

Future concerns of an ANSP

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The NATS logo is located in the bottom right corner of the slide. It consists of the word "NATS" in a bold, italicized, white sans-serif font. The background of the slide is a dark teal color with a large, light blue, curved line graphic that sweeps from the top right towards the bottom left, framing the content.

Presentation purpose - To explain what the key challenges in cybersecurity are for an operational Air Navigation Service Provider and possibly for the wider ATM industry.

- Introduction
- Drones and UTM
- Digital data services for ATM
- Artificial Intelligence/Machine Learning
- ANSPs – what does the future look like?

Introduction



About me:

Strategic Threat & Risk Lead for NATS

Member of the Cyber Risk and Information Security Team

Preceded by...

15 years operational Air Traffic Control experience

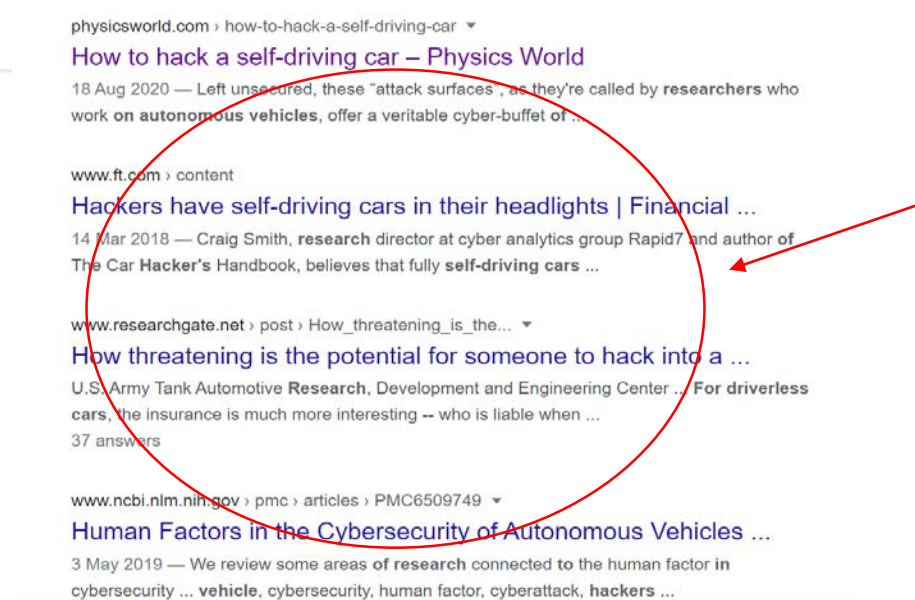
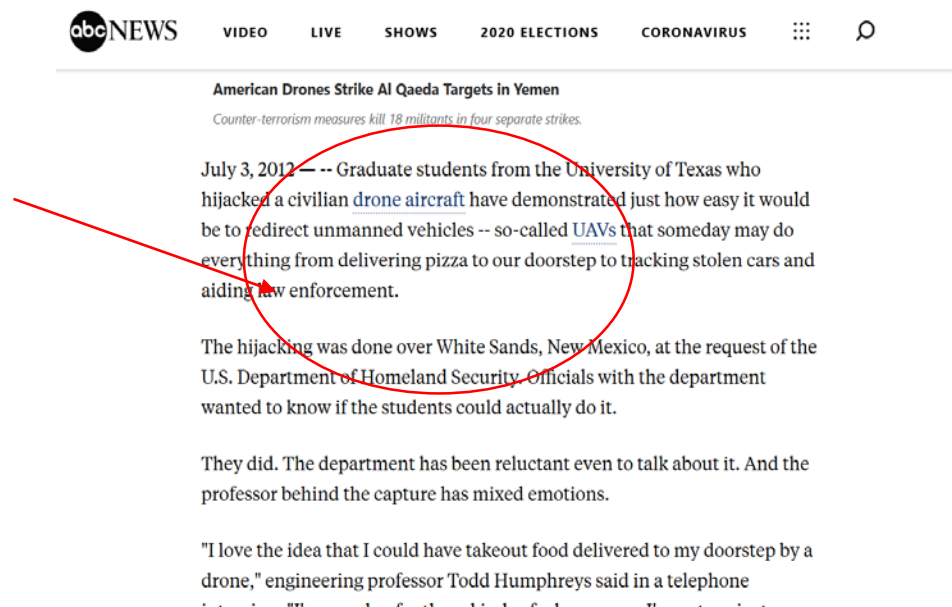
14 years in International Affairs



Drones and UTM 1/3

- Rapidly evolving technology; not slowed by COVID-19.
- UAS tracking using conventional primary radar is impractical
- Reliance on onboard telemetry -> GPS spoofing
- UAS themselves are data rich; are they a cyber risk?

Do they
pose a risk
to traffic
in
Controlled
Airspace?



Should
we
match
research
levels in
car
hacking?

Drones and UTM 2/3

- Proposed to move to U-Space (drone traffic management)
- New service providers in the field – USPs
- Increasingly likely to interface with ANSPs and each other at a data level
- Need to ensure that the data transmission between the USP and the ATM service provider is accurate and cyber secure
 - trustworthy enough for decisions to be made based upon it.
 - Known accuracy – we have no current standards or certified benchmarks
 - does not provide a door through which an attacker can enter
- Cybersecurity, as part of safety and security, must be adopted through any UTM regulatory actions, to reduce vulnerabilities/minimise any cyber threats



Drones and UTM 3/3

High-Altitude Long Endurance (HALE) operations above 50,000'



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- Stratospheric Platforms (e.g. Loon balloons) - hydrogen-fuel cell powered High-Altitude Pseudo-Satellite (HAPS) UAV; bringing ultra-fast 5G connectivity from the skies.
- Airbus Zephyr – In a 2018 test flight Zephyr achieved a record 25 days, 23 hour and 57 minute endurance, without refuelling. Controlled from a Ground Control Stations anywhere in the world using Beyond Visual Line of Sight (BVLOS) capabilities.

What does this mean for the operation and security of the airspace and aircraft they are operating above?

- Data exchange, cyber security of the Air-Ground link, telemetry and the ability for it to exert influence on traffic below

Digital data services for ATM 1/3

- Data services (e.g. Met or Aeronautical Information) required to provide ATS - currently integrated into ANSPs - New model for ATS data proposed by the EC in the “Amended proposal for the implementation of the Single European Sky.”
- Future 3 categories: Data Production Services > ATM Data Service Providers (including processing and integration) > Air Traffic Services
- New separation of functions - ADSPs to manage and integrate data
- ADSP can purchase from numerous ancillary suppliers
- ANSPs purchase data from ADSPs
- EC expect this will enable more flexible ATS service provision



Digital data services for ATM 2/3



- Discussions ongoing as to what the new data model will look like (number of ADSPs, range of data, ANSPs as data providers etc.)
- Could increased competition drive less secure, albeit cost effective data provision?

What does this mean?

- Longer term - potential for new forms of internal data delivery leading to virtual centres (aspirational)
 - more flexible matching of supply and demand; moving away from 'sectors' to a more dynamic and cross-border airspace configuration
 - Cross-border sharing of data would be necessary to enable the temporary delegation of ATS provision to an alternate ACC

Digital data services for ATM 3/3



- Proposed amendments to current Regulations only partly cover Cyber Security issues
- Increased need for cybersecurity to be implemented
- The proposal sees operational data potentially made available to a wide range of parties, including to those who might not even be certified ATS (proposed in the SES2+ package).
 - How resilient is the data
 - How can ATS providers be assured as to the accuracy of data
 - Can we build future initiatives based upon availability of data
 - Can we get visibility of where the data has gone, to whom and for what purposes

- AI and ML are at early stages within ATM
- Present and potential applications within the ATM support environment
 - EUROCONTROL ML in post ops analysis of the performance of Optimised Runway Delivery
 - Meteorological forecasting/demand balancing
 - Safety data or security review of public/dark/deep/web for aviation related data
- AI and ML within the operational ATC world to support, supplement and even eventually replace routine/repetitive tasks for the operational and engineering staff.
- Integral to the IT defence network, speeding up responses to attacks (which may themselves be AI)

- Advancing AI/ML will require collaboration with the outside organisations.
- Do we know what AI/ML in ATM could look like – No
- How do we make our staff AI aware
- At a Regulatory level, do you regulate AI or the ethics of AI
 - Is Regulatory development agile enough to keep pace with rapidly evolving technologies?
- ANSPs need to assure the outcomes (for safety reasons); currently there is very little thinking about the assurance of AI.



ANSPs – what does the future look like?



- The ANS world is changing - a higher dependency on external data and so potentially more at risk of attack.
- Aviation has been badly impacted by COVID-19
 - 60%+ reduction in traffic; back to 2019 levels by 2024....perhaps!
 - Reduced investment capacity - will be visible for at least 5-7 years
 - Future may be a higher demand for regional travel before long-haul operations resume.
 - Industry leaders push that long-term climate action should be a priority alongside economic recovery in the coming years.

Thank you

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