

Cyber threats to aviation – Moscow 25th Feb 2016

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Aviation threats – what do we know?

- High profile
- Guaranteed media coverage
- Huge security ramifications
- Complicated to deal with
- Cross international boundaries

High profile threats by extremists utilising aircraft began in late 1960s



What deliberate aviation threats exist today?

- Chemical - bomb, munition, rocket/missile, explosive device
- Persons (armed hijack, crew overpowering, lock-out.)
- Debilitating – lasers, bio etc.
- Cyber (Cyberjacking) – aircraft, ATC , Ground operations, customer interface, finance control

Chemical



Persons



Hazard e.g. laser blinding, bio attack



How does cyber threat compare?

- Threat to life is low (at the moment)
- Potential operational disruption is high
- Can (and mostly does) originate remotely (through servers)
- A risk generated remotely is one of the hardest issues to deal with, why?
 - Geographically difficult to locate
 - Hard and expensive to resolve
 - May derive from an area with poor legislation/policing
 - Culprits may remain anonymous and disappear

In time, a greater upload capability will come with remote access over internet systems for aircraft

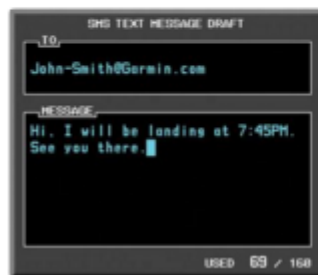
- Aircraft already have multiple links to remote systems
- Wifi, ACARS (Aircraft Communications Addressing and Reporting System) , ACMS (Aircraft Condition Monitoring System), voice comms, satellite
- B707 16 bands of data per flight
- B787 146,000 bands of data per flight

Do aircraft fly using wifi or through internet servers?

- No, aircraft flight systems do not rely on wireless/internet connections
- Can aircraft systems be updated through wireless?

Garmin® Adds Connectivity to Cockpit with GDL® 59 and GSR 56

26 JULY 2010 @ 3:00 AM / AVIATION /

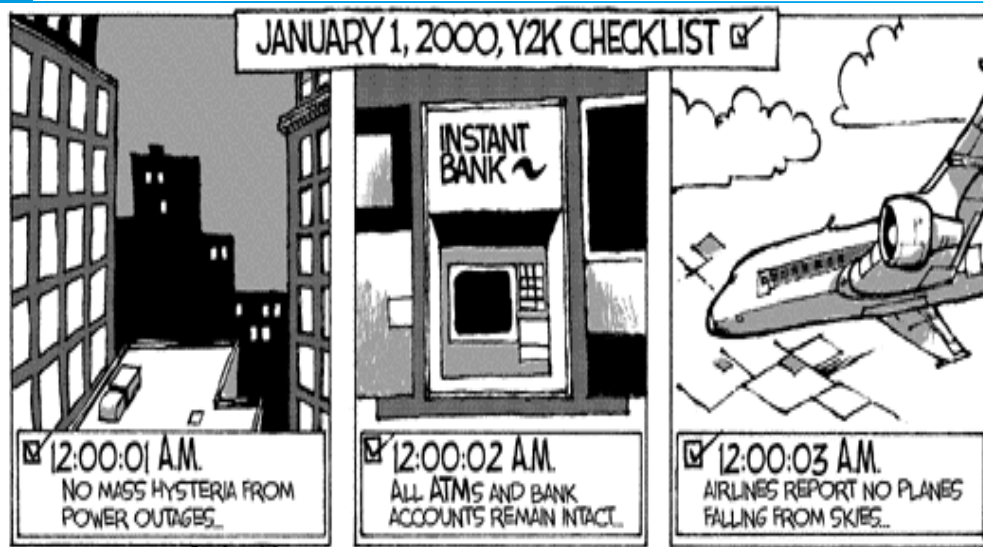


OSHKOSH, Wis./July 26, 2010/Business Wire — Garmin International Inc., a unit of Garmin Ltd. (NASDAQ: GRMN), the global leader in satellite navigation, today announced the GSR 56 Iridium datalink and GDL 59 data logger and Wi-Fi datalink. These independent systems offer features like worldwide weather, voice communication and data communication.

Update methods for aircraft

- Software via computer link (hard connection)
- Minor uploads via memory devices
- But this is changing





K)

Security expert says he hacked into aircraft controls through entertainment system

United Airlines says it's not possible to do that

Aviation experts dispute hacker's claim
he seized control of airliner mid-flight

"Internet connectivity in the cabin should be considered a direct link between the aircraft and the outside world, which includes potential malicious actors."

US Government Accountability Office

**United Airlines breached by Chinese hackers behind OPM
cyber attack - report**

Are there proven cases of control loss?

- We assumed we had it with mobile phones
- We assumed we had it with computers, Ipads etc.
- No proven flight control system failure known
- We have had computer related software and hardware issues in the past (failure on the part of maintenance, design and implementation)

Cyber Attack - Where is the primary risk now?

- Flying – No (though this may change)
- Airline/airport infrastructure and support systems - Yes



The real cyber danger at this time operational

ISIS Planning Major **Cyberattacks** Against **Airlines**, Hospit...

International Business Times - 17 Nov 2015

Islamic State's Cyber Caliphate hack A print screen of a defaced Facebook page belonging to the French TV network TV5Monde, which was ...

Britain to launch **cyberattacks** against ISIS to stop them recruiting ...

In-Depth - Daily Mail - 17 Nov 2015

United Airlines Breach Linked to Chinese-Origin Hackers Behind OPM Cyber Attack

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BY: **Morgan Chalfant**

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July 29, 2015 2:37 pm

A previously unreported breach of United Airlines computer systems has been linked to the Chinese-origin hackers behind the massive cyber attack on the Office of Personnel Management that compromised the personal data of 22.1 million Americans.

Bloomberg Business reported that United noticed an invasion of its computer systems between May and early June, according to individuals familiar with the investigation,



three of whom alleged that investigators have connected the breach to the cyber attacks on OPM and health insurer Anthem Inc.



Polish airline, hit by **cyber attack**, says all carriers are at risk
Reuters - 22 Jun 2015

Ruben Santamarta, a researcher on airline's cyber-security, said there were not enough details on the LOT attack to properly assess what ...

Polish airline LOT grounded after 'first of its kind' **cyber attack**
ITProPortal - 22 Jun 2015

Polish airline attack fears as hackers force planes to be grounded at ...
Daily Mail - 22 Jun 2015

Cyber attack on Polish carrier LOT grounds 1400 passengers at ...
In-Depth - Economic Times - 22 Jun 2015

Planes Grounded After Hackers Hijack an Airline's Flight Plan System
inion - Gizmodo - 22 Jun 2015

land's LOT Says **Flights** Back to Normal After **Cyber-Attack**
Depth - Bloomberg - 22 Jun 2015

Prevention (similar to aviation)

- Investment in security is needed
- Assume of some kind of failure (as accounted for in aircraft design)
- Have default positions
- Be vigilant in all aspects
- Ask the questions before it happens (what ifs?)

The future of Cyber threat

- One way only – INCREASE
- Target infrastructure and the public
- For the moment the risk to flight is very low
- The risk to financial operation is high
- It can be contained, with resource

Thank you for listening.

Any questions?