

# MQ-9B SkyGuardian

UAV integration in Air Traffic

04<sup>th</sup> October 2022

Nivelles

Captain (OF-2) NOIRFALISE B.  
COMOPSAIR  
A5 - AIRC4ISR – MQ-9B WG



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)<sup>BEL Unclass</sup>



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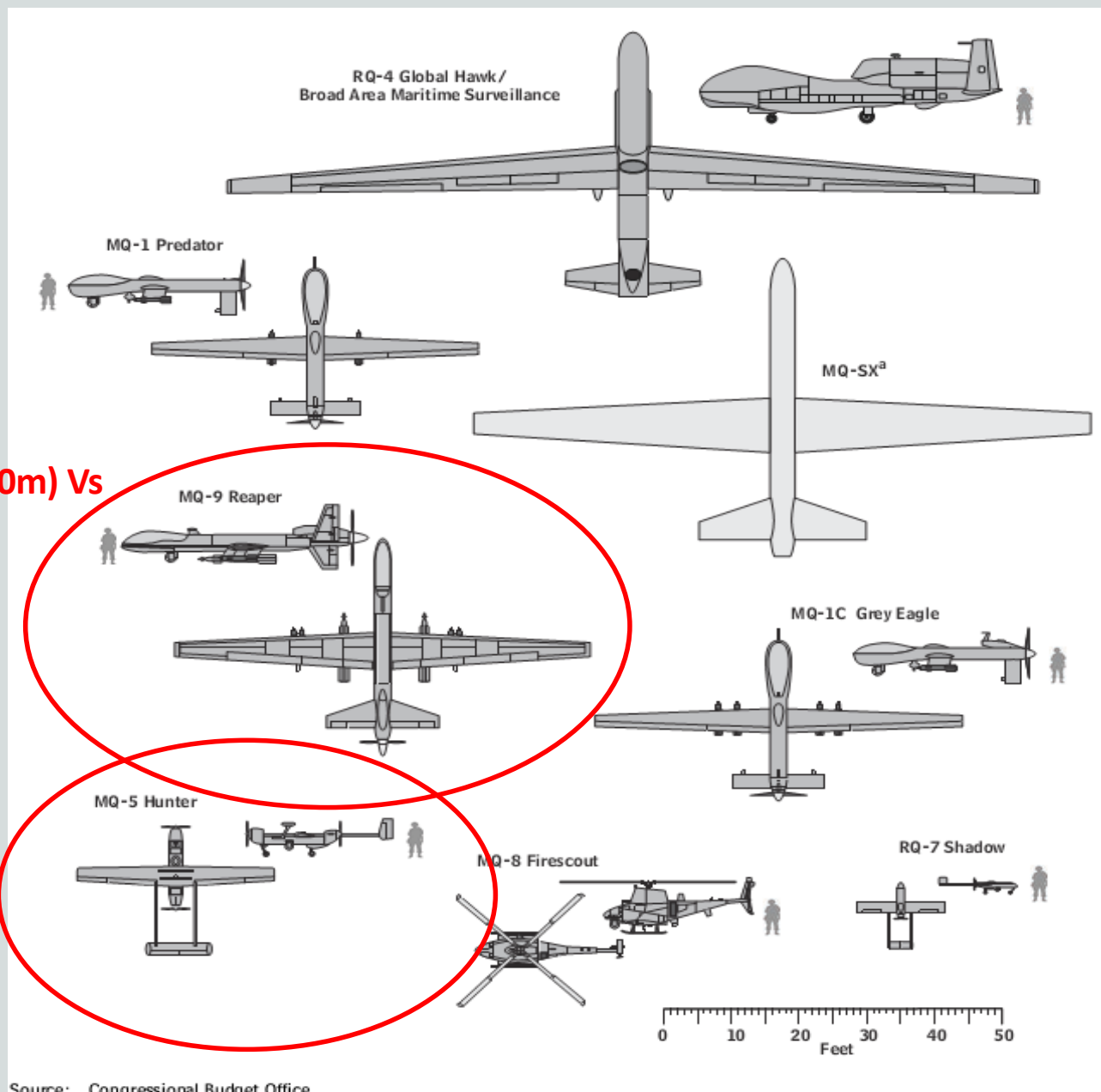
# MQ-9B Overview





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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

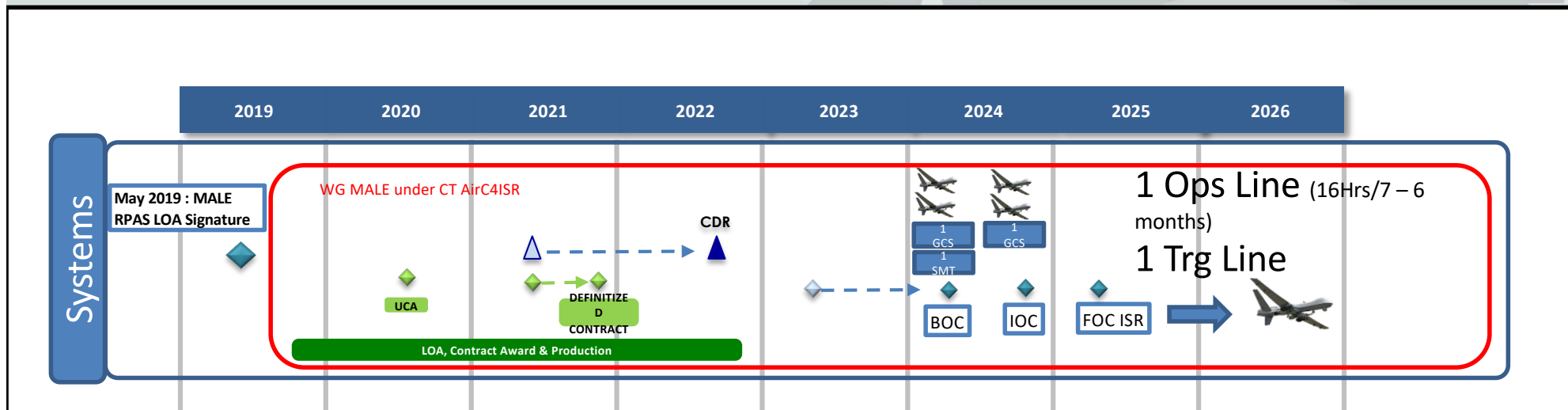
- Damage tolerant airframe
- Automatic Takeoff/Landing
- Short takeoffs w/ alcohol water injection
- Secure NATO-certified radios
- X/Ku-band Beyond LOS (BLOS) datalink
- Inmarsat Backup BLOS datalink
- Cooperative Detect and Avoid System
  - ADS-B In/Out
  - TCAS II
- Provisioned for:
  - Due Regard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





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# 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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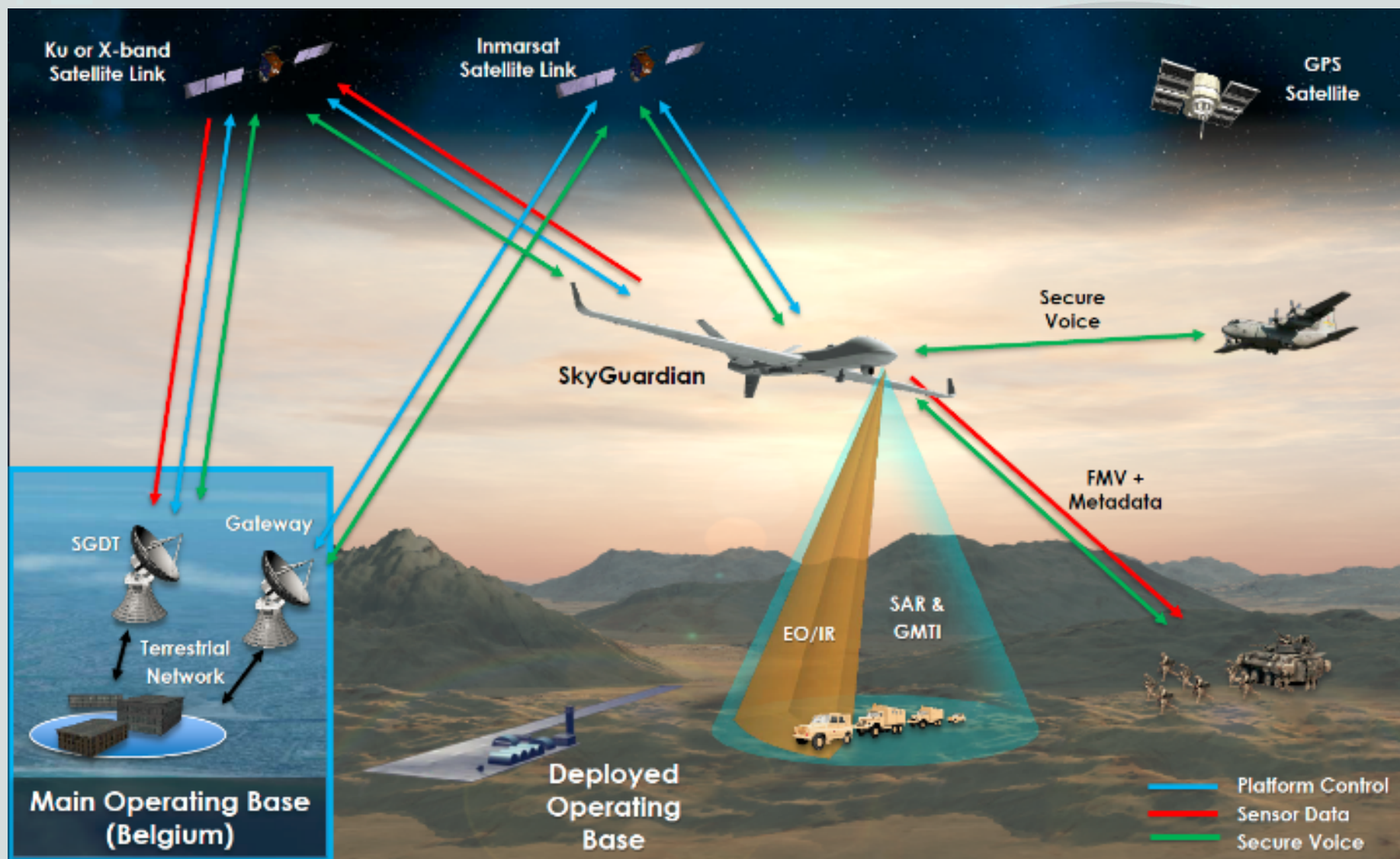
# Airspace Integration

- 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



BEL Diffusion Restreinte





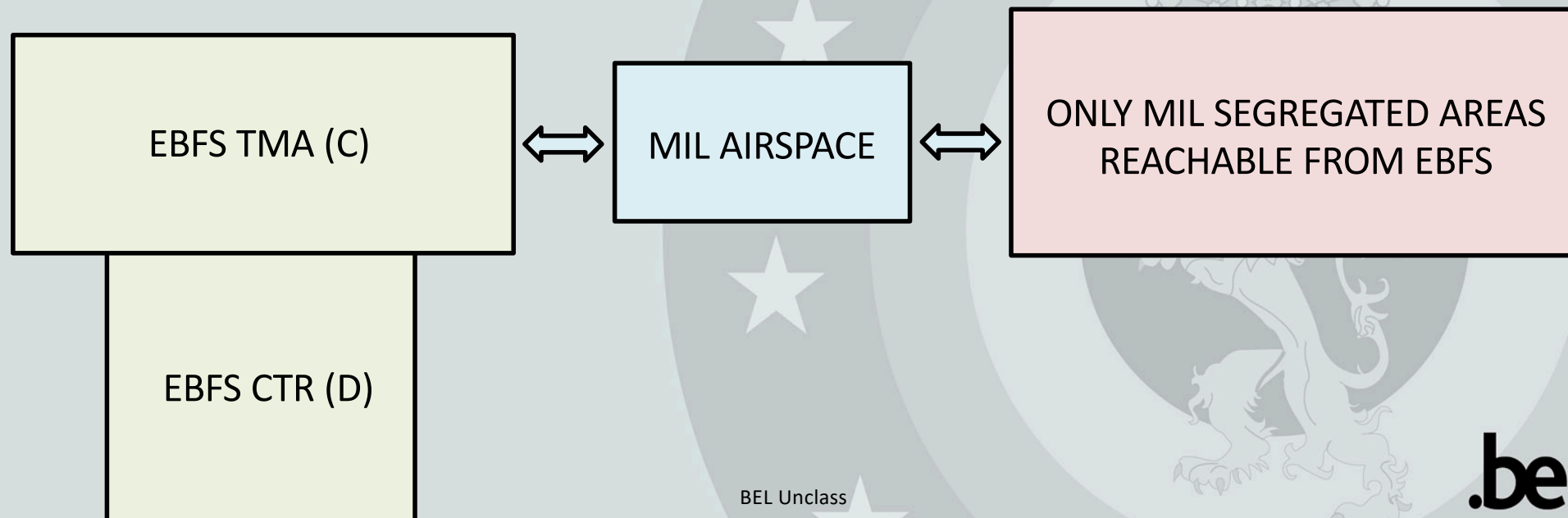


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# Confidence build-up Phase (MPtF or MTC)

## 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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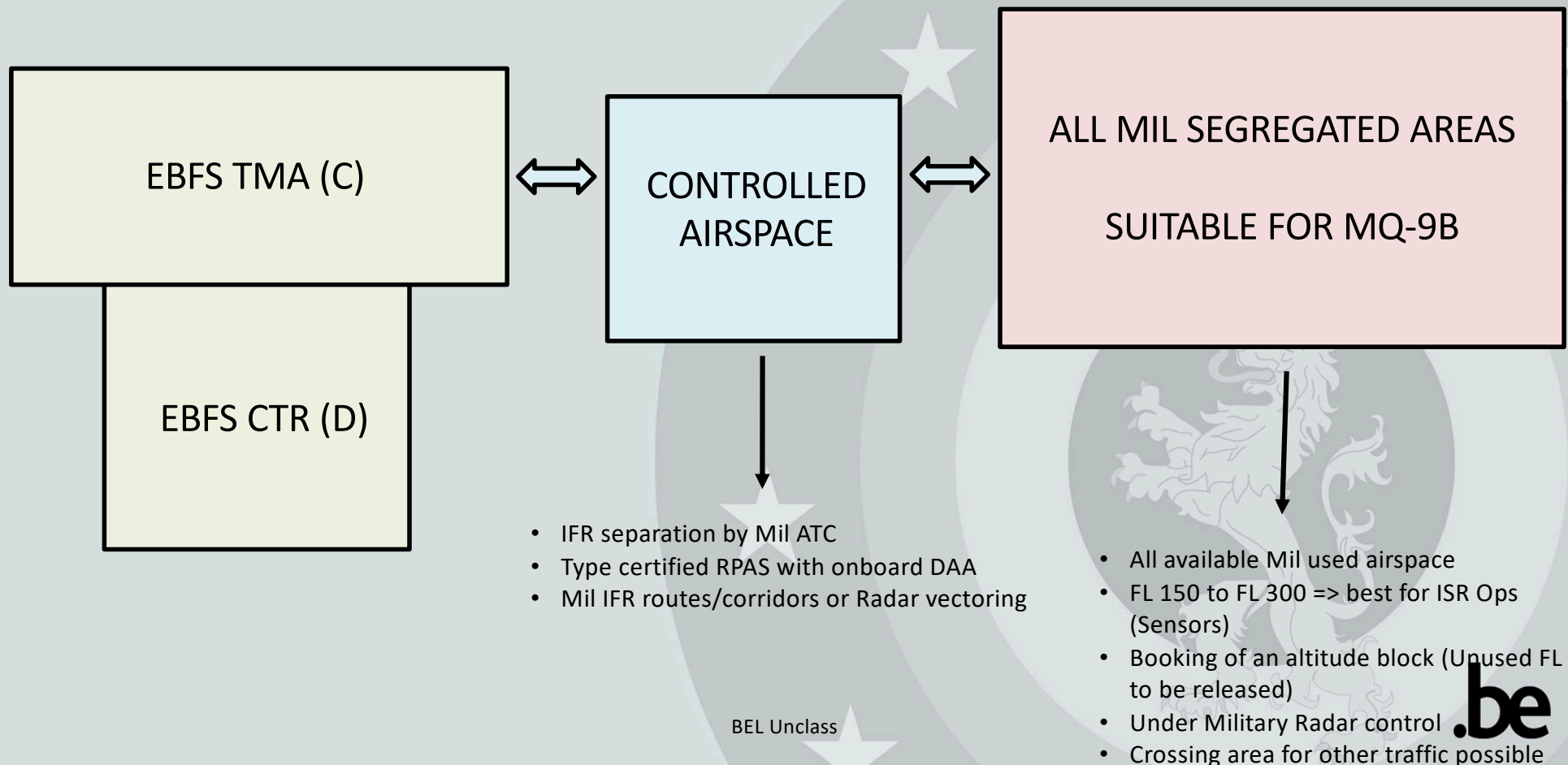


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# Initial Phase (MPtF or MTC)

## 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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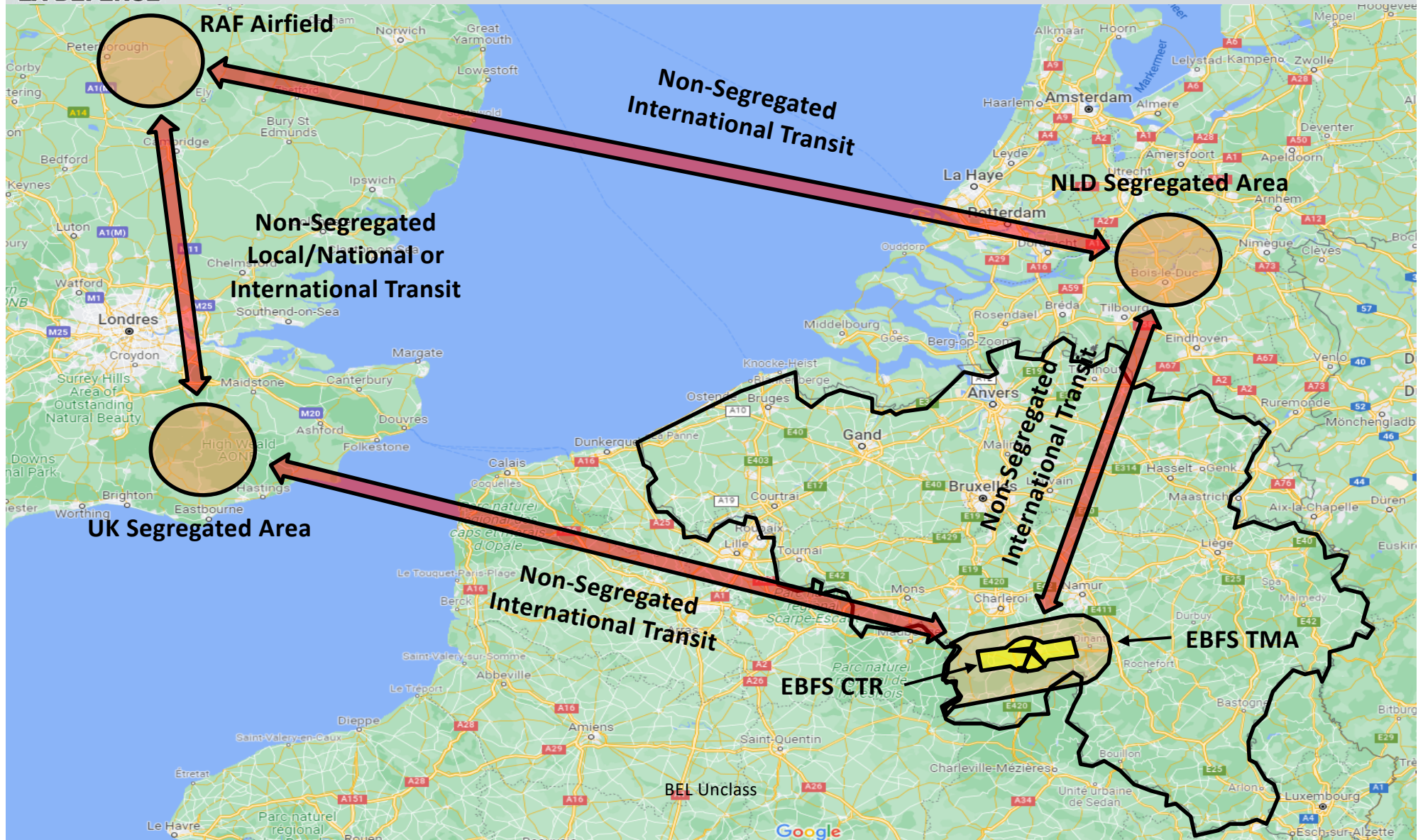
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# Final Phase (MTC needed)





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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...

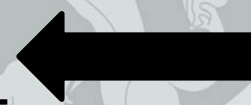


Police/Customs/Maritime Customs

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



**Urgent need for regulatory change**







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# Q&A



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