

MQ-9B SkyGuardian

UAV integration in Air Traffic

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Nivelles

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BELGIAN AIR



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Agenda

- My background
- BAF MQ-9B SkyGuardian
- MQ-9B Overview
- Current Timeline
- Belgian Air Force requirements
- Certifiable RPAS (Remotely Piloted Aircraft System) and certification process
- Airspace integration generalities and phases
- Conclusion
- Q&A



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My background

- Royal Military Academy (2008-2013)
- Training Marchetti SF-260 (Aug13 – Aug14)
- Training A-Jet (Sep14 – Jun15)
- Mission Commander 80UAV Squadron (Jun15 – Oct20)
- Intelligence course (Nov 15 – Jun 16)
- Imagery Analyst course (Oct 17 – Dec 17)
- Operational missions
 - Afghanistan, Mazar-i-Sharif (Apr18 – Aug18) → ISR Manager
 - Mali, Gao (Jan20 – Mar20) → IA
- MQ-9B WG (Oct20 - ...)
- Future MQ-9B Remote Pilot (Jan24 - ...)



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Belgian Air Force (BAF) MQ-9B SkyGuardian

- Why ?

- Strategic Military Vision 2016

- Necessity of military materiel renewal
- Lack of MALE (Medium Altitude Long Endurance) capacity within Belgium and other european NATO countries
- Replacement of aging B-Hunter
- Increase support for national, NATO and EU missions in terms of ISR capability



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Belgian Air Force (BAF) MQ-9B SkyGuardian

- How ?

- MALE Program Office (Jun17)

- Mandated by CHOD (Chief Of Defence)
- Market survey (Nov17)
 - Gov to Gov contract
 - 02 MQ-9B SkyGuardian Systems from GA-ASI (General Atomics Aeronautical Systems Inc)
- Acquisition validated by Ministerial Council (Oct18)
- LOA (Letter of Offer and Acceptance) btw BEL Def and US Gov (May19)

- MQ-9B WG (end 19)

- Initial contract signature btw US Gov SPO FMS (Special Programs Office Foreign Military Sales) and GA-ASI (Aug20)
- Final contract signature (Nov21)^{BEL Unclass}

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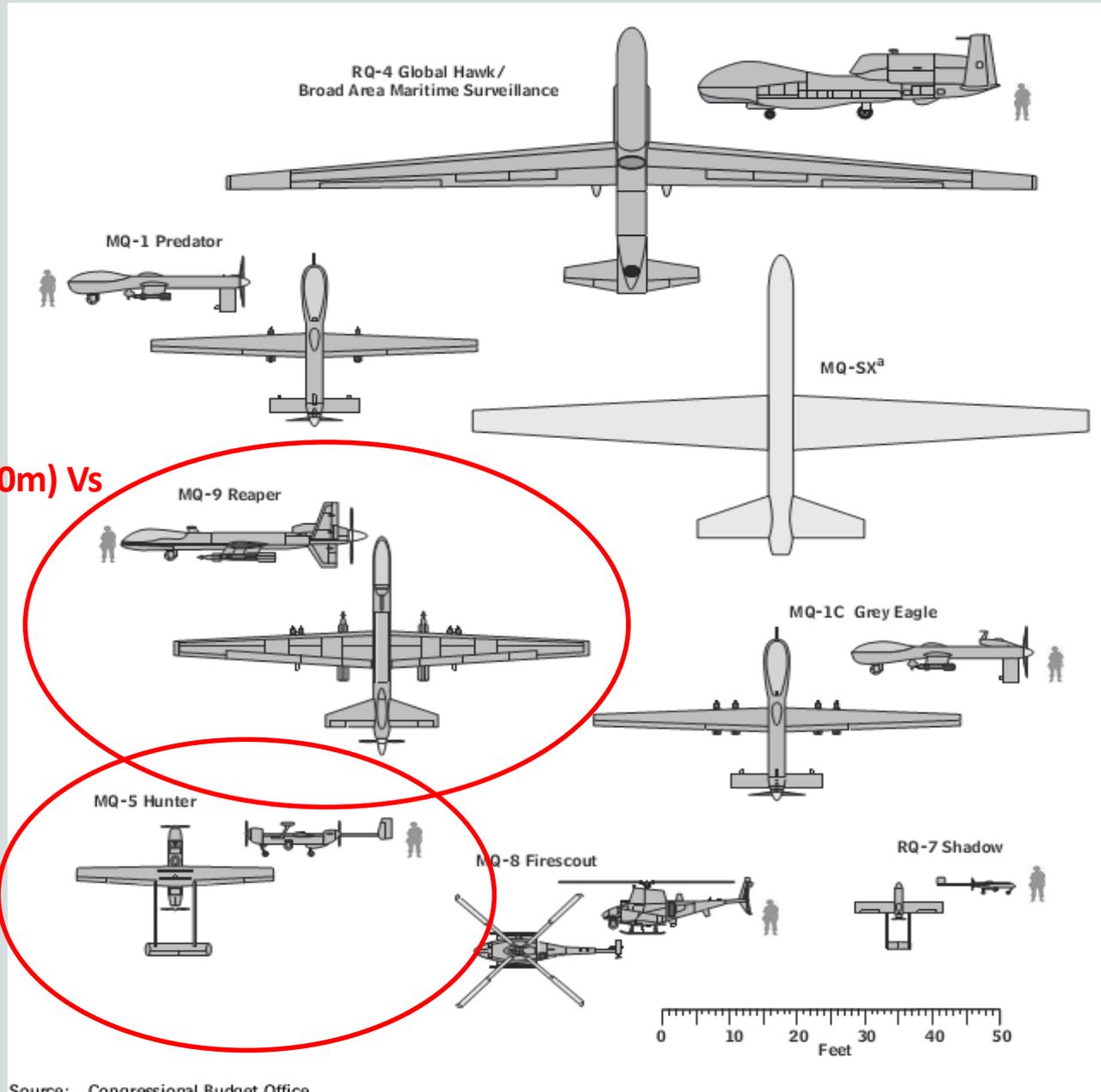
MQ-9B Overview





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MQ-9B Overview



**MQ-9 Reaper (20m) Vs
MQ-9B 24m**

Former B-Hunter

Source: Congressional Budget Office.

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MQ-9B Overview

Made for Civil Airspace access
Compliant with NATO flight certification standards
(STANAG 4671/UK DEFSTAN 00-970)



>35-hr Endurance ISR Configuration

CHARACTERISTICS

Wing Span:	79 ft (24m)
Length:	38 ft (11.7m)
Powerplant (4-blade prop):	Honeywell TPE331-10
Max Gross Takeoff Weight:	12,500 lb (5,670 kg)
Fuel Capacity (internal):	6,000 lb (2,722 kg)
Payload Capacity:	4,000 lb (1,814 kg) across 9 hard points 800 lb (363 kg) internal
Power:	45 kVA
Backup power:	2.2 kW

PERFORMANCE

Max Altitude: > 40,000 ft
Max Endurance: > 35 hr
Max Air Speed: 210 KTAS

CAPABILITIES Include

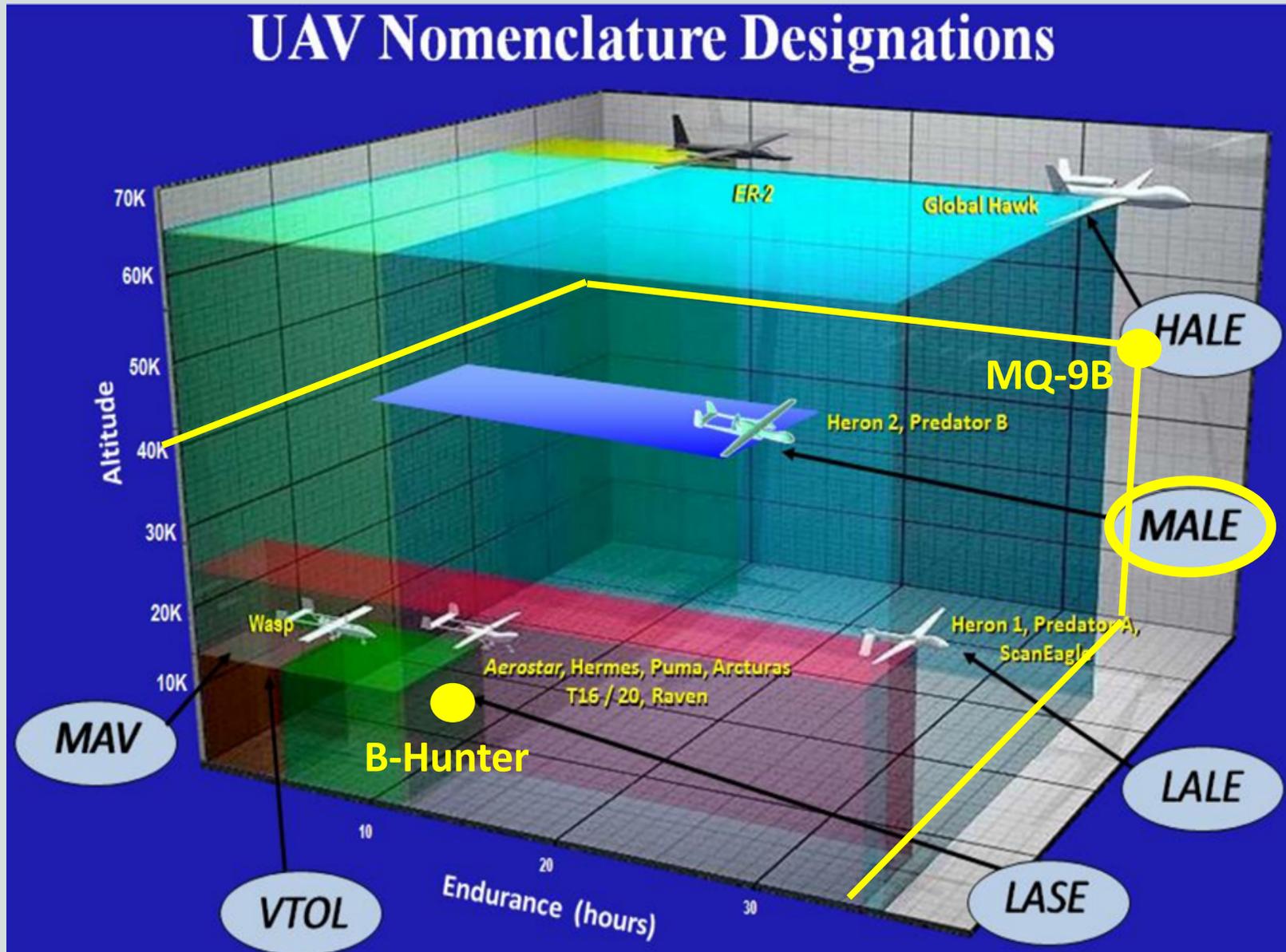
- Lightning/Ice Protection
- 40,000 hr Service Life
- Certifiable composites
- Fastened structures
- Fuel/Electrical Separation
- Power plant fire protection

- Damage tolerant airframe
- Automatic Takeoff/Landing
- Short takeoffs w/ alcohol water injection
- Secure NATO-certified radios
- X/Ku-band Beyond LOS (BLOS) datalink
- Inmarsat Backup BLOS datalink
- Cooperative Detect and Avoid System
 - ADS-B In/Out
 - TCAS II
- Provisioned for:
 - Due Regard Radar



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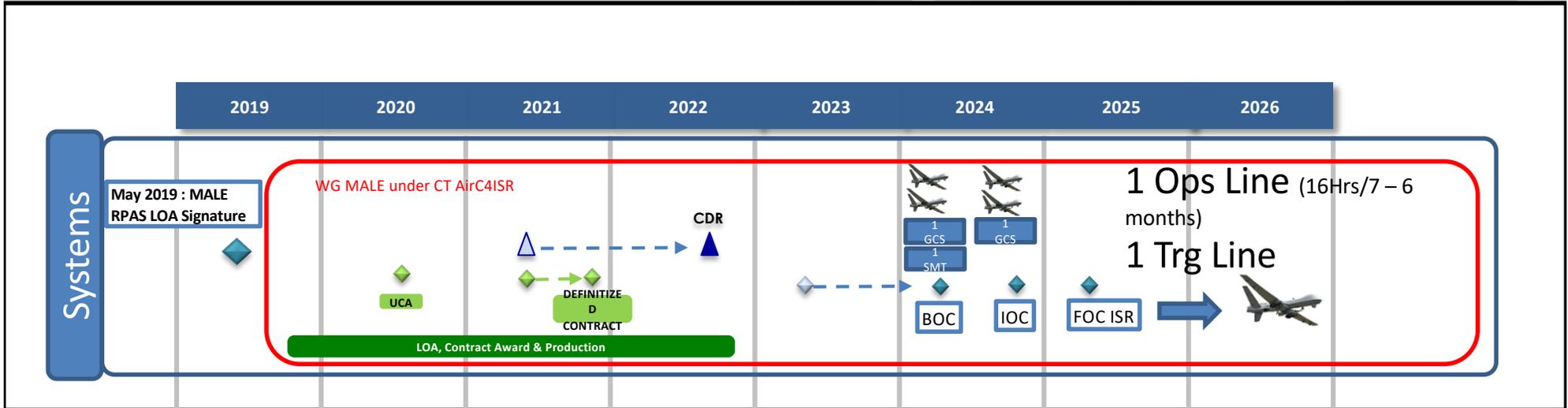
MQ-9B Overview





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Current Timeline





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BAF requirements for MALE system

- Multiple candidates but only one checking all following boxes:
 - Certifiable
 - Integrated in the Airspace
 - Interoperable
 - Satcom Link
 - Satcom Automatic T/O and Ldg
 - Weapons (if needed and after political decision)



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Certifiable RPAS

- MQ-9B to be considered as any other military aircraft
- MQ-9B to operate in segregated and non-segregated airspace
- MQ-9B SkyGuardian compliant with STANAG 4671
 - STANAG 4671 = NATO Standard for UAV System Airworthiness Requirements
 - Minimum requirements for military RPAS system
- MQ-9B SkyGuardian operable via MTC (Military Type Certificate)
 - Over Belgium, Europe or operational area(s) all around the world
 - Over populated or unpopulated area(s)



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BEL Vs UK Certification Process

- BEL MQ-9B MTC based on UK Protector MTC
- No desk within BEL MAA to perform certification process
 - Solution = AW PA + mutual recognition between BEL & UK
- All documents and technical data provided by SPO via GA

TCB

- All criteria needed for certification (STANAG 4671/UK Specifics/Engine/...
- Submitted by UK TAA and agreed by UK MAA (BEL MAA)
- UK-derived TCB produced and based on BEL Vs UK delta configuration

TCE

- TCE indicates for each criteria if NO/PARTIAL/FULL compliant with TCB
- Submitted by UK TAA to UK MAA
- TCE Annex produced due to delta config

TCR

- Review of TCE leading to MTC
- Review by UK MAA
- SOCA produced => BEL MTC issued by BEL MAA



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BEL Vs UK Certification Process

- MTC = final objective but long and time-consuming process
- BEL MTC will probably not be issued on time...



Short term solution = MPtF (Military Permit to Fly)

- Temporary solution
- Per tail number
- Flight allowed while still performing some specific test
- BEL MPtF planned to be issued on time for first MQ-9B flight in Belgium



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Airspace Integration

Preliminary remarks

- Step by step approach
- Based on current BEL airspace design
- Airspace integration strongly linked with certification
- BAF MQ-9B flights in BEL => always IFR, OAT in Radar Controlled Airspace
 - No flight authorization to be received from Civ authorities
 - Only emergency procedures (Loss Link, Diversion, Flight termination) to be formalized when needed



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Airspace Integration

BAF Statement

- The BEL MQ-9B SkyGuardian will be a certified Remotely Piloted Aircraft
- It is a state-aircraft flying in OAT IFR (even in VMC) under Radar Control
- Like any other BAF aircraft flying in the same conditions and regime, the BEL MQ-9B SkyGuardian will be granted to fly in all controlled airspace available to OAT traffic, the IFR separation being ensured by Mil ATC
- Combined operations or training with other aircraft will be allowed under strict procedures



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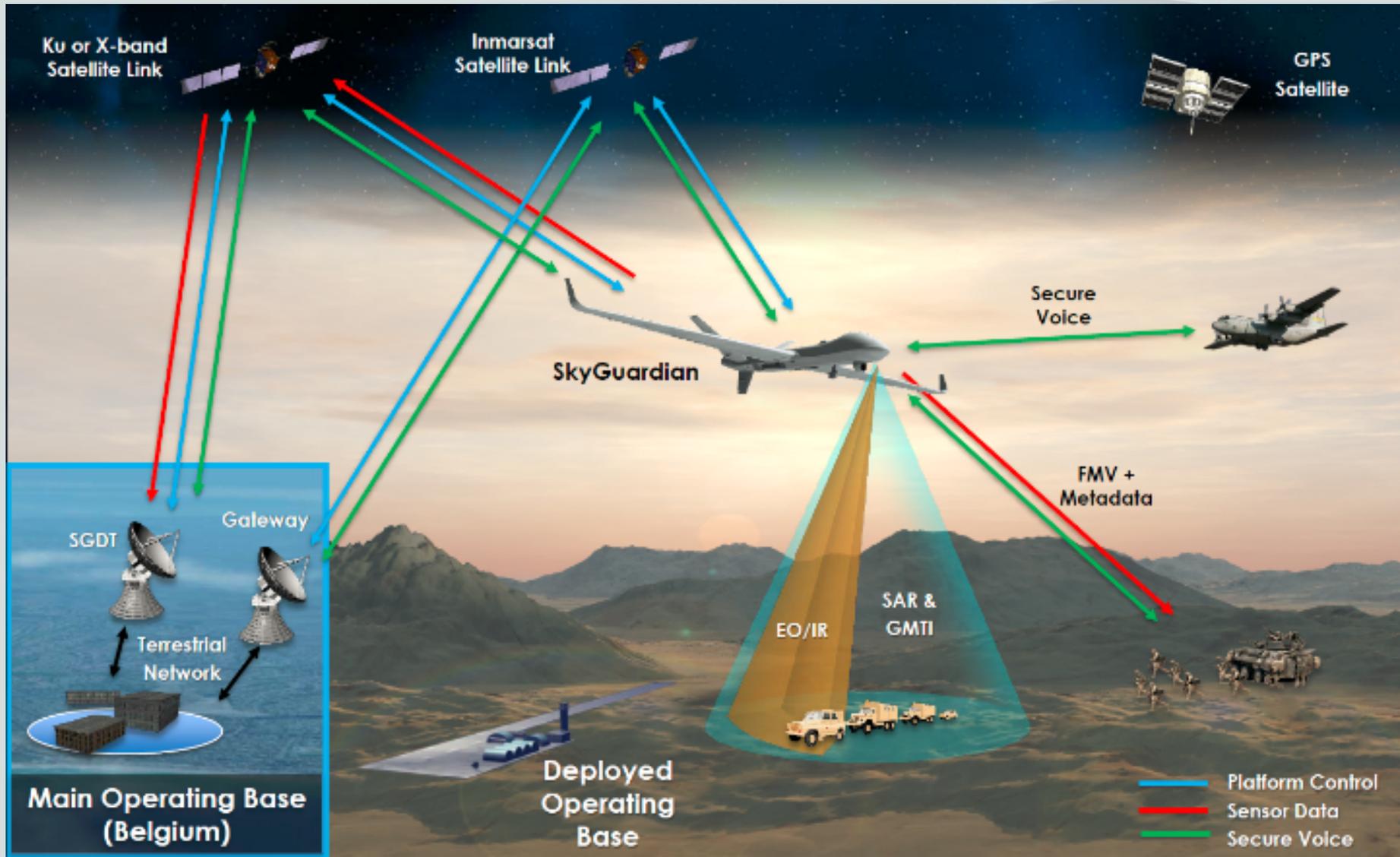
Airspace Integration

- MQ-9B SkyGuardian equipped with:
 - Primary KU or X-band datalink (Satcom)
 - Secondary Inmarsat (backup) datalink (Satcom)
 - Two-way Secure NATO-certified radios (UHF/VHF)
 - Cooperative Detect and Avoid System
 - ADS-B In/Out
 - TCAS II via IFF 3A/C/S
 - Provisioned for Due Regard Radar retrofitting
 - Tracking of non-cooperative aircraft
 - **Perspective** of operations in Class G (uncontrolled airspace)



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SATCOM Concept of Operation



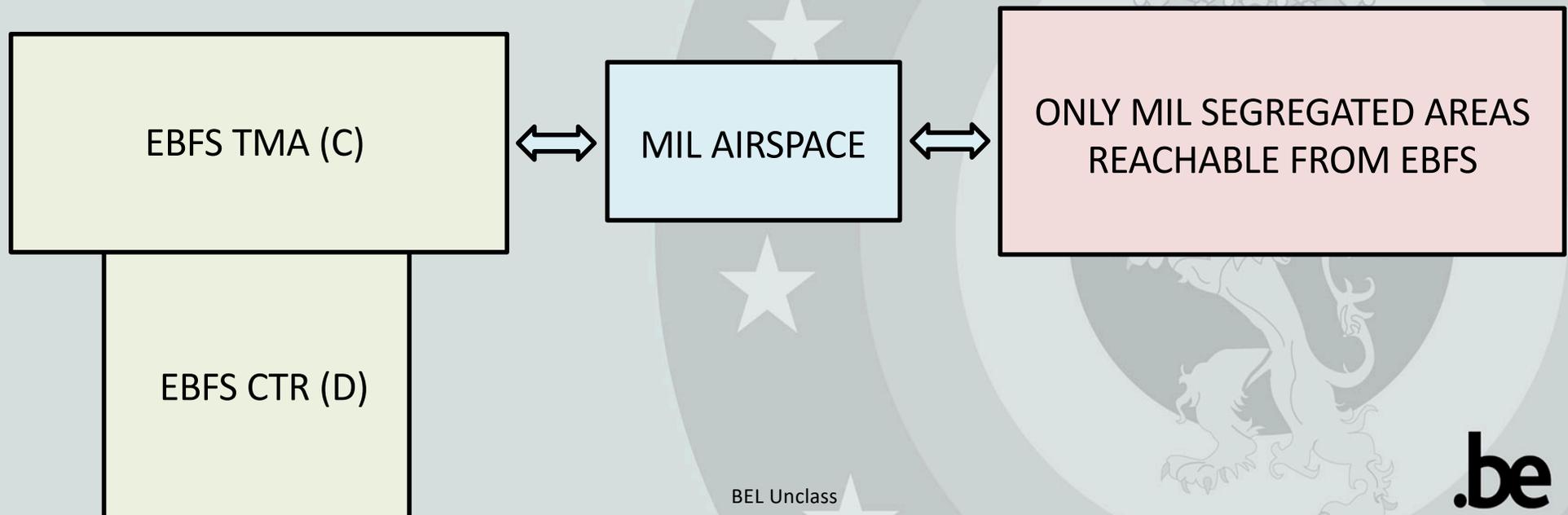


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Confidence build-up Phase (MPtF or MTC)

BEL Airspace

- Always IFR even if VMC
- Always Mil controlled airspace (OAT)
- Flight Plan
- Continuous two-way radio comm's
- Squawk
- Return Home route => Standardized and communicated by the pilot to the ATC
- Flight with cooperative manned A/C allowed (Standard radar separations)



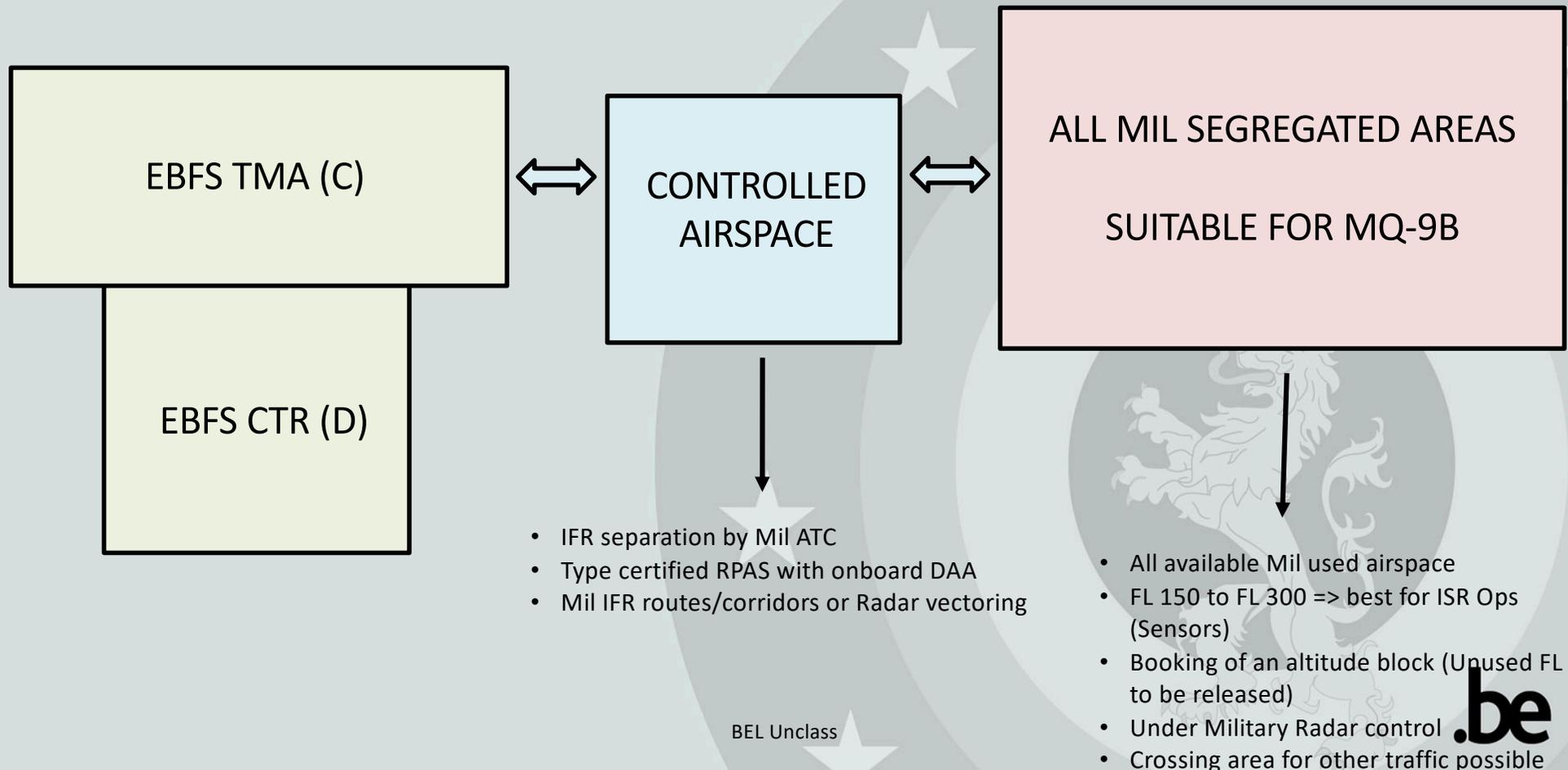


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Initial Phase (MPtF or MTC)

BEL Airspace

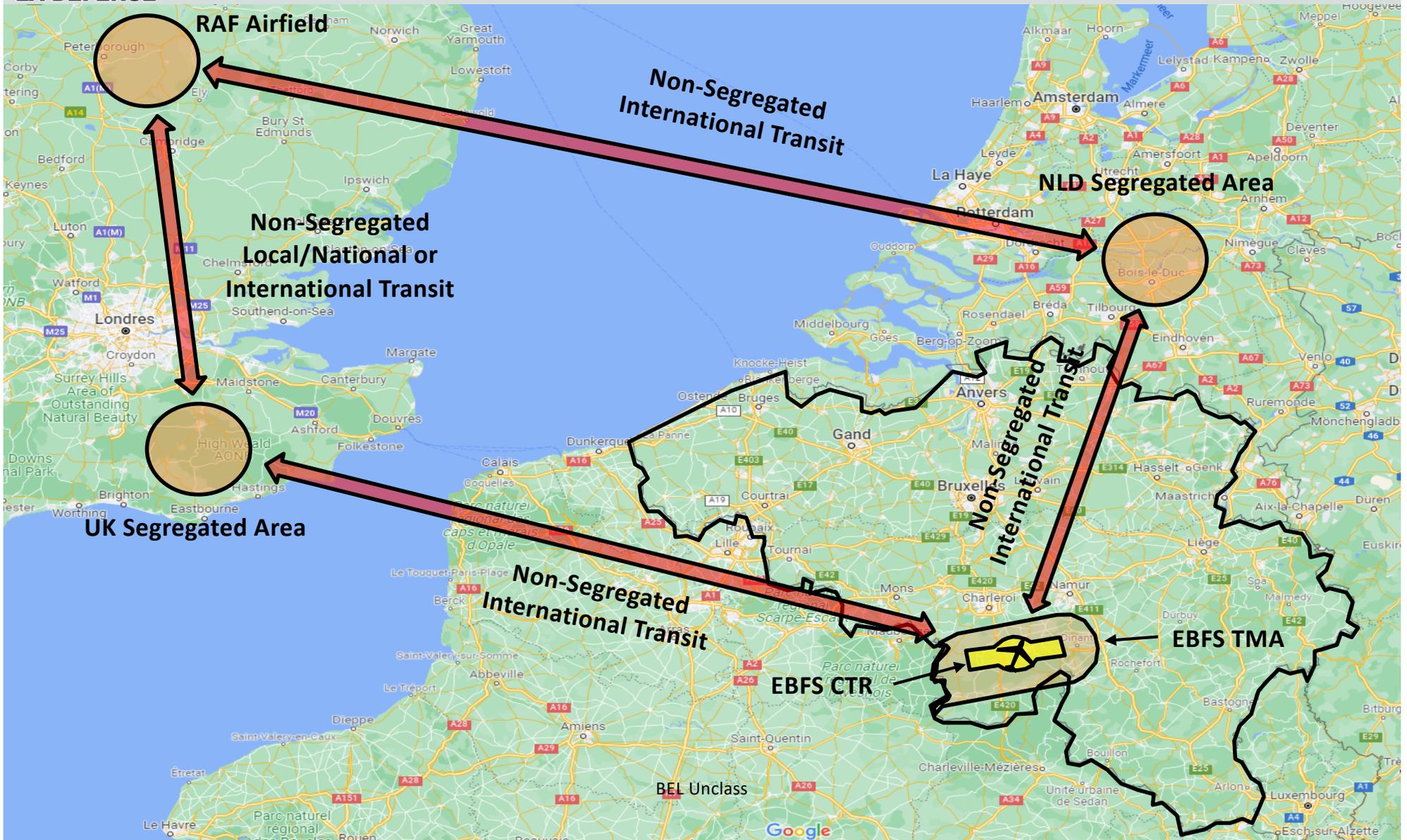
- Always IFR even if VMC
- Always Mil controlled airspace (OAT)
- Flight Plan
- Continuous two-way radio comm's
- Squawk
- Return Home route => Standardized and communicated by the pilot to the ATC
- Flight with cooperative manned A/C allowed (Standard radar separations)





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Final Phase (MTC needed)





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Final Phase (MTC needed)

International Airspace

- Always IFR even if VMC
- Mil and/or Civ controlled airspace depending phase of the flight => OAT or GAT possible (transit flight only)
- Flight Plan
- Continuous two-way radio comm's
- Squawk
- Return Home route => Standardized and communicated by the pilot to the ATC
- Flight with cooperative manned A/C allowed (Standard radar separations)





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Conclusion

- BAF will be the first security agency to operate a MALE System over Belgium but definitively not the last one...



Police/Customs/Maritime Customs

- Civilian companies will probably follow in the future...



Urgent need for regulatory change





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Q&A



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