

Supporting
European
Aviation



Civil-Military CNS Interoperability

Civil-Military cooperation workshop

Lima, Peru, 2 to 5 December 2019

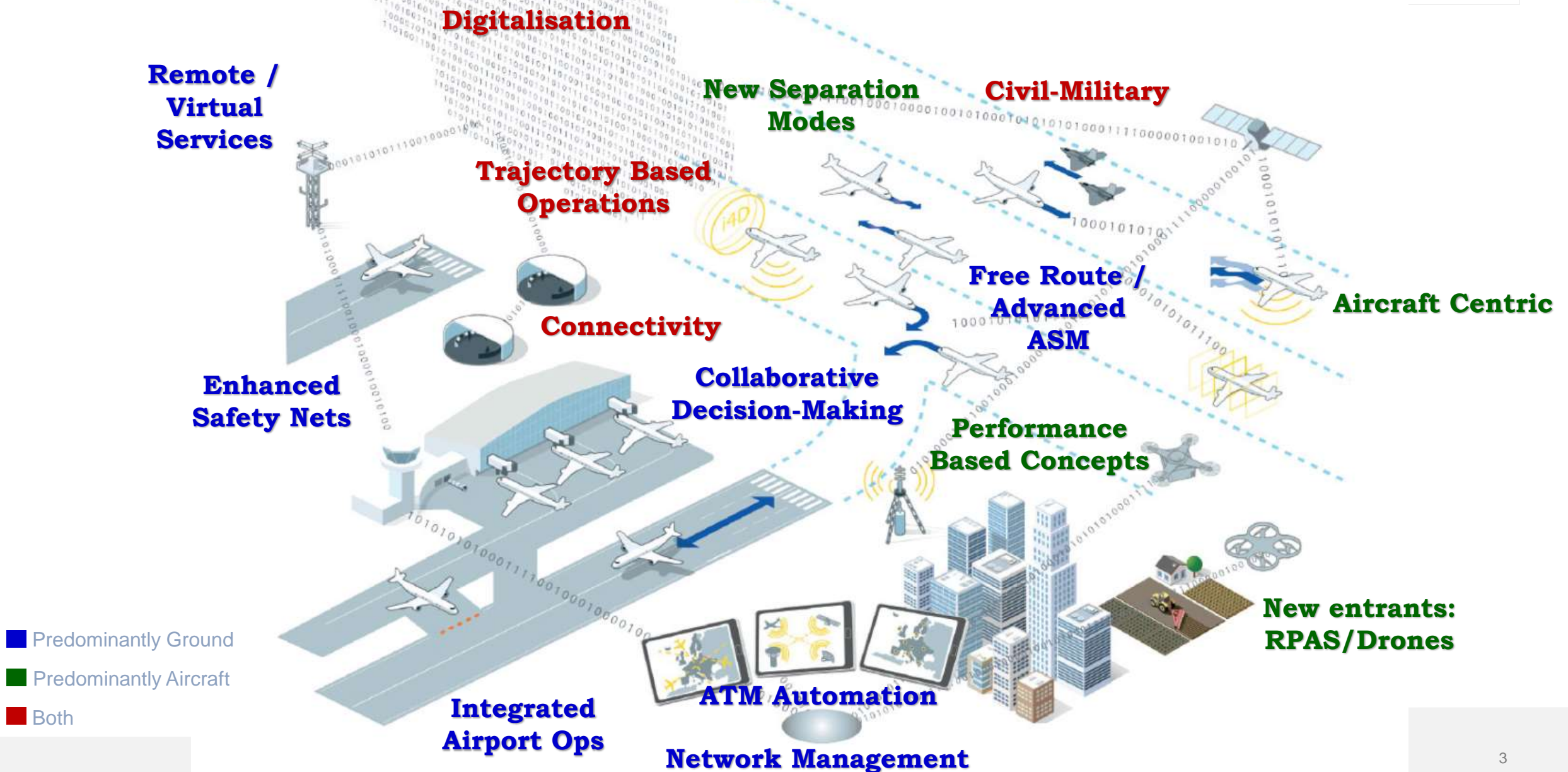


Aviation is Global !

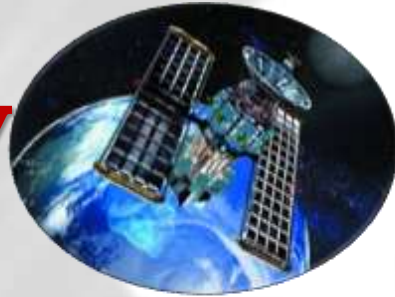
ICAO and Alignment of Regional Programmes (e.g. NEXTGEN, SESAR)



Aviation Modernisation is Underway !



Concepts supported by Technology Evolution !



Satellite Technologies

- GNSS
- SATCOM



Advanced NAV and SUR

- PBN
- 4D NAV
- ADS-B
- ACAS



Air-Ground Data Link

- CPDLC
- 4DT/ADS-C
- LDACS
- AEROMACS



Trajectory Based Operations



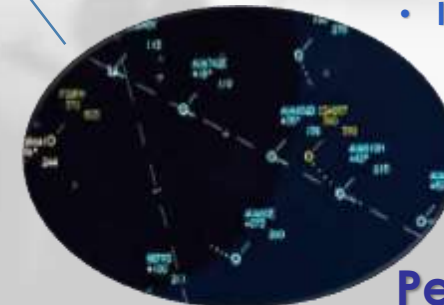
Aircraft Centric

- Modular Avionics
- Integrated CNS



ATC Automation and Connectivity

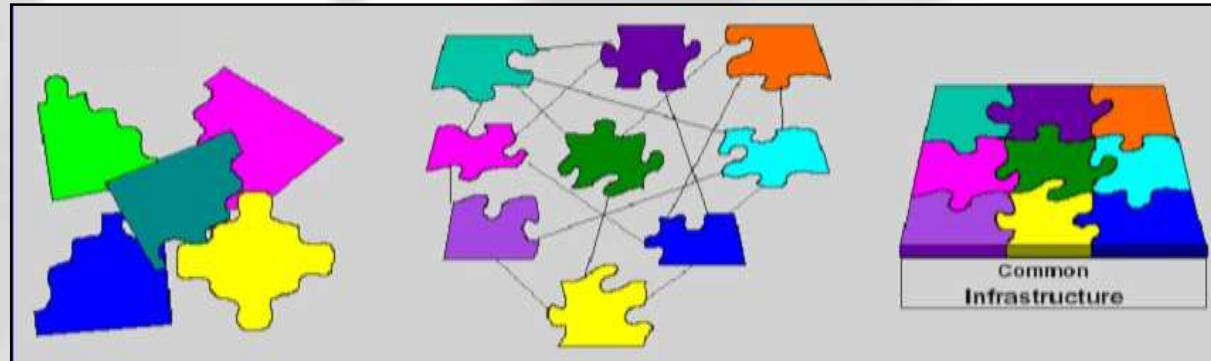
- SWIM
- IP Backbone



Performance-Based Remote/Virtual Services Security

Civil-Military CNS Interoperability:

a key enabler for military operations facilitation



FRAGMENTATION

INTEROPERABILITY

INTEGRATION

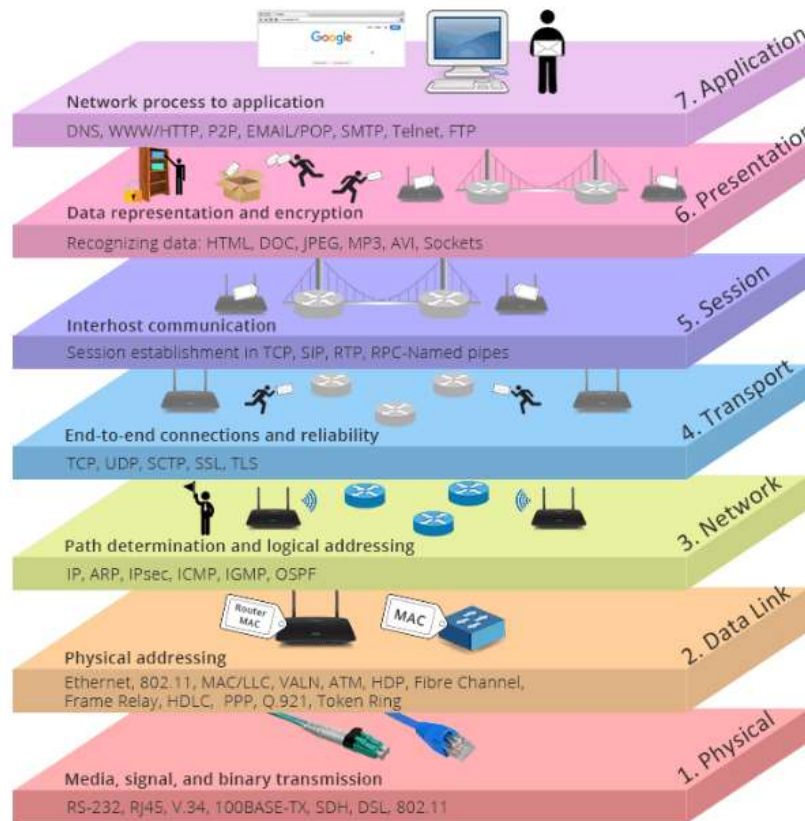
PERFORMANCE-BASED
OPERATION



MINIMISE
EXEMPTIONS
AND
DEROGATIONS

CONVERGE
TECHNOLOGIES

Ground-Ground Communications



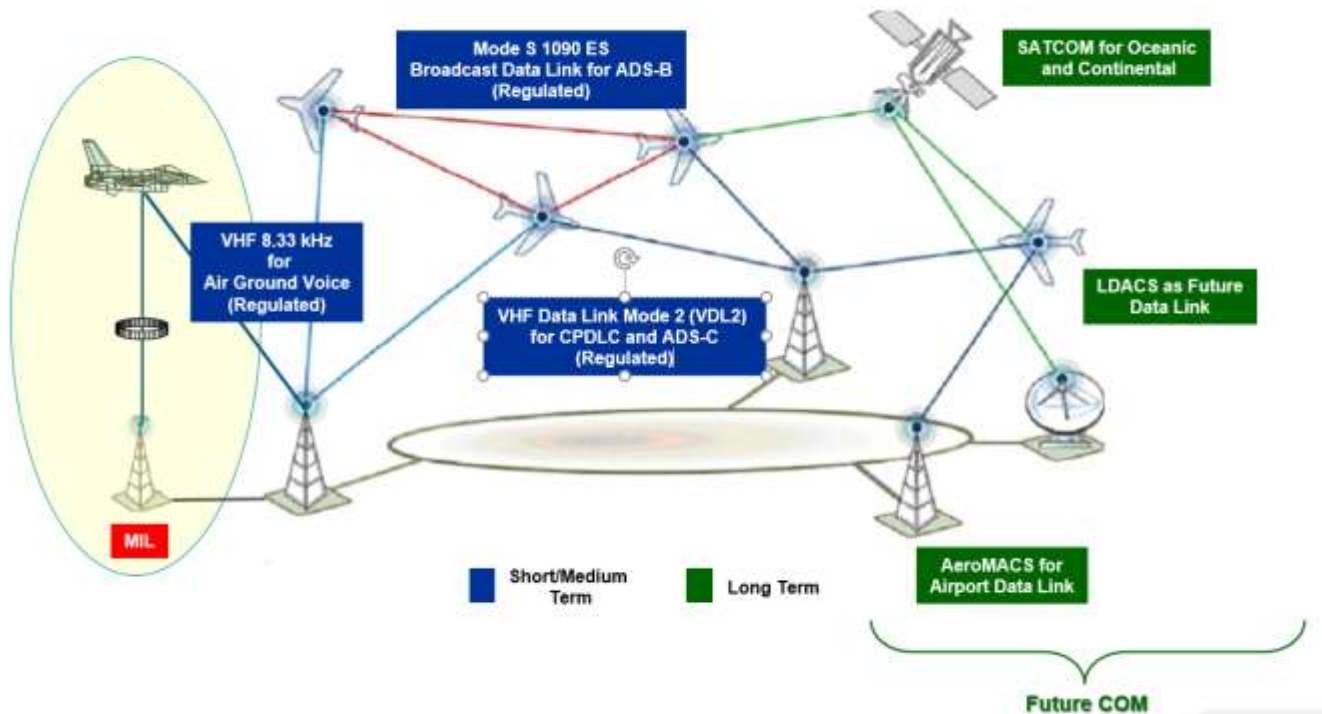
SWIM (Standardised data and service models. Infrastructure Profiles. Security. Governance)

IP Network (PENS, B2B, etc.)

Key Recommendations for the Military:

- Participate in SWIM as needed
- Adhere to new messaging services (AMHS) replacing ICAO AFTN network
- Ensure security
- Adhere to services as needed such as Voice over IP and Surveillance data sharing

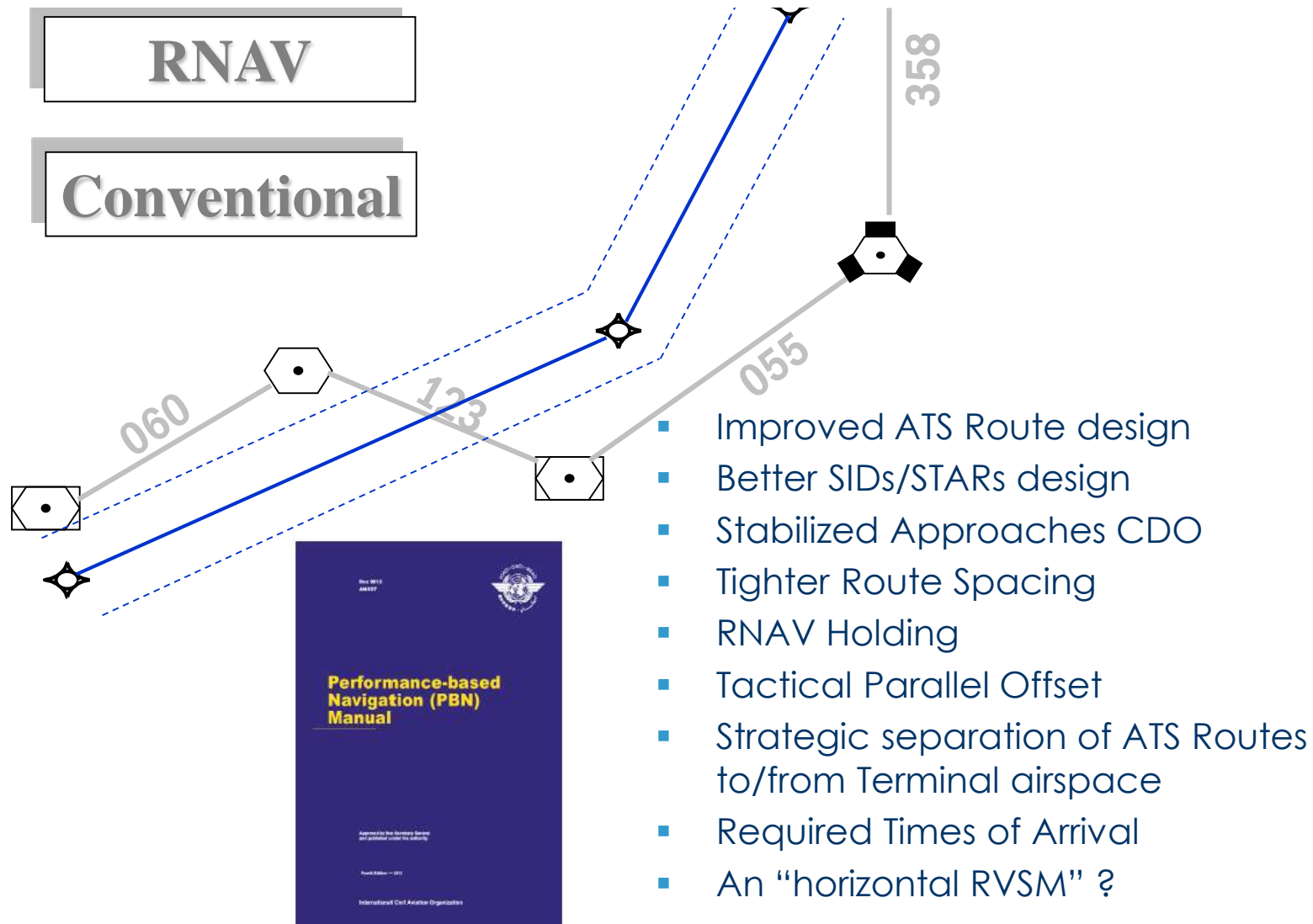
Air-Ground Communications



Key Recommendations for the Military:

- Equip with VHF 8.33 kHz to support air-ground voice (UHF retained to handle non-8.33)
- Consider VDL2 data link for New Transport Aircraft (for CPDLC and Initial 4D trajectory)
- Converge to Future Communication Data links
- Acknowledge that data link will gradually replace voice and it is needed for military aircraft participation in trajectory environment.

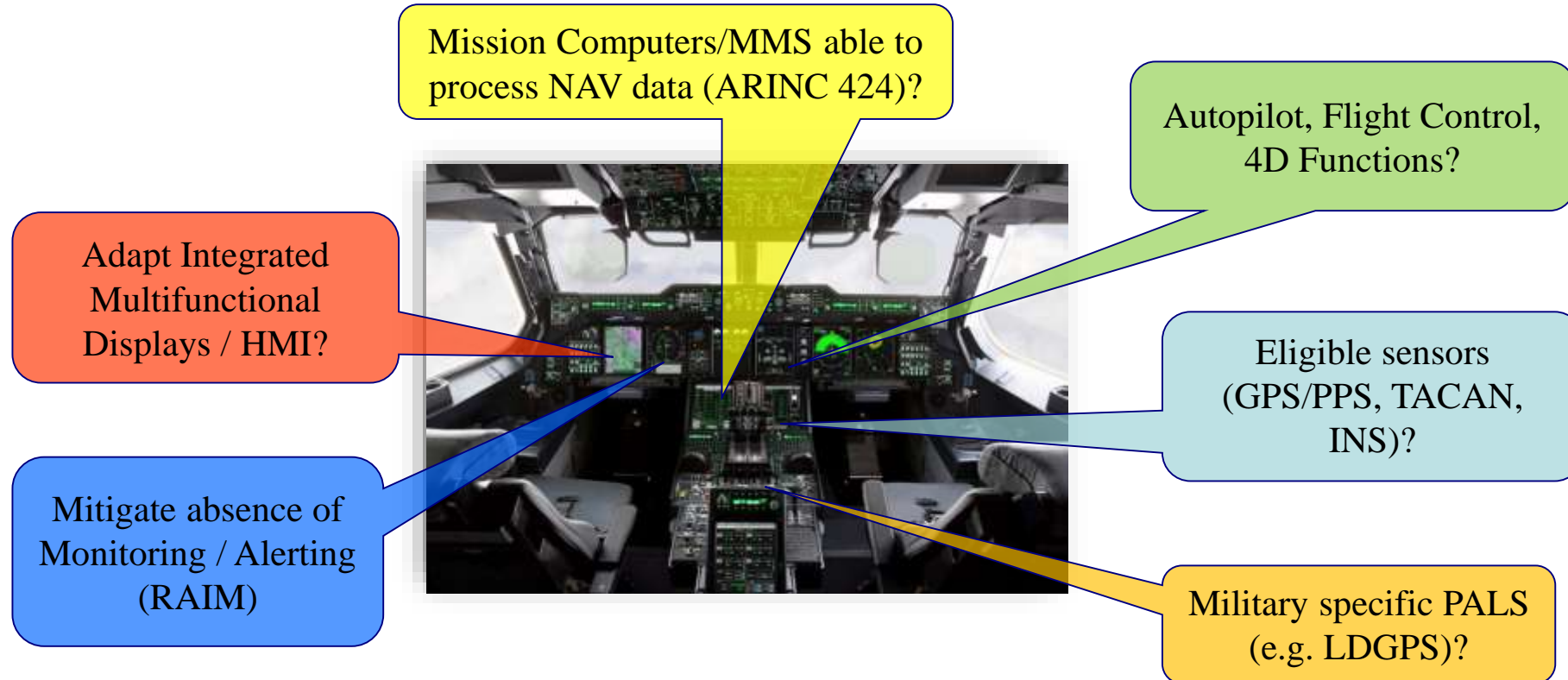
Performance-Based Navigation (PBN)



Key Recommendations for the Military:

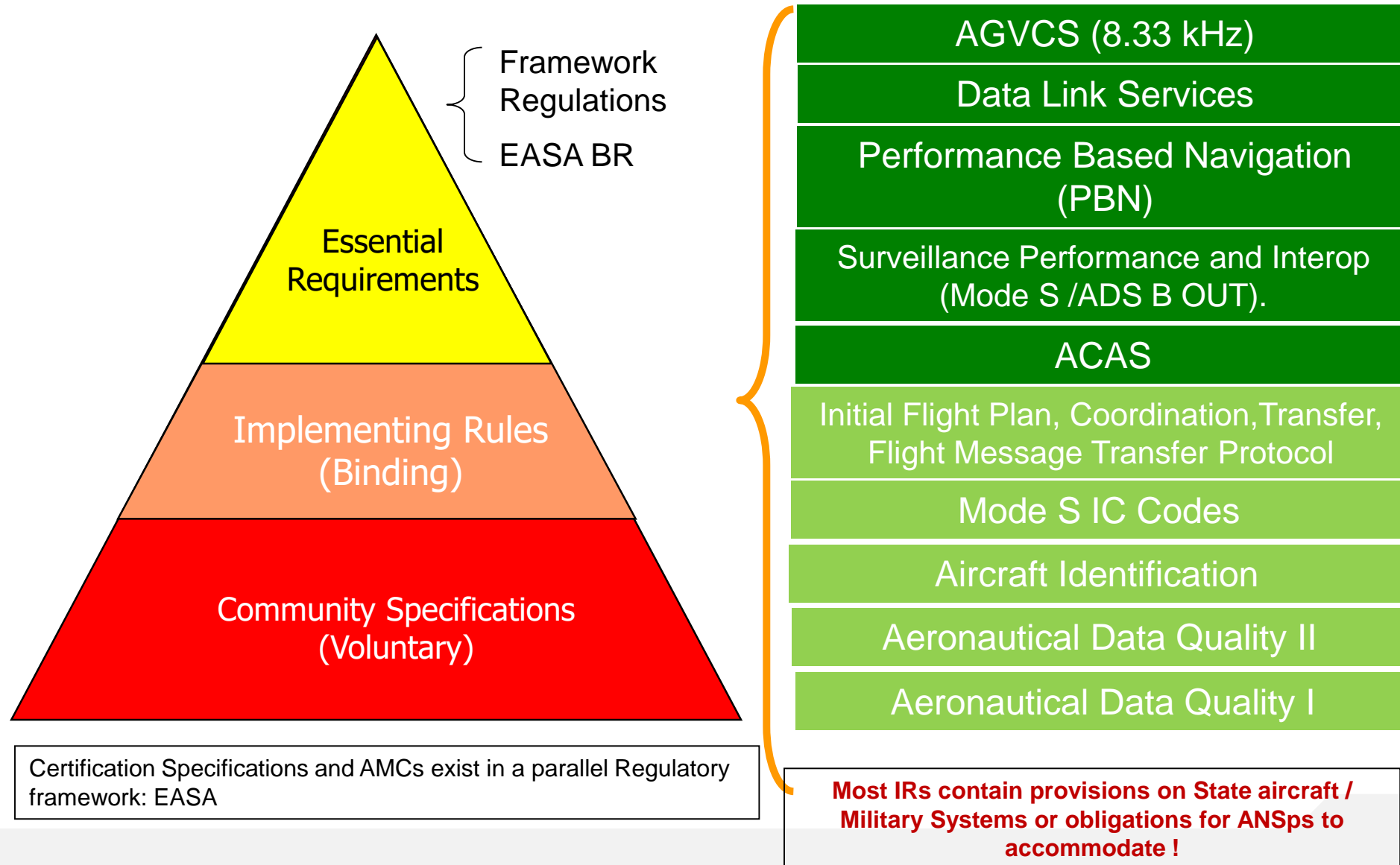
- Promote use of TACAN (including as terrestrial backup to GNSS)
- Recognition of GPS PPS and other GNSS restricted signals
- Adhere to PBN requirements (e.g. RNAV-5 enroute, RNAV-1 in terminal, RNP APPCH)
- Conventional support to non equipped traffic until 2030
- Compatibility of precision approach and landing solutions
- Promote performance based certification (re use of military equipment)

Can military capabilities be reutilised to achieve interoperability?



Modern military aircraft capabilities can potentially be equivalent. Compliance can potentially be achieved through **Performance Equivalence**

Single European Sky (SES) Regulations



Main ATM/CNS Avionics Requirements Impacting State Aircraft (short/medium term)



- Regulated impact on Fighter a/c
- Potential impact on Fighter a/c
- Regulated impact on Transport a/c (in addition)
- Potential impact on Transport a/c

Regulated for State a/c:

- VHF 8.33 kHz VCS
- Data Link Services for CPDLC
- Mode S ELS/EHS and ADS-B Out

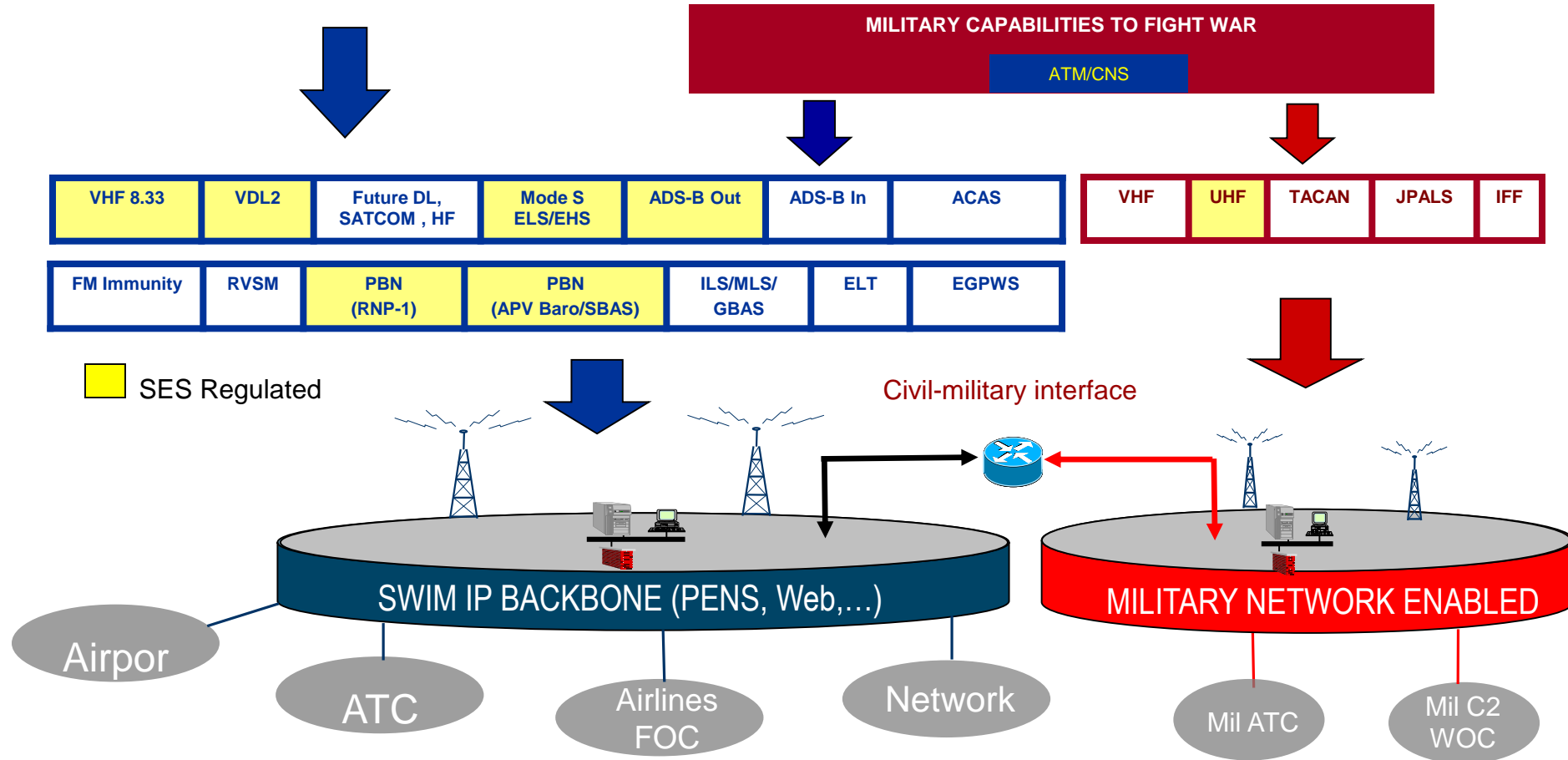
Non-Regulated for State a/c:

- Data Link Services for i4D/ADS-C
- Performance Based Navigation (PBN)
- ACAS/TCAS
- RVSM
- FM Immunity
- ADS-B-In
- EGPWS/TAWS

Other (not GAT-related):

- V/UHF 25 kHz
- TACAN+GPS/INS+ILS/MLS
- SSR Mode A/C

Civil-Military ATM/CNS Integration: The Full Picture



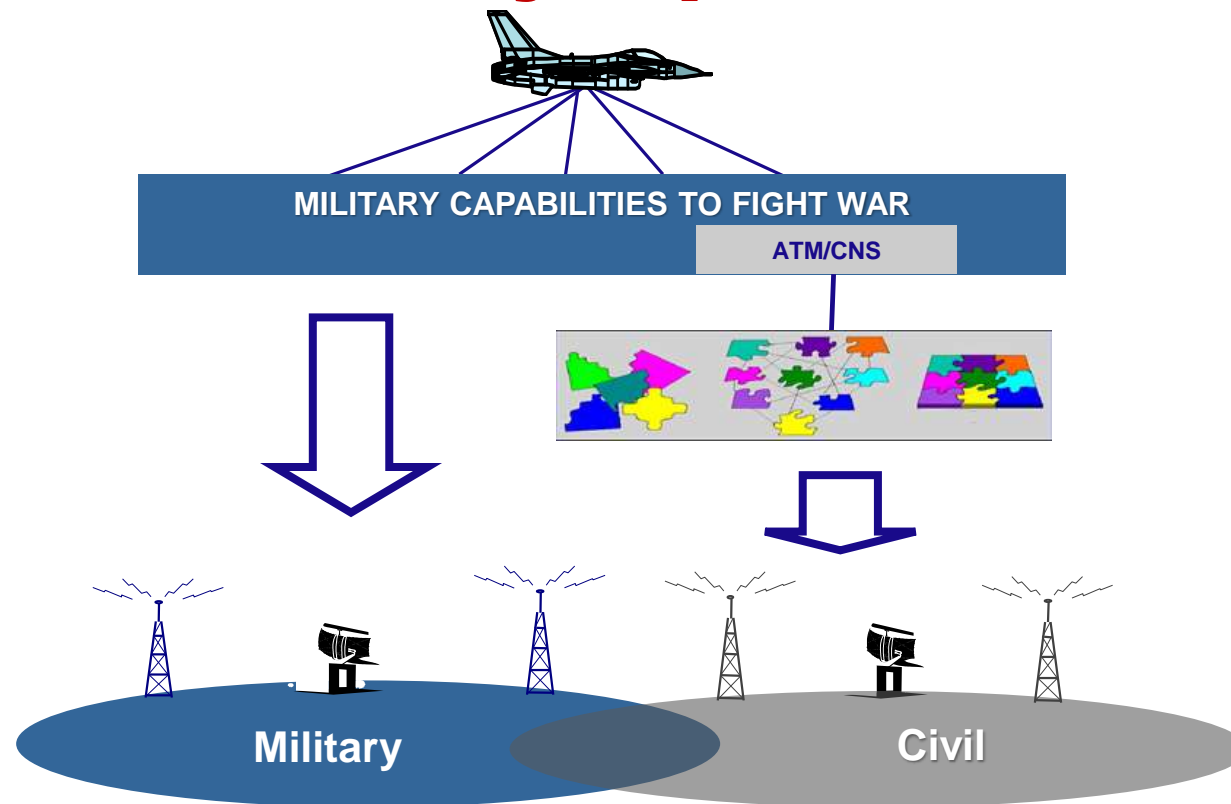
Capability re-use, optimized equipage, multi-mode avx, equivalent certification

Dual Use CNS Approach

Decouple technology from performance. Reutilize available military capabilities.



- Performance-based approaches are needed
- Different approach for transport and fighters



- Obsolescence management
- Alternative certification approaches
- Capabilities for new programmes
- Supplementary ground support.

Thank You !

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