UNMANNED AIRCRAFT SYSTEMS (UAS)

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International Civil Aviation Organization

- The International Civil Aviation Organization (ICAO) is an United Nations agency created in 1944 by the Convention on International Civil Aviation *(Chicago Convention)* to study international civil aviation problems and to promote regulations and standards unique to world aviation.

Currently comprised of 193 States

NACC ICAO Office (Mexico)

https://www.icao.int/NACC/Pages/ES/default_ES.aspx

NACC Contracting States

ICAO Member States (22):

- Antigua and Barbuda
- Bahamas
- Barbados
- Belize
- Canada
- Costa Rica
- Cuba
- Dominica
- Dominican Republic
- El Salvador
- Grenada
- Guatemala
- Haiti
- Honduras
- Jamaica
- Mexico
- Nicaragua
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Trinidad and Tobago
- United States

Territories (19):

France

- French Antilles (Guadeloupe, Martinique, Saint Barthélemy, Saint Martin, Saint Pierre et Miquelon)

Netherlands

- Aruba, Curaçao, Sint Maarten, Bonaire, Saba, Sint Eustatius

United Kingdom

- Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, Turks and Caicos Islands

United States

- Puerto Rico, Virgin Islands

ICAO Mission

- Facilitating global harmonization by enhancing safety
- Develop standards and recommended practices (SARPs), procedures and guidance to facilitate the safe and efficient integration of aviation and of course remotely piloted aircraft (RPA).
- Maintain the existing safety level for manned aviation.
- Support States in the development of regulations applied to unmanned aircraft operations.
- Open discussion forums to share lessons learned, promote improvements, among others.

UAS Activities

- ICAO has developed and published a UAS regulation model for local use, a template for those States that require regulations for the safe operation of unmanned aircraft that do not undergo traditional aviation certification processes.
- ICAO continues to develop Standards and Recommended Practices (SARPs), procedures and guidance material to facilitate the integration of RPAS into international IFR operations in controlled airspace.

Unmanned Aircraft

Aircraft. any machine that can be sustained in the atmosphere by reactions of the air other than the reactions of the air against the surface of the earth.

Unmanned aircraft. An aircraft intended to be operated without a pilot on board.

ICAO's mission: to facilitate global harmonization increasing safety

Applications in the use of unmanned aircrafts

- Social events (sports, concerts, others)
- Package delivery (Amazon, medicines, others)
- Emergency situations (Applications in remote rural areas, environmental events...)
- Border controls
- Scientific and archaeological research, etc.
- Fire control
- Miscellaneous applications during the pandemic
- Photography, video and cinematography
- Entertainment
- Applications to support equipment certification air navigation
- Obstacle survey
- Support for the development of air navigation procedures
- Support for wildlife control at airports
- Other airport activities
- Air cabs
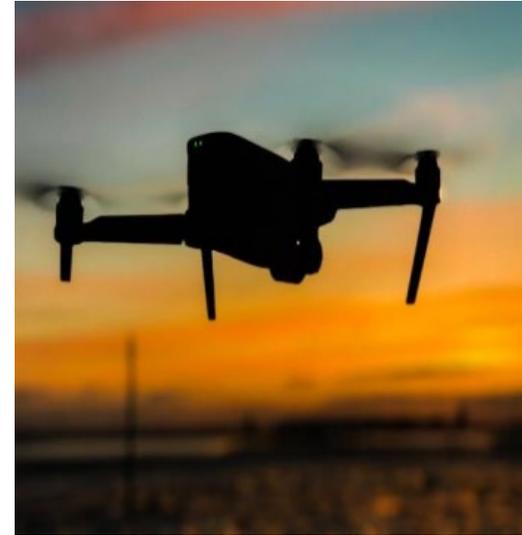
What do we have for the future?

- Increased unmanned aviation activities with more evolved capabilities and technology.
- Accelerating the pace of technological development, e.g. autonomous aerial vehicle with increased use.
- Technology to various applications that will reduce costs and increase efficiency.
- There will be significant economic impacts, especially for those states that are prepared to implement it. The new capability will provide considerable social benefits and cost savings for governments to deliver essential services on a massive scale.

What do we have for the future?

✈ The Association for Unmanned Vehicle Systems International (AUVSI) states that "in the first three years of drone integration, more than 70,000 jobs will be created in the United States with an economic impact of more than $13.6 billion dollars. This benefit will grow through 2025, when we anticipate the creation of more than 100,000 jobs and an economic impact of $82 billion." https://www.auvsi.org/

BOEING 737-800

Challenges

- ✈ Integration of these new aircraft into the airspace alongside manned aircraft.
- ✈ Prevent the use of UAs for illicit activities.
- ✈ Avoid incidents and accidents.
- ✈ Privacy and protection of information.
- ✈ Security, Cybersecurity.
- ✈ Application of the correct legislation for its use.
- ✈ Awareness in its use. Education of the population.
- ✈ Continuous evolution and adaptation to new technologies and applications.
- ✈ To have qualified personnel for its development and application.
- ✈ Implementation of technologies to support the operation of large-scale UAs.

Collision avoidance

Control of flight surfaces

Situational awareness

Human factors

ATC communications

Remotely Piloted Aircraft Systems Section of the International Civil Aviation Organization (ICAO)

Headquartered in Montreal, Canada

https://www.icao.int/safety/UA/Pages/default.aspx

How is ICAO doing?

- ✈ ICAO RPAS Expert Group brings regulators and industry together
- ✈ 26 States from the 6 regions, ensuring geographic representation and diversity of views/development of the stages.
- ✈ Most relevant aviation industry organizations: IATA, ACI, CANSO, EUROCONTROL, EASA, IFALPA, IFATCA, IAOPA, RTCA, EUROCAE, NATO, AUVSI, UVSI
- ✈ The RPAS Expert Group acts as focal point and coordinator of the work on RPAS.

✈ International IFR operations

✈ Controlled airspaces and aerodromes

✈ Global interoperability

  ✈ RPAs to operate alongside manned aircraft as a predictable and cooperative airspace user: the 19 affected Annexes

  ✈ Priority given to the fundamentals for starting international operations

    ✈ Remote pilot license

    ✈ Certificate of Airworthiness

    ✈ C2 Link Link

    ✈ RPAS operator certificate

- Remotely Piloted Aircraft Systems Manual (Doc 10019), under update.
- RPASP (secure portal)
- RPASP Timelines, in update
- ICAO Unmanned Aviation Web Site www.icao.int/safety/UA
  - CONOPS RPAS for international IFR operations
  - UAS Model Regulations
  - U-AID
  - UAS Toolbox
  - UTM Orientation
  - ICAO Webinars

ANNEXES TO THE INTERNATIONAL CIVIL AVIATION CONVENTION

* Annex 1 - Personnel licenses
* Annex 2 - Air Regulations
* Annex 3 - Meteorological Service for international air navigation
* Annex 4 - Aeronautical Charts
* Annex 5 - Units of Measurement
* Annex 6 - Aircraft Operation
* Annex 7 - Aircraft Nationality and Registration Marks
* Annex 8 - Airworthiness
* Annex 9 - Facilitation
* Annex 10 - Aeronautical Telecommunications
* Annex 11 - Air Traffic Services (Annex 12 - Search and Rescue
* Annex 13 -Aircraft Accident and Incident Investigation
* Annex 14 - Aerodromes
* Annex 15 - Aeronautical Information Services
* Annex 16 - Environmental Protection
* Annex 17 - Security: Safeguarding international civil aviation against acts of unlawful interference
* Annex 18 - Safe Transport of Dangerous Goods by Air
* Annex 19 - Safety Management
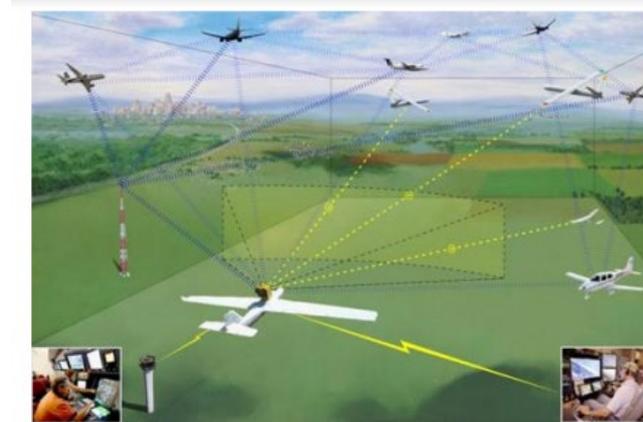
Education is essential

✈ Information on RPAS and other UAS

 ✈ Regulators - what and how to regulate - The industry, including manufacturers - Service providers - Operators and other airspace users - General public

✈ General information is required for each group

 ✈ Specific information on how to operate RPAS/UAS safely - and: where/why some areas are dangerous.

✈ **UNMANNED AIRCRAFT (UA)**
- ✈ Unmanned aircraft (UA) operate as part of an unmanned aircraft system (UAS) that also includes a remote pilot station (RPS), a C2 link for control and management, and other necessary components.
- ✈ UAs include a broad spectrum of aircraft, from unmanned free balloons and model aircraft to highly complex remotely piloted aircraft (RPAs).
- ✈ (RPA), operated by licensed aviation professionals.

✈ **REMOTELY PILOTED AIRCRAFT (RPA)**
- ✈ RPAs are a subset of UAs. Another subset of RPAs is expected to be accommodated and eventually integrated into the airspace
- ✈ for international instrument flight rules (IFR) operations, which will require full regulatory certification.

✈ **SMALL UA**
- ✈ This subset of small unmanned aerial vehicles, generally weighing less than 25 kg, is known as drones.

✈ **UNMANNED FREE BALLOON**
- ✈ This term describes unmanned, unpowered, lighter-than-air aircraft in free flight.

✈ **AEROMODELISM**
- ✈ This term describes small-sized unmanned aircraft, which generally represent a scaled-down version of full-sized aircraft and are used for recreational purposes in the sport and hobby of aeromodeling.
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Aircraft Visual Line of Sight **(VLOS)**
Beyond Visual Line of Sight of the remote pilot **(BVLOS)**
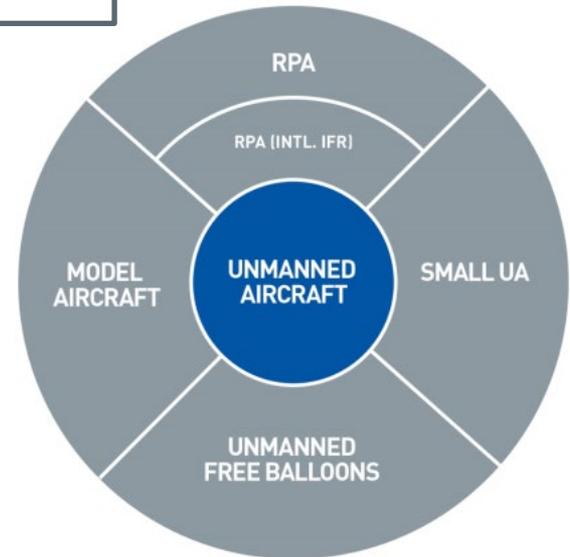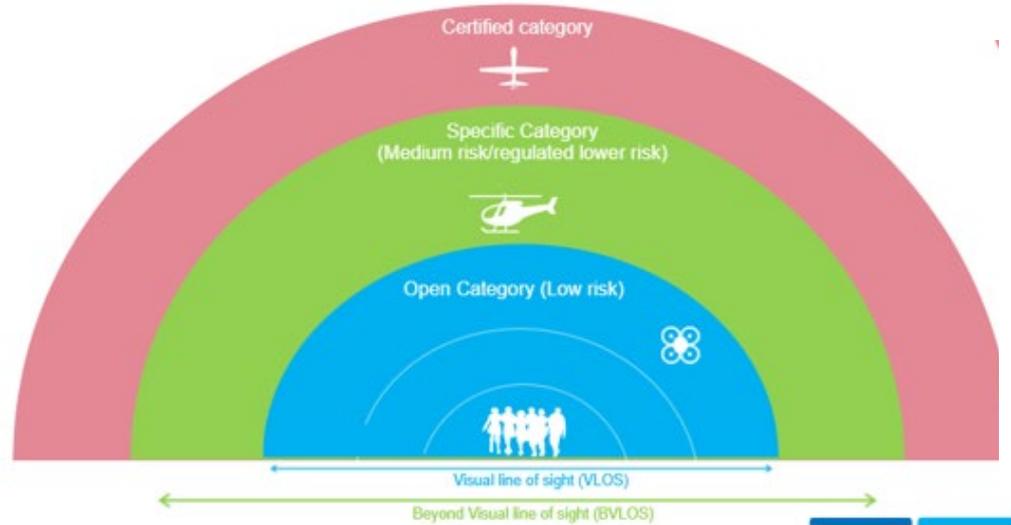
Conclusion

The challenge of integrating unmanned aircraft into the aviation system requires:

Aviation experience

Industry-regulator

Intergovernmental

Global coverage

- Technical expertise
- Intergovernmental frame of reference
- Global geographic coverage
- Regulator and industry cooperation
- Education
- Monitoring and continuous improvement

ICAO SAFETY

Online Course

www.icao.int/training

Air Navigation Services
Unmanned Aviation Fundamentals

21

https://www.icao.int/NACC/Pages/meetings-2020-uas.aspx

Webinar Unmanned Aircraft Systems (UAS) for the NAM/CAR and SAM regions

ICAO TV

ttps://www.icao.tv/

THANK YOU