



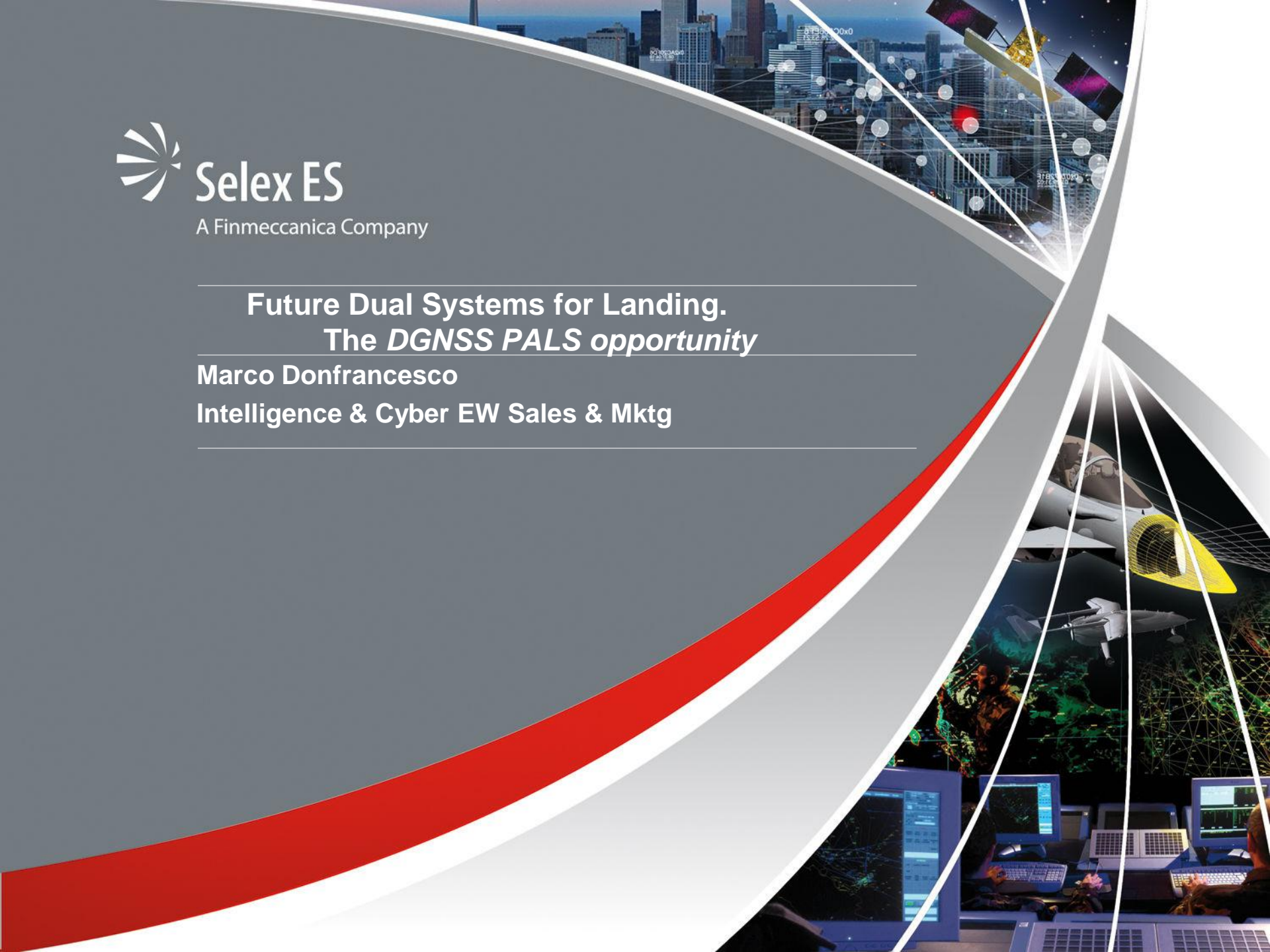
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**Future Dual Systems for Landing.
The *DGNSS PALS* opportunity**

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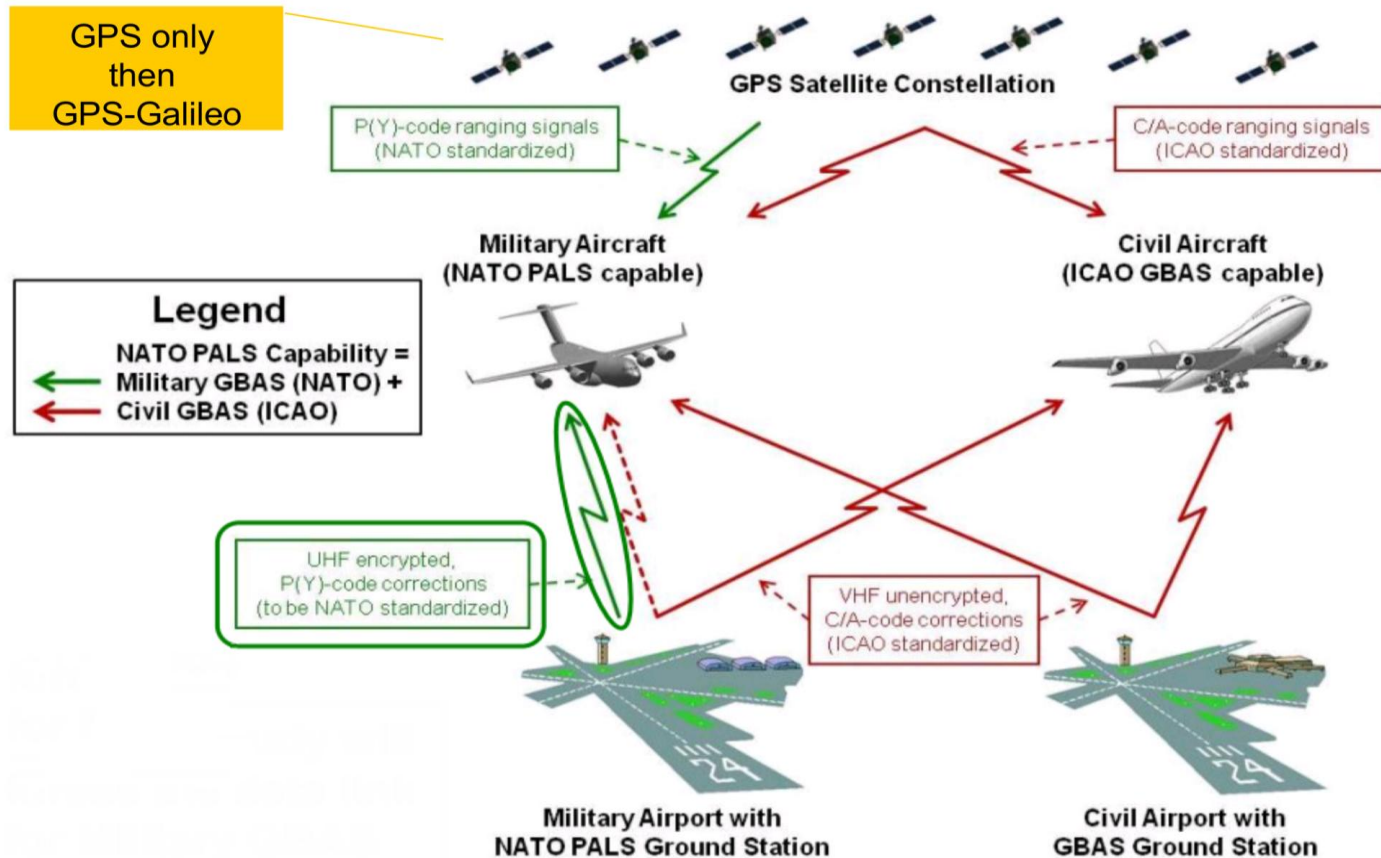


SG-175 DGNSS PALS study

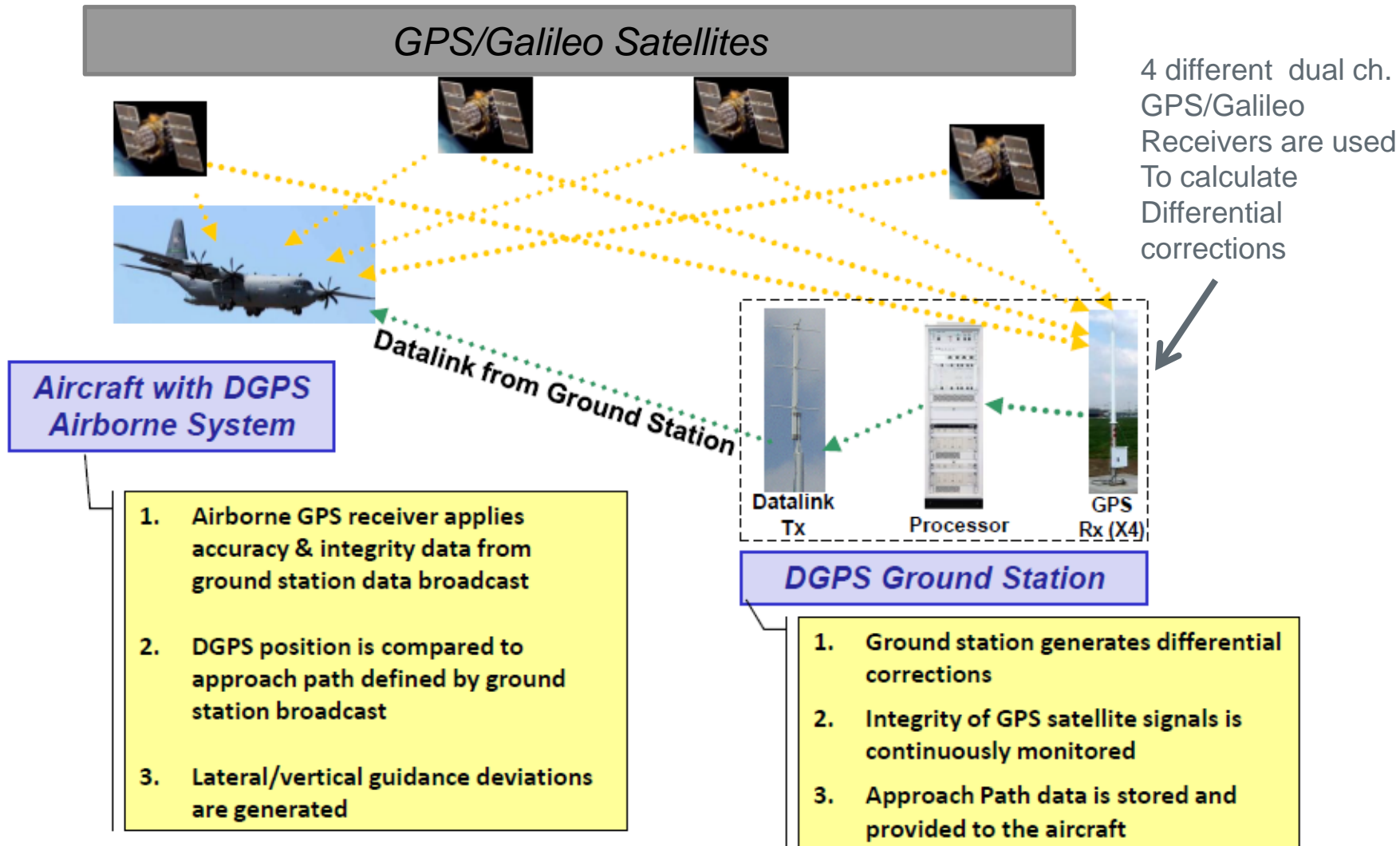
“The study shall provide technical advice on the data link capabilities required to enable proper functionality of the future NATO Differential Global Navigation Satellite System (DGNSS) Precision Approach and Landing System (PALS), and assure its interoperability with civilian DGNSS PALS.

The study shall focus on the specific aspects of data links for DGNSS PALS, but it may also address other related navigation and communications capabilities”

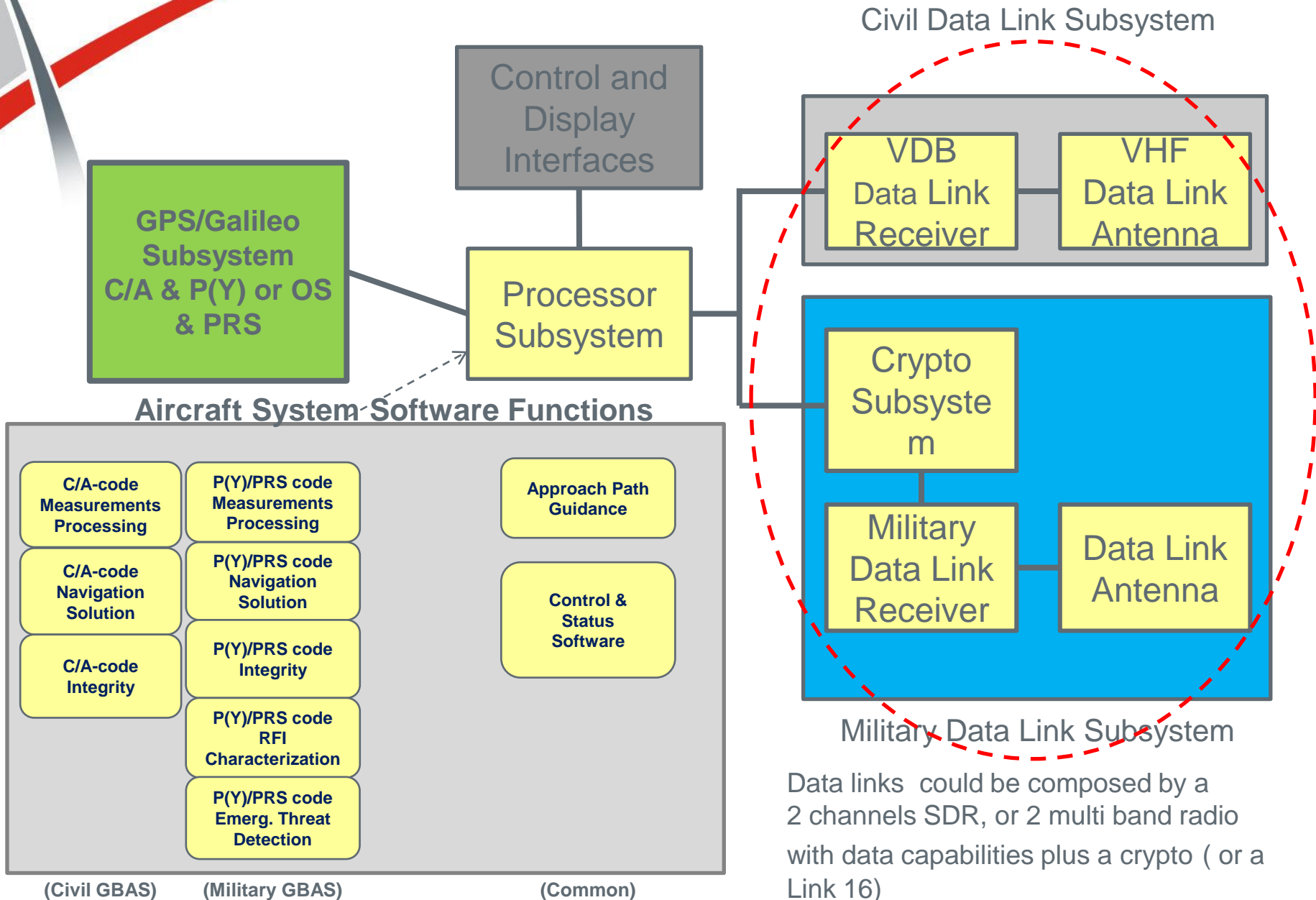
NIAG 175 SG Objective



DGPS (differential gps) System Overview



Aircraft Segment Functional Block Diagram



Data links could be composed by a 2 channels SDR, or 2 multi band radio with data capabilities plus a crypto (or a Link 16)

Proposal for Developing a Technology Demonstrator

- ✦ In the last ACG5 (Avionic Capability Group 5) held in Praga (last Oct,17) an advanced technological demonstrator has been proposed at the Board by the Italian Government Representatives.

- ✦ **SCOPE:** *improve the cyber resilience of the military critical technologies, i.e., the correction data transmission chain composed by encryption system, radio transmitters, airborne and ground receivers and decryption system against intrusions , real attacks, or internal vulnerabilities.*
 - Several threats scenarios shall be applied to the Demonstrator., not only limited to RF Jamming ,Spoofing.
 - Introduce pre-correlation anti jamming (null steering,beam forming, specific jammer detection/removal,etc)
 - The Dual System Architecture (including the civil and military chains) shall carried out a first protection level due to the features of the data link and the characteristics of the military signal processing.
 - Continuous monitoring techniques and hardening approaches
 - Test case : insertion of pseudolites or CRPA antennas to improve antiJamming
 - Test case: integration with inertial navigation system has to be measured and validated too in order to enhance the Pals availability and continuity.

PRS : a Building Block to consider for the future Jpals development

Secure Module: strategic building block inside PRS Galileo

- anti-tampering (no-controlled cryptographic item)
- Release A for military platforms, like as SAASM (anti spoofing modules) with additional national capabilities.
- Release B for handheld smart computers (likely with the receiver integrated , low consumption and very small sizing)

Receiver: different models:

- **Military / Professional** - General Purpose for vehicles, small boats and mini UAV
- **Fixed** - Critical Infrastructure : time /frequency precision receivers
- **Avionic. Strategic application. Military GPS/PRS shall be a mandatory requirement.**
- **Fixed - Interference Sensor** used to monitor the GNSS spectrum against different jammers
- **Chipset** - this is the integrated receiver that could be used in the professional and gov.(no defence) applications.

Riflections

- ⇒ Product Development Life Cycle
- ⇒ Pentesting and ethical hacker /cracker culture inside the defence industry
- ⇒ Supply chain monitoring
- ⇒ **Attack and Targeted Malware Payloads**



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THANKS

