [11] SESAR– D66-B4.2 – SESAR Concept of Operations Step 1 ed 2013 – 01.01.00-  
3521 22/11/2013
- 3522 [12] SESAR D02-WPC02- Performance Plan – Airports Classification-00.00.01, 28/11/2011
- 3523 [13] DEL-06.05.04 D08\_OFA050101\_OSED 00.02.02
- 3524

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## Appendix A: OIs changes

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The excel sheet below presents all differences between the list of OI steps that was referenced in the previous version of this DOD and the current updated version:

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**Erreur ! Liaison incorrecte.**

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The table below presents the differences (compared to the previous version of this DOD) in definition (title and description) of the OI steps referenced in both section 2 and section 7.1.

3532

OI Step code	OLD definition	UPDATED definition	Comment
AO-0104-A	<p><b><u>Airport Safety Nets including Taxiway and Apron</u></b></p> <p>The systems detect potential conflicting situations/incursions involving mobiles (and stationary traffic) on runways, taxiways and in the apron/stand/gate area. Appropriate alerts are provided to controllers and also to the relevant pilots/vehicle drivers.</p>	<p><b><u>Airport Safety Nets for Controllers in Step 1</u></b></p> <p>The System detects conflicting ATC clearances during runway operations, and non-conformance to procedures or clearances for traffic on runways, taxiways and in the apron/stand/gate area. Appropriate alerts are provided to controllers.</p>	<p>Reduced scope (to controllers only) due to overlap with existing AUO-0605-A (alerts for pilots) and new AO-0105 (alerts for vehicle drivers).</p> <p>OI step code has been changed from AO-0104 to AO-0104-A</p>
AO-0205	<p><b><u>Automated Assistance to Controller for Surface Movement Planning and Routing</u></b></p> <p>The System provides the controller with the best route calculated by minimising the delay according to planning, ground rules, and potential conflicting situations with other mobiles. The System informs the appropriate controller (ground or runway) of any deviation from the cleared route.</p>	<p><b><u>Automated Assistance to Controller for Surface Movement Planning and Routing</u></b></p> <p>The System provides the controller with the best route calculated by minimising the delay according to planning, ground rules, and potential conflicting situations with other mobiles.</p>	<p>Reduced scope (to route generation only) due to overlap with existing AO-0104-A (non-conformance alerts).</p>
AO-0206	<p><b><u>Automated Assistance to Controller for Surface Movement Planning and Routing</u></b></p> <p>The system provides to vehicle drivers the display of dynamic traffic context information including status of runways and taxiways, obstacles, and an airport moving map.</p>	<p><b><u>Enhanced Guidance Assistance to Airport Vehicle Driver Combined with Routing</u></b></p> <p>The system provides to the Vehicle Drivers the display of dynamic traffic context information including status of runway and taxiways, obstacles, route (potentially by application of an airport moving map). Ground signs (stop bars, centreline lights, etc.) are triggered automatically according to the route issued by ATC.</p>	<p>Enlarged scope to include AGL (airfield ground lighting)</p>
AO-0304	<p><b><u>Weather Dependent Reduced WV Separations for Final Approach and Departure</u></b></p> <p>The application of weather dependent separation (WDS) for arrivals on final approach, and for departures from the runway for the initial common departure path, through a reduction or a suspension of the wake turbulence separation, over the duration of identified and stable forecast weather conditions, that either ensures transport of the wake turbulence out of the path of the follower aircraft, or ensures decay of the wake turbulence so that it is no longer a hazard to the follower aircraft.</p>	<p><b><u>Weather Dependent Reduced Wake Turbulence Separations for Departure</u></b></p> <p>The application of weather dependent separation (WDS) for departures from the runway for the initial common departure path, through a reduction or a suspension of the wake turbulence separation, over the duration of identified and stable forecast weather conditions, that either ensures transport of the wake turbulence out of the path of the follower aircraft, or ensures decay of the wake turbulence so that it is no longer a hazard to the follower aircraft.</p>	<p>Reduced scope (to departures only) due to split with new AO-0310 (for arrivals).</p>
AO-0502	<p><b><u>Improved Operations in Low Visibility Conditions through Enhanced ATC Procedures</u></b></p> <p>LVP (Low Visibility Procedures) are collaboratively developed and are implemented at applicable airports involving in particular a harmonised application across airports and the use of optimised separation criteria.</p>	<p><b><u>Improved Operations in Low Visibility Conditions</u></b></p> <p>Improved Operations in Low Visibility Conditions through enhanced ATC procedures and/or navigation systems. LVP (Low Visibility Procedures) are collaboratively developed and are implemented at applicable airports involving in particular a harmonised application across airports and the use of optimised separation criteria. Navigation systems can be enhanced through</p>	<p>Enlarged scope of the OI Step</p> <p>(result of the merging of AO-0502, AO-0503 and AO-0504)</p>

OI Step code	OLD definition	UPDATED definition	Comment
		changes applied to ILS antenna (smaller ILS sensitive and critical areas in CAT II/III) or use of MLS.	
AO-0703	<p><b><u>Aircraft Noise Management and Mitigation at and around Airports</u></b></p> <p>Aircraft noise emissions are minimised both in the air and on the ground, any noise impact falls on the least number of people. Unnecessary noise driven limits, restrictions or non-optimal operations are not imposed. Any constraints, non-optimal procedures or economic burdens that are imposed strike the most appropriate balance between social, economic and environmental imperatives. Where a strategic gain can be won by the voluntary adoption of lesser restrictions, those are developed following the balanced approach and with the full input from all relevant ATM stakeholders, and the option with the best sustainability balance is selected.</p>	<p><b><u>Aircraft Environmental Impact Management and Mitigation at and around Airports</u></b></p> <p>The objectives are to ensure that decisions taken at the local level achieve the optimum environmental performance from aircraft operations at and around airports, by achieving the most appropriate balance between social, economic and environmental imperatives. A key aim will be to balance sometimes conflicting needs for noise and atmospheric emissions reduction and to account for system wide implications of local decisions. A correctly balanced environmental regime at an airport can help to ensure that legal compliance to regulation is maintained, that the rules are harmonised to the extent possible, and the global and local impacts are minimised to the extent possible. Most importantly, a key objective is to ensure that non-optimal environmental procedures and constraints are avoided and where such constraints are being considered that the least damaging options are selected. Optimum environmental efficiency and capacity can be achieved at and around airports through the collaborative local selection of the most appropriate ATM capabilities and OIs available, within an overarching and harmonising framework. This framework must involve all operational stakeholders.</p>	Enlarged scope of the OI Step  (result of the merging of AO-0703 and AO-0704)
AUO-0203-A	<p><b><u>Shared Business / Mission Trajectory (iSBT)</u></b></p> <p>The Shared Business / Mission Trajectory (iSBT/SMT) is the trajectory published by the Company / Wing Operation (FOC/WOC) that is available for collaborative ATM planning purposes. The subsequent iSBT is then available for iterative refinement of the intended trajectory allowing the user to take into account current weather forecasts and ATM constraints, which may be the result of Network Management Demand &amp; Capacity Balancing activity. In the Medium/Short Term planning phase, in addition to the flight plan as currently filed by the Aircraft Operator, a Shared Business/Mission Trajectory (iSBT/MT) will be created and published by the Aircraft Operator to authorised users subject to appropriate subscription mechanisms. The iSBT/MT will be subject to an iterative revision process, as time moves towards the execution phase and latest information affecting the flight becomes available. The iSBT/MT will describe the flight intentions and will include the following: flight's city pair, user preferred 2D route, ATM constraints if any, flight's performance and user preferred 4D Trajectory that takes into account the ATM constraints (including TTA). Note that, the user preferred 4D Trajectory will be generated by the FOC/WOC systems and included in the iSBT/MT as soon as becomes ready for publishing.</p>	<p><b><u>Shared Business / Mission Trajectory (iSBT) in Step 1</u></b></p> <p>The current flight plan will first be extended to include flight performance and 4D profile information. This extended flight plan will then evolve into the initial iSBT/SMT (iSBT/iSMT). The iSBT/iSMT will be a partial implementation of the iSBT/SMT, which is the published business/mission trajectory that is available for collaborative ATM planning purposes. The iSBT/iSMT will be published when the flight intentions (schedules, airport slots and routing) of the airspace user have stabilized sufficiently (in the medium-term planning). The iSBT/iSMT will include all extended flight plan information. The iSBT/iSMT will additionally include a unique flight identification (GUFI). The iSBT/iSMT will be progressively refined with incoming information from the airspace user, following a layered collaborative ATM planning process, as time moves towards the execution phase and latest information affecting the flight becomes available.</p>	Enhanced description
AUO-0204-A	<p><b><u>Agreed Reference Business / Mission Trajectory (iRBT/iRMT)</u></b></p> <p>An initial Reference Business/Mission Trajectory is the result of the collaborative planning process that revises the iSBT/SMT. It is published as the initial Reference Business/Mission Trajectory (iRBT/iRMT) at the moment when, due to the proximity of the Execution Phase, all data relevant to the iSBT is sufficiently reliable and agreed. At this point it becomes</p>	<p><b><u>Agreed Reference Business / Mission Trajectory (iRBT/iRMT) in Step 1</u></b></p> <p>The iRBT/iRMT will be the partial implementation of the RB/MT, which is the reference used by all ATM partners during the flight execution. The iSBT/iSMT will change to the iRBT/iSMT either at a fixed time before off-block or when a specific A-CDM milestone occurs. The iRBT/iRMT will include all iSBT/iSMT information. The iRBT/iRMT will contain, among other information, target times (TTO/TTA).</p>	Enhanced description



OI Step code	OLD definition	UPDATED definition	Comment
	an agreed parameter of the iRBT that the airspace users agree to fly and the ANSPs and airports agree to facilitate.		
AUO-0401	<p><b><u>Air Traffic Situational Awareness (ATSAW) on the Airport Surface</u></b></p> <p>Information regarding the surrounding traffic (incl. both aircraft and airport vehicles) during taxi and runway operations is displayed in the cockpit, superimposed to the airport layout on a moving map.</p>	<p><b><u>Airborne Traffic Situational Awareness on the Airport Surface (ATSA-SURF)</u></b></p> <p>In addition to display of the airport layout (showing taxiways, runways, fixed obstacles) and the own aircraft position, the Flight Crew has an improved situational awareness thanks to the additional display of surrounding traffic (incl. both aircraft and optionally airport vehicles). A decrease in flight crew and controller workload is expected by reducing requests for repeated information with respect to surrounding traffic. An improvement of safety is also expected, especially at taxiway and runway intersections, as well as for aircraft landing and taking off.</p>	Enhanced description
AUO-0403	<p><b><u>Enhanced Vision for the Pilot in Low Visibility Conditions</u></b></p> <p>'Out of the window' positional awareness is improved through the application of enhanced vision of external environment in low visibility condition.</p>	<p><b><u>Enhanced Vision on Head-Up display for the Pilot in Low Visibility Conditions</u></b></p> <p>'Out of the window' positional awareness is improved through the application of visual enhancement technologies thereby reducing the difficulties of transition from instrument to visual flight operations</p>	Enhanced description
DCB-0103-A	<p><b><u>SWIM enabled NOP</u></b></p> <p>The Network Operations Plan (NOP) is in fact a 4 dimensional real time virtual representation of the European ATM environment. It is a unique, dynamic, rolling picture (rather than a series of discrete daily plans) that provides a relational image of the state of the ATM environment for past, present and future. ATM stakeholders, via the appropriate applications, have visibility of the demand and capacity situation, the agreements reached, detailed business/mission trajectory information, resource planning information as well as access to simulation tools for scenario modelling. The NOP draws on the latest available information being shared in the system. It includes scenarios to assist in managing diverse events that may threaten the network in order to restore stability of operation as quickly as possible.</p>	<p><b><u>Collaborative NOP for Step 1</u></b></p> <p>The NOP will be enhanced to achieve collaborative planning with the support of services which can be automated (B2B services are initial examples). The NOP will provide information on stakeholders' agreements and related justifications. To enhance the planning process, the NOP will use available information provided by the airports (available from the AOPs). The NOP will continuously provide up-to-date information on the Network situation. This is especially important in the case of crisis. Furthermore, the NOP will provide access to initial network performance objectives and support to network performance assessment in post-operations.</p>	Enhanced description
DCB-0207	<p><b><u>Management of Critical Events</u></b></p> <p>Critical events refers to a sudden and usually unforeseen event leading to a high drop in ATFCM capacity, involving many partners and requiring immediate action to minimise consequences and to retrieve network stability. A pan-European procedure is established for managing Industrial Action events which can be tailored to individual countries needs/requirements thus leading to better utilisation of limited available capacity.</p>	<p><b><u>Management of Critical Events</u></b></p> <p>Critical event means an unusual situation or crisis involving a major loss of EATMN capacity, or a major, imbalance between capacity and demand, or a major failure in the information flow involving many partners and requiring immediate action to minimise consequences and to retrieve network stability. A pan-European procedure is established for managing critical events such, as industrial actions etc, which can be tailored to the needs/requirements of individual countries thus leading to better utilisation of limited available capacity. Since the impact of some events goes beyond ATM a European Aviation Crisis Coordination Cell (EACCC) has been established supporting the activation and coordination of contingency plans at State level.</p>	Enhanced description
SDM-0101	<p><b><u>Network Performance Assessment</u></b></p> <p>Key Performance Indicators are developed and monitored to determine how effective ATM is meeting users' demand and to act as driver for further improvements of the ATM system. Both users and providers are able to assess the actual operation (routes flown, usage of allocated airspace, runway utilisation, etc.) against the forecast operation and to assess the adequacy of the</p>	<p><b><u>Network Performance Assessment</u></b></p> <p>Key Performance Indicators are developed and monitored to determine how effective ATM is meeting users' demand and to act as driver for further improvements of the ATM system. Both users and providers are able to assess the actual operation (routes flown, usage of allocated airspace, runway utilisation, etc.) against the forecast operation and to assess the adequacy of the capacity provision. In particular for RP1, the</p>	Enhanced description

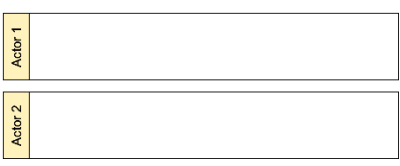

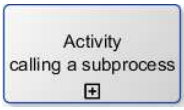








OI Step code	OLD definition	UPDATED definition	Comment
	capacity provision.	agreed NM KPIs on en-route delay and flight efficiency/route extension will be monitored and reported by NM and PRB.	
TS-0202	<p><b><u>Departure Management Synchronised with Pre-departure Sequencing</u></b></p> <p>Departure management has the objective of maximising traffic flow on the runway by setting up a runway sequence with minimum separations. Tower Clearance Delivery Controllers will follow TSAT (pre-departure sequencing) when issuing the startup approval and Tower Runway Controllers will follow as much as possible the TTOT (departure sequencing) given by the DMAN when establishing the departure sequence.</p>	<p><b><u>Pre-Departure Sequencing supported by Route Planning</u></b></p> <p>Pre-Departure management has the objective of delivering an optimal traffic flow to the runway. Accurate taxi time forecasts provided by route planning are taken into account for TSAT- Calculation while the flight is off-block. Pre-Departure sequence (TSAT sequence) is set up by Tower Clearance Delivery Controllers who will follow TSAT-window when issuing start-up approval.</p>	Re-scoping (to pre-departure management) and enhanced description
TS-0308	<p><b><u>Co-ordination of Departure Management and Arrival Metering (Co-ordination of Arrival and Departure Flows)</u></b></p> <p>Metering arrivals and pre-sequencing departures will consider the dependency between arrivals and departures on a runway operated in mixed mode in order to minimise or better manage delay.</p>	<p><b><u>Flow based Integration of Arrival and Departure Management</u></b></p> <p>Integrated Arrival and Departure management aims at increasing throughput and predictability at an airport by improved co-ordination between Approach and Tower controllers. Arrival and Departure flows to the same runway (or for dependent runways) are integrated by setting up fixed arrival-departure pattern for defined periods. The successive pattern might be chosen by the operators or provided by an optimization algorithm considering arrival and departure demand. Departure flow to the runway is managed by pre-departure sequencing (integrating route planning) while arrival flow to the runway is managed by arrival metering.</p>	Enhanced description



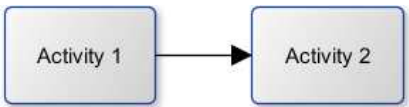
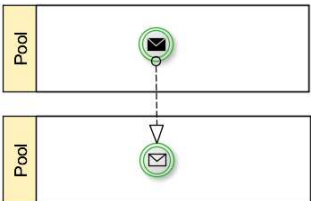


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## Appendix B: Business Process Model and Notation (BPMN)

A succinct description of the main BPMN elements used in the operational models is presented below:

Swimlanes	Pool		Represent responsibilities for activities in a process. A pool can represent an organization, a role or an actor.
Activities	Task		Unit of work to be performed
	Sub-process		Decomposable activity
	Loop Activity		Iterated activity
Events	Start		Start of the flow
	Intermediate		Intermediate event in the process
	End		End of the flow
	Catching message		Receiving message
	Timer		Timer event, point in time
Gateways	Exclusive (data-based)		When splitting it routes the sequence to exactly one of the outgoing branches based on conditions
	Exclusive (Event-based)		Is always followed by catching events or receive tasks

Gateways	Parallel		When used to split the sequence flow, all outgoing branches are activated simultaneously
	Inclusive		When splitting, one or more branches are activated based on branching conditions
Connectors	Sequence Flow		Sequence Flow defines the execution order of activities
	Message Flow		Message/Information Flow symbolizes information flow across organizational boundaries
Artefacts	Annotation		Text annotation associated to any object to provide information
	Data Object		Information flowing through the process

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3540 The basic BPMN modelling rules can be found in the BPMN specification document available at the  
 3541 following website address: <http://www.bpmn.org/>.

3542 **Appendix C: List of deleted Operational Requirements**

3543 In this appendix are all the Operational Requirements that have been deleted with respect to previous  
3544 version of the document.

3545

Identifier	REQ-06.02-DOD-6200.0002
Requirement	Reduction of the runway incursion risks shall be achieved by 'Improvements in lay-out of taxiway system as well as location of runways with respect to the terminal/apron.

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Identifier	REQ-06.02-DOD-6200.0004
Requirement	The Tower Runway Controller shall be able to detect alerts in case of unauthorized / unidentified traffic

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Identifier	REQ-06.02-DOD-6200.0010
Requirement	The Tower Runway/Ground/Clearance Delivery controllers shall be able to issue relevant information and clearances to the aircraft.

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Identifier	REQ-06.02-DOD-6200.0012
Requirement	Taxiing process shall be fully integrated into arrival and departure management at the same airport.

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Identifier	REQ-06.02-DOD-6200.0013
Requirement	Arrival and departure management shall be integrated with CDM processes between airport operator, aircraft operators and air traffic service provider at the same airport.

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Identifier	REQ-06.02-DOD-6200.0019
Requirement	Where appropriate and approved by local / national regulations, interlaced take-off and landing procedures shall also be applied on airports with multiple runways.

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Identifier	REQ-06.02-DOD-6200.0029
Requirement	Aircraft Fuel Use and Emissions Management shall be taken into account during all airport operations in order to guarantee performance improvements.

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Identifier	REQ-06.02-DOD-6200.0033
Requirement	Tower Runway Controller shall be able to monitor the optimum descent profile for each aircraft under his responsibility.

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Identifier	REQ-06.02-DOD-6200.0034
Requirement	Flight crew shall be able to send to the ANSP actual aircraft information (like weight, speed, weather etc.) and to receive cleared route (STAR) from the ANSP.

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Identifier	REQ-06.02-DOD-6200.0035
Requirement	The Departure controller shall be assisted by system support to trajectory management in order to manage continuous climb departure.

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Identifier	REQ-06.02-DOD-6200.0036
Requirement	The airspace users shall be fully involved in airport/network CDM through UDPP

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Identifier	REQ-06.02-DOD-6200.0040
Requirement	The pilot shall be informed through datalink about the proposed revision of Reference Business / Mission Trajectory (iRBT).

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Identifier	REQ-06.02-DOD-6200.0041
Requirement	The Tower Runway/Ground/delivery controllers shall be informed through datalink by pilot about the aircraft preferences in terms of STAR, ETA, ETA min/max, runway exit in case proposed revision of Reference Business / Mission Trajectory (iRBT).

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Identifier	REQ-06.02-DOD-6200.0053
Requirement	Involved partners shall manage the traffic considering local situation and reduce the ATFM delays (pre-coordinated measures with airports). [procedure Tower-FMP-NMOC]

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Identifier	REQ-06.02-DOD-6200.0058
Requirement	The Tower Clearance Delivery shall be provided with pre-departure sequence (TSAT sequence) to issue start-up approval.

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Identifier	REQ-06.02-DOD-6200.0065
Requirement	The TMA Supervisor shall be able to manually adjust the departure sequence to enable a more consistent and manageable delivery into the En route phase of flight.

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Identifier	REQ-06.02-DOD-6200.0059
Requirement	The Departure and Arrival management shall be taking into account the information exchanged between close airports.

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**-END OF DOCUMENT -**