

CEPT Workshop on Spectrum for Drones / UAS

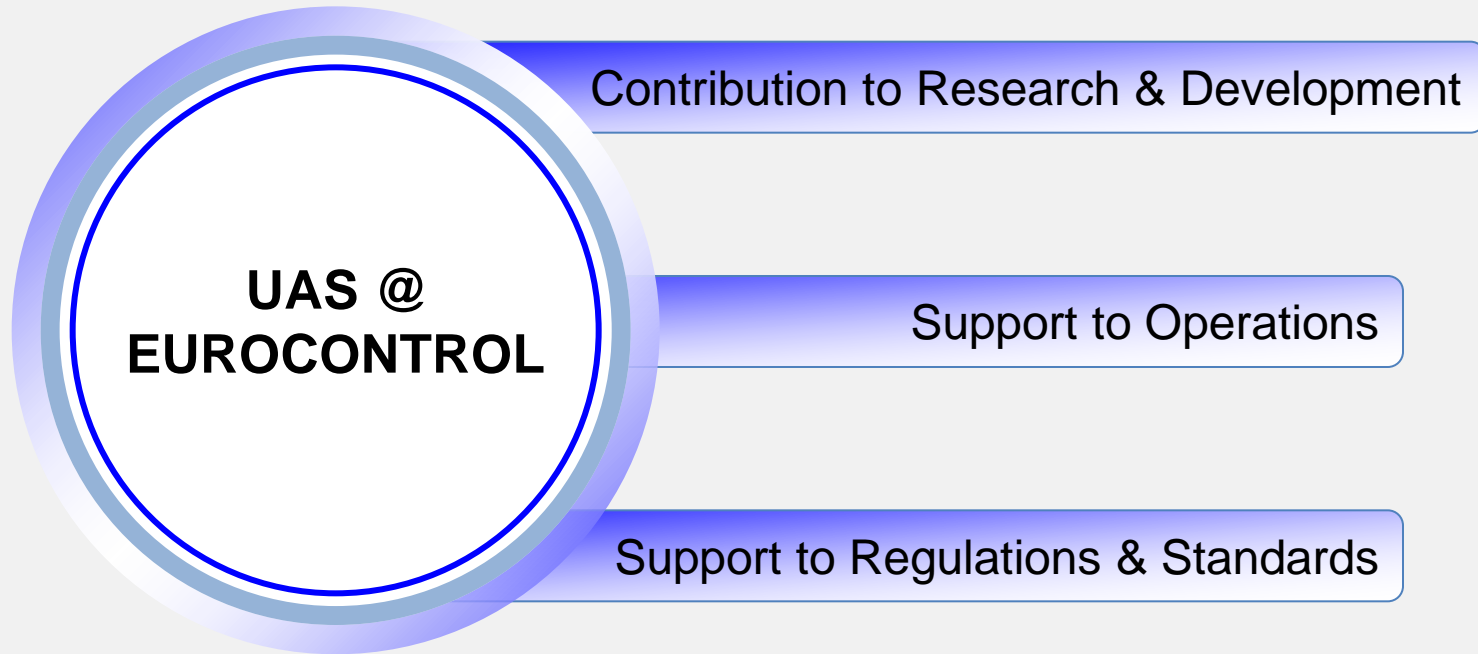
Current EUROCONTROL work programme on Drones

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UAS @ EUROCONTROL



R&D Contribution



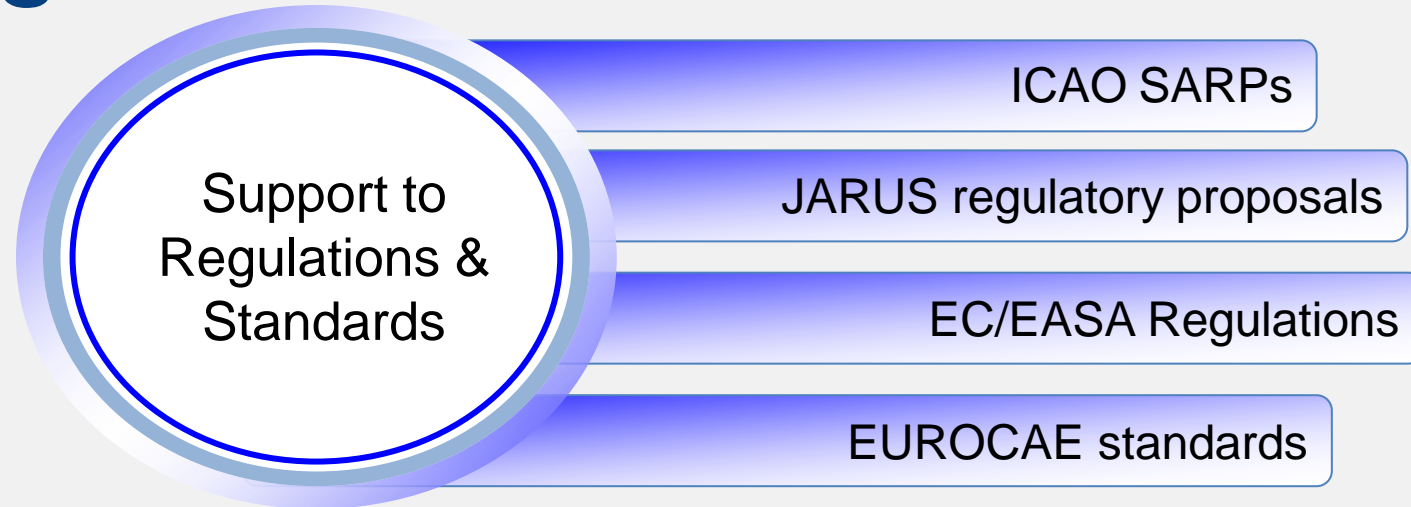
Focused in the integration of large certifiable RPAS into controlled airspace

Operations



- Protect GAT flows from the risks induced by the increasing number of small UAVs, to preserve the CNS network infrastructure against radio-congestion, and to ensure consistency of RPAS CNS with the aviation spectrum strategy

Regulations & Standards



Expert support to key international regulatory bodies (particularly JARUS, ICAO) and panels developing RPAS regulations and standards with a link to ATM such as EASA. The Agency will also continue close cooperation with the Air Traffic Service Providers, Radio Regulators, IATA, ESA, standardisation organisations, as well as with NATO.

Objectives

Enable
development of
UAS market

Address
safety and
Security
issues

Share
expertise

Development
of ATM UAS
CONOPS

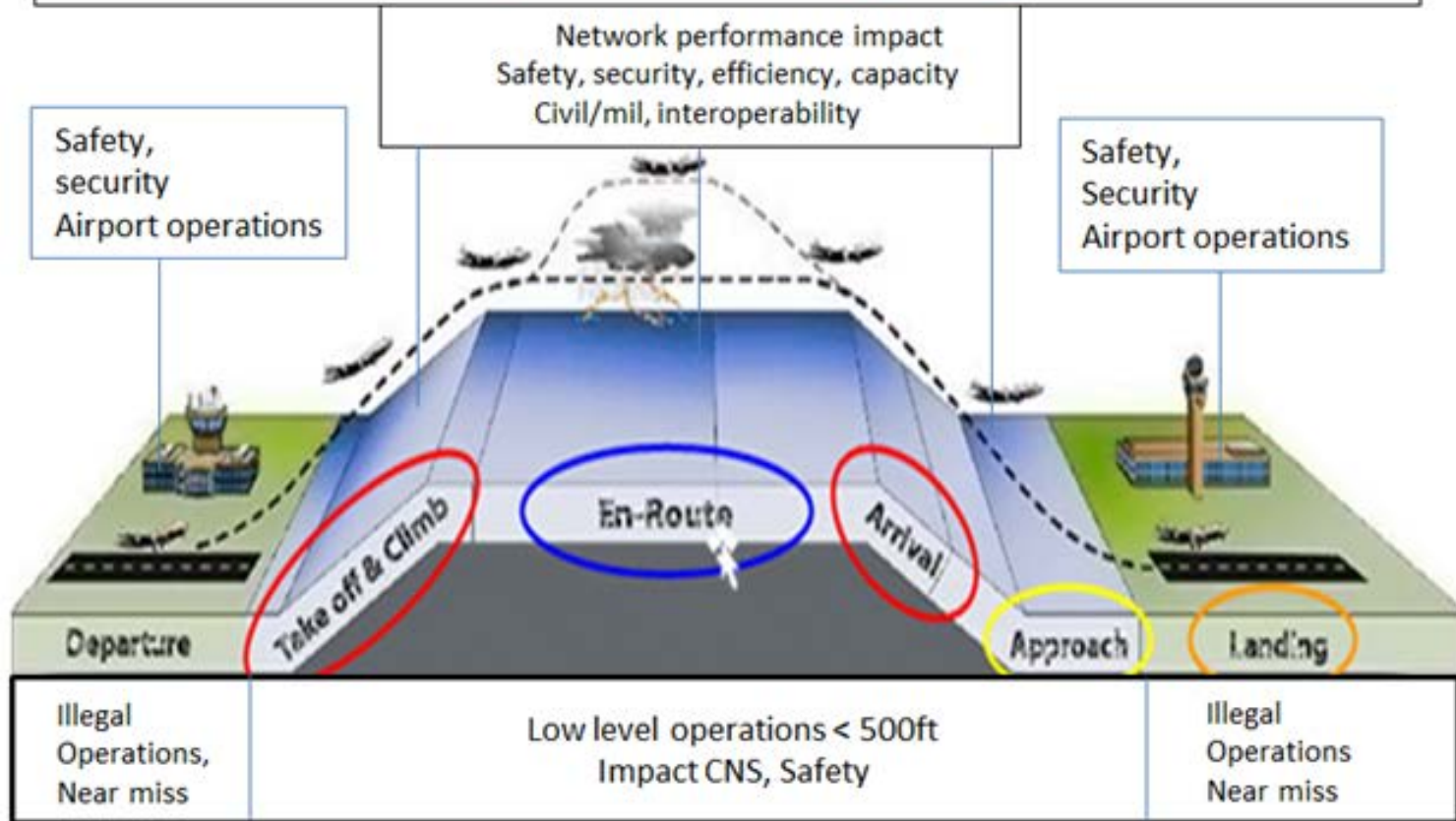
Development
of relevant
ATM
guidelines

Network
impact
assessment

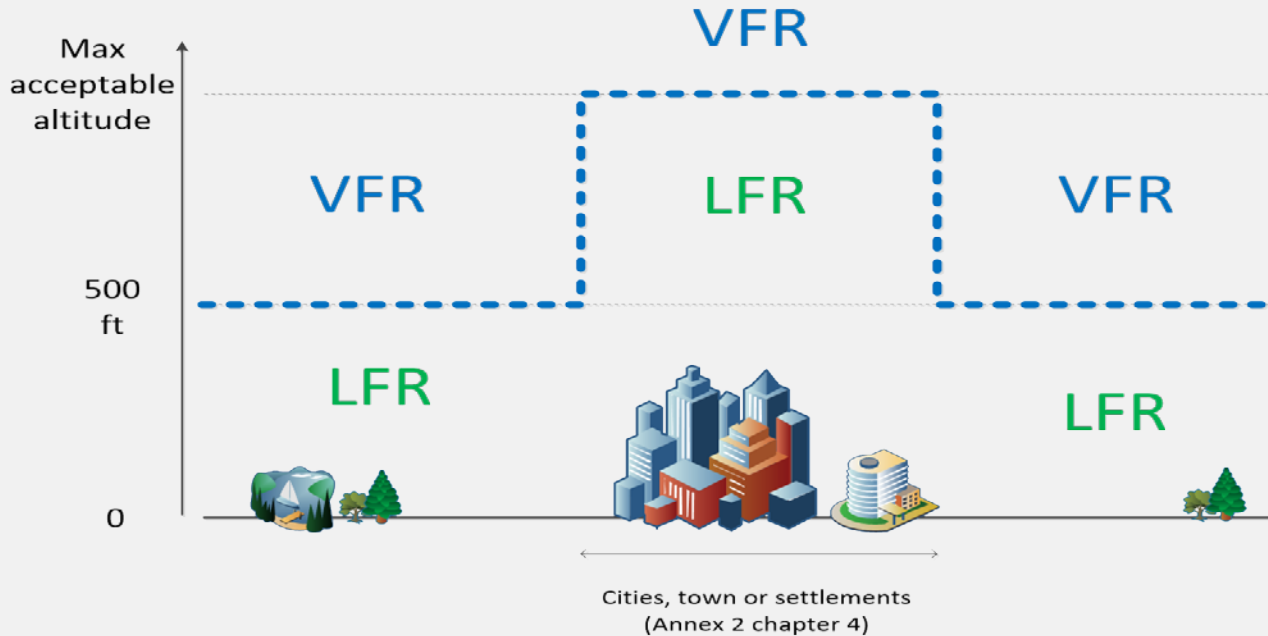
Support to
States

UAS treated
like any other
airspace user

Airspace access



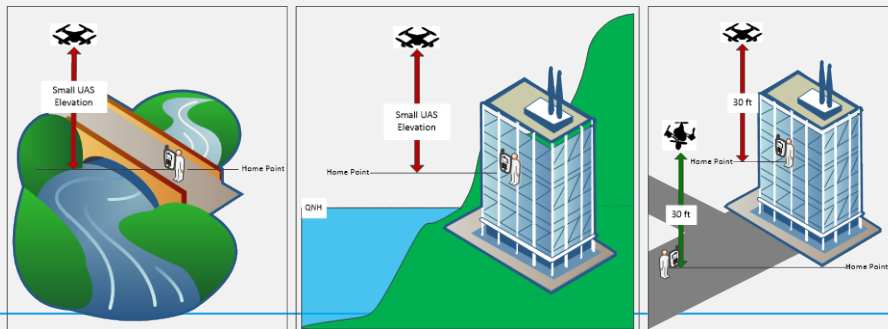
RULES of the AIR and Flight rules



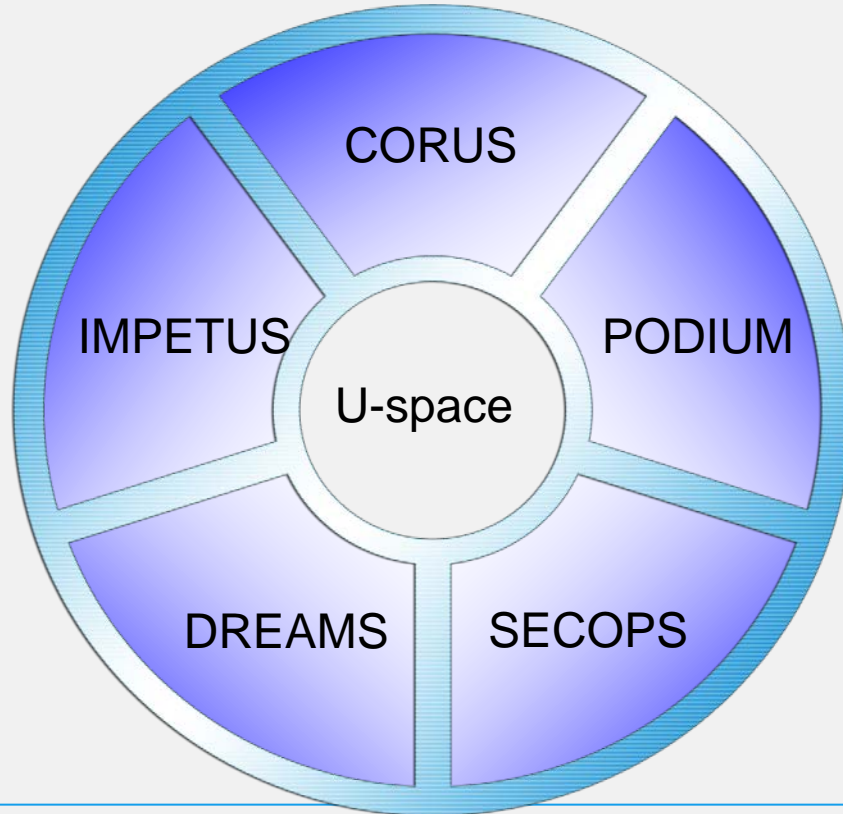
<p>Visual Flight rules VFR</p> <p><small>ICAO Annex 2 chapter 4</small></p>	<p>Instrument Flight Rules IFR</p> <p><small>ICAO Annex 2 chapter 5</small></p>	<p>Low level Flight Rules LFR</p> <p><small>To be developed</small></p>	<p>High level Flight Rules HFR</p> <p><small>To be developed</small></p>
<p>General Flight Rules</p> <p><small>ICAO Annex 2 chapter 3</small></p>			

Small UAS Altitude Measurement & Reference Point

- Two main sources of discrepancy concerning manned/ unmanned aviation:
 - Usage of different reference points
 - Usage of different equipment for elevation measurement
- Two main areas of concern:
 - airspace close to the airports
 - upper limit of VLL (very low level) airspace



SESAR 2020



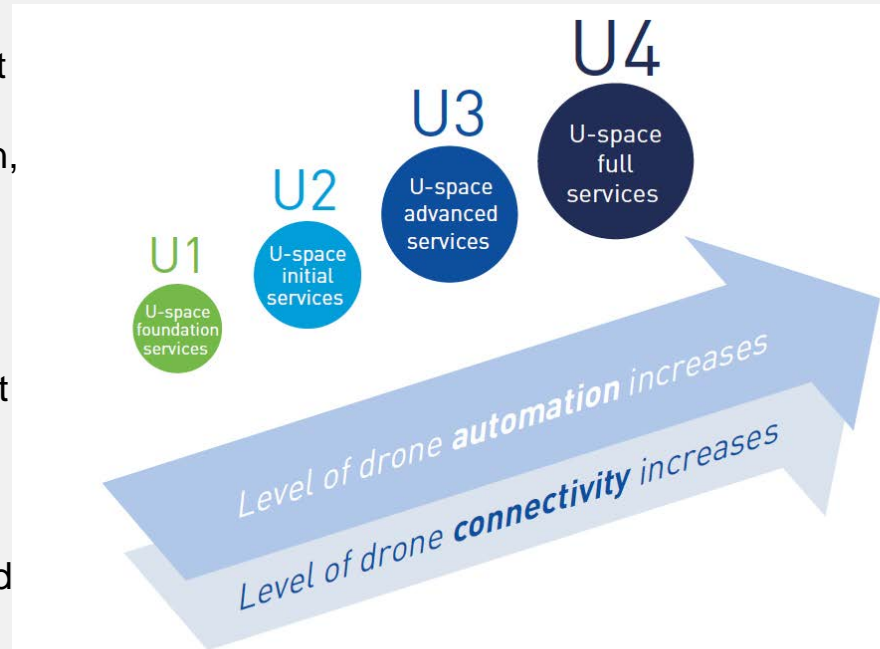
U-space Blueprint /UTM

U1 - U-space foundation services provide e-registration, e-identification and geofencing.

U2 - U-space initial services support the management of drone operations and may include flight planning, flight approval, tracking, airspace dynamic information, and procedural interfaces with air traffic control.

U3 - U-space advanced services support more complex operations in dense areas and may include capacity management and assistance for conflict detection. Indeed, the availability of automated ‘detect and avoid’ (DAA) functionalities, in addition to more reliable means of communication, will lead to a significant increase of operations in all environments.

U4 - U-space full services, services offering integrated interfaces with manned aviation, support the full operational capability of U-space and will rely on very high level of automation, connectivity and digitalisation for both the drone and the U-space system.



CORUS

Concept of Operation for European UTM Systems (CORUS)

CORUS aims to address VLL airspace, also including the airspace around airports

1. Establish and clearly describe a concept of operations. Develop clear use cases for nominal scenarios and describe how losses of safety in non-nominal situations (e.g. contingency, emergency ...) can be minimized.
2. Address drones operations in uncontrolled airspace as well as in and around controlled or protected airspace (e.g. airfields).
3. Develop a concept enabling safe interaction with all different classes of airspace users taking into account contingencies and emergencies, and making clear any assumptions about the volumes of traffic.
4. Examine non-aviation aspects, identifying key issues for society (e.g. safety and privacy, noise ...) and offering solutions to ease social acceptance
5. Identify necessary services and technical development, quantifying the level of safety and performance required and proposing an initial architecture description.

PODIUM

Proving Operations of Drones with Initial UTM Management
SESAR 2020 VLD



- +185 drone flights
- VLOS & BVLOS
- Urban & rural, airport vicinity
- Uncontrolled & controlled A/S
- Eelde (NL), Odense (DK), Paris & Toulouse (FR)

- **U-space** blocks
 - Foundation U1
 - Initial U2
 - Some advanced U3
- Situational awareness
- Tracking: Mode-S, L-Band, GSM

- EUROCONTROL (leader), Airbus, DSNA, DELAIR, Drones Paris Region, INAS, Naviair, NLR, Orange, Unifly, + 17 LTPs, + 4 subcontractors

- Demo report = end 2019

- Prep. & Demos = 2018 – 2019

- Kick-Off = Jan 2018

- GA signature = 12 Dec 2017

SECOPS



- The main objective of SECOPS is to define such an integrated security concept for drone operations that ensures that security risks in U-space are mitigated to an acceptable level, in particular:
 1. Drones do not divert from their intended mission, due to unexpected interference.
 2. Drones cannot deliberately be misused for illegal or dangerous activities.
 3. Detect and act when drones are misused (by the pilot or an external party).

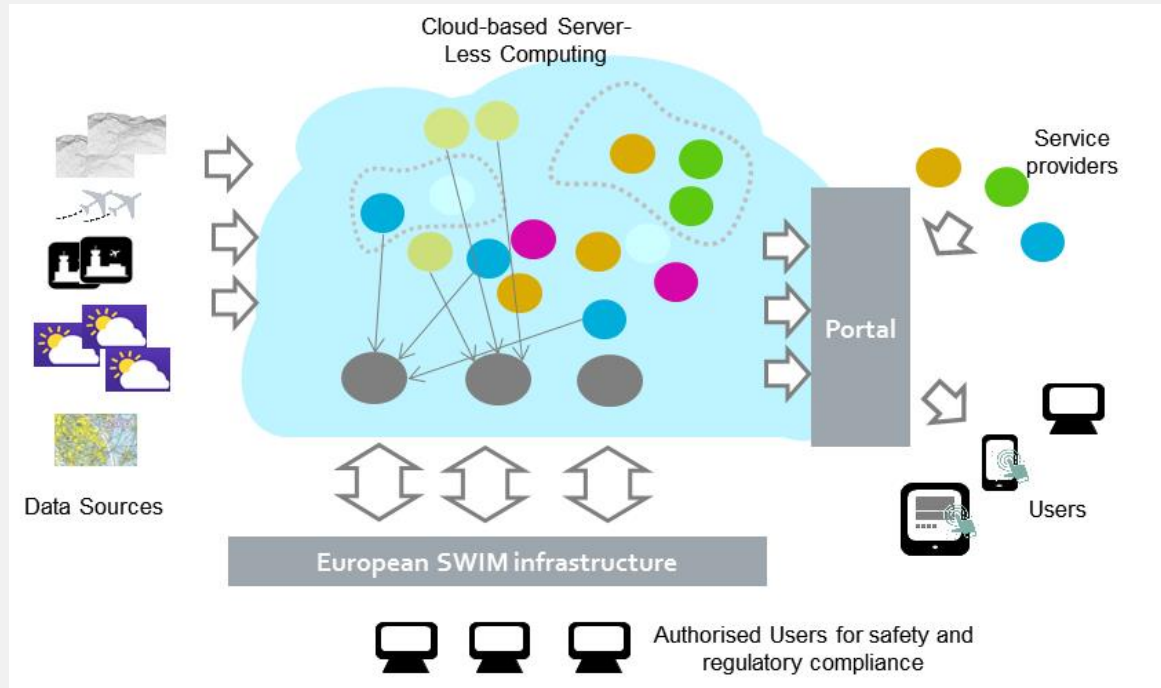
DREAMS



- Fill the gap between the existing information used by traditional manned aviation and the needs of the new unmanned aviation;
- Analyse and simulate present and future real-world applications, to ensure that the system can be scaled as the market for drones grows and the number of applications increases;
- Analyse and validate the technologies related to information exchange that will make possible the implementation of the future U-space concept for the management of drones in Europe

IMPETUS

- Information Management Portal to Enable the inTegration of Unmanned Systems - IMPETUS



Drone Critical Communications - DroC2om

- DroC2om project contributes to the definition of integrated cellular-satellite data link specifications for UASs.
- Design a cellular-satellite system architecture concept, which ensures reliable and safe operation for remote controlled, semi-autonomous and fully autonomous small UAS

CLASS



- Ground based technologies for a real-time unmanned aerial system traffic management system (UTMS) - CLASS



Conclusion

- UAS integration is very complex as it affects all aspects of civil and military ATM
- EUROCONTROL contributions in full support to EC, EASA, EDA, SJU, NATO, ICAO, JARUS
- ICAO and ITU have a major role



Thank You

Questions?

