



Unmanned Aircraft System (UAS): regulatory framework and challenges

NAM/CAR/SAM
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Overview

- Background
- Objective
- UAV?
- Assumptions
- Challenges
- Regulatory Framework
- UAS in ATM System
- Emerging Situational Technologies
- Recommendations

Background





Can an UAS operate in controlled airspace?

Which technologies can be used to reduce the impact?

UAS in civil applications

Improve the regulations for UAS operations



ICAO Global ATM operational concept (Doc 9854)

UAV:

“[a]n unmanned aerial vehicle is a pilotless aircraft, in the sense of Article 8 of the Convention on International Civil Aviation, which is flown without a pilot-in-command on-board and is either remotely and fully controlled from another place (ground, another aircraft, space) or programmed and fully autonomous.”

Objective

- This presentation provides an overview of the regulatory frameworks for the UAS activities and how to ensure safe operations in the ATS system.
- It also addresses regional coordination between States and other stakeholders for UAS operations during natural disaster events.
- It explains future challenges of the UAS into the ATM system.

Assumptions

UAS is another user of the airspace

The ATM should be able to allow the UAS operations

The activities should include both civil and military air operations

The first step is regulatory framework for the UAS in order to ensure safety integrated operations into the ATM system

States to disseminate ATS procedures for UAS air operations



UAVs applications

- Demand of RPAS for Military & civil operations
- International Military operations
- SAR, Coastguard / coastline and sea-lane monitoring
- Fire Services and Forestry Fire detection, incident control
- Owners / operators of model aircraft doing to commercial activity
- Many non-aviation businesses and entities importing RPAS
- Aerial photography, Film, video, still, etc.
- Agriculture Crop monitoring and spraying
- Conservation, Pollution and land monitoring
- Electricity companies, Power, line inspection



- Support the evolution of RPAS for airspace operations.
- Ensure industry development and evolution.
- Determine Class / Category on a case-by-case basis
 - Below 150kg as a starting point
 - size, weight, complexity, human factors, airspace requirements, & operational characteristics
- Publication of regulatory framework
- **Full member participant**

Can an UAV operate in the ATS airspace?

Regulatory

Technological

Safety





Chicago Convention

- ✓ Article 3 *bis* - States to exercise its sovereignty
- ✓ Article 8 - Pilotless Aircraft
- ✓ Article 12 - *Rules of the Air*
- ✓ Article 15 - *Airport and similar charges*
- ✓ Article 29 - *Documents carried in aircraft*
- ✓ Article 31 - *Certificates of airworthiness*
- ✓ Article 32 - *Licenses of personnel*
- ✓ Article 33 - *Recognition of certificates and licenses*



- ✓ Guidance based on the Chicago Convention
- ✓ Same standards as manned aircraft
- ✓ Application of ICAO 19 Annexes requirements
- ✓ Safety Management
- ✓ Remotely-Piloted Aircraft System (RPAS): set of configurable elements
 - associated remote pilot station(s)
 - C2 links
 - software
 - health monitoring
 - ATC communications equipment
 - a flight termination system
 - launch and recovery elements.
- ✓ RPAS operations: in ATS airspace subject to authorization
- ✓ Segregated airspace established by AIP and /or NOTAM
 - Restricted
 - Experimental
 - Special flights



UAV in the ATM system

Although the pilot of a UAV operated outside a militarily hostile environment must maintain A/G communication with the relevant ATC units and obtain appropriate clearances to operate

The Regulatory Requirements for UAV are exactly the same “Rules of the Air” as manned aircraft

This includes a requirement to ‘see and avoid’ other air operations

UAV in the ATM system

Can technologies act as a part of the solution?





- Air Traffic Management & Frequency Spectrum allocation

- ATM regulations and procedures
 - i. Rules of the Air
 - ii. Air-to-ground communication between ATS/ATC and RPAs
 - iii. Ensure communication between RPAS pilot and ATS/ATC station
 - iv. Timely training for ATS/ATC Personnel



Why technologies?

- UAVs operate in combined civil and military airports
- Most of airports share the same airport infrastructure
- The UAVs will follow the ATS routes and execute approach procedures?



Emerging situational awareness technologies

ACAS / TCAS

ASAS

ADS-B

Emerging Technologies to reduce the impact

- Which technologies can be used to reduce the impact?
- An UAV can be equipped with a TCAS?
- The RA would be sent to the remote pilot in order to execute the requested maneuver or to other flights as done currently.





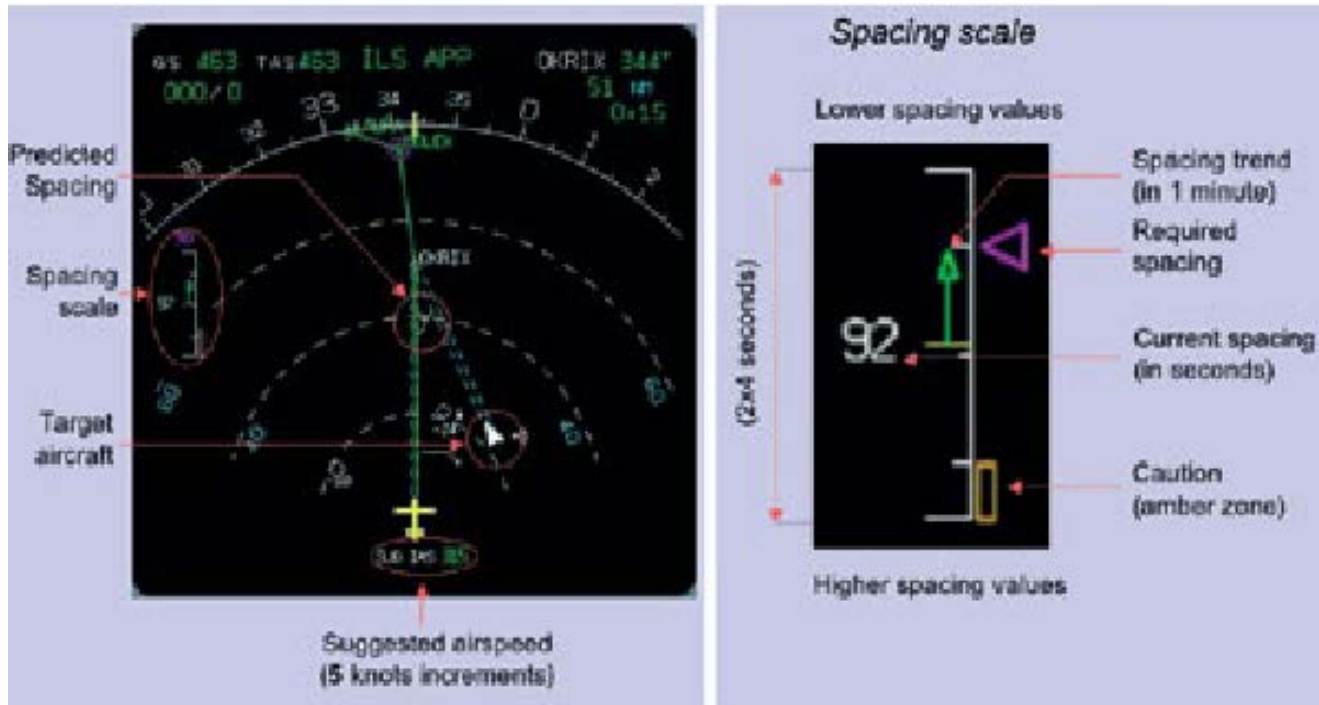
Emerging technologies

Airborne Separation Assistance System (ASAS)

Airborne Surveillance (AS) applications facilitate situation awareness to air operators as well as to ground operators

- **An UAS based on airborne surveillance that provides assistance to the remote pilot supporting the separation of their UAS from other aircraft, monitoring and controlling aircraft separation.**
- **ASAS provides information to the cockpit (or RP) about the position of surrounding traffic.**
- **In the future this may enable the UAS remote pilot to take over some of the separation tasks of air traffic controllers.**

Airborne Separation Assistance System (ASAS)

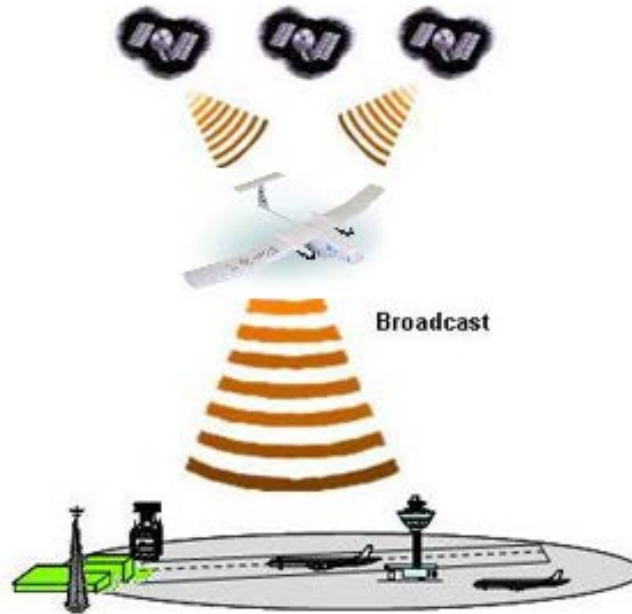


ASAS pages on MCDU for data input

Existing Technologies ...

- ADS-B can be a solution

The UAS could broadcast its position to the other aircrafts and to the ATC.





UAS (unmanned aircraft system) is a reality and its complete adaptation to the ATM system will depend on us....



ATM system should be prepared!

Recommendations

- Regulatory framework for UAS in combined civil and military air operations
- Ensure airports infrastructure when sharing the same airport
- To follow UAS developments and execute the ATS routes and procedures, as applicable
- Safety Management



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CAPACITY & EFFICIENCY

