

ICAO UTM FRAMEWORK

A hand holding a small black drone with four propellers. The drone is centered in the frame. Overlaid on the drone and the background are various digital elements: a green circular light on the drone's body, several circular gauges with numbers like 72%, 54%, 96%, and 82%, and various geometric shapes and lines. The background is a blurred blue with a network of white dots and lines, suggesting a digital or technological theme.

Core Principles for Global Harmonization

17 NOVEMBER 2020

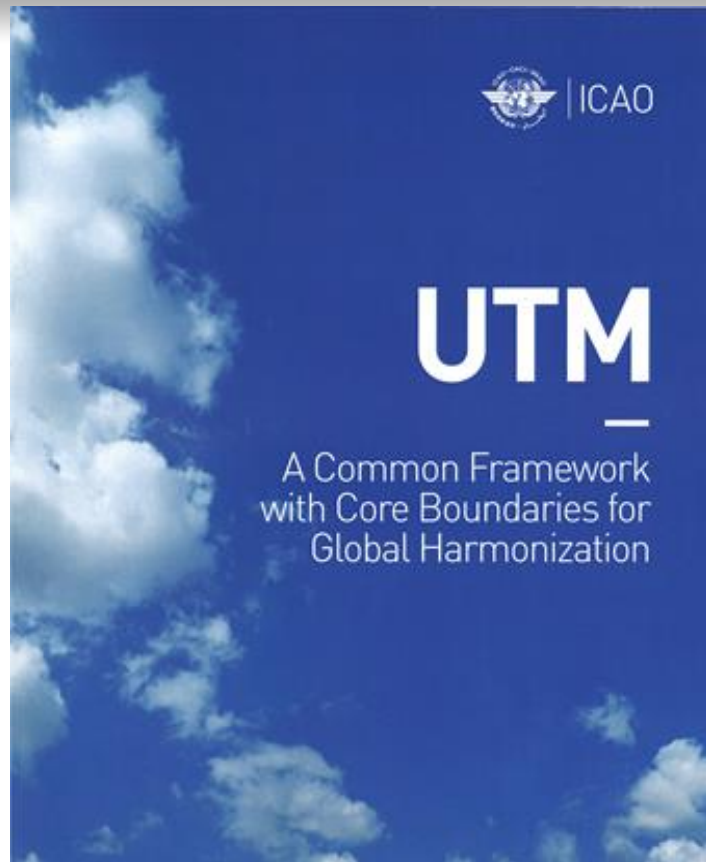
BACKGROUND

- 2015 – States started requesting that ICAO address UAS issues
 - Since then, formal requests were raised during several key events
- Recognized that existing ICAO processes could not keep up with the pace of technology
- UAS-AG formed to address these challenges
- Initial UAS-AG work included the development of ICAO UAS Toolkit
- Once Toolkit completed, UAS-AG moved onto UTM activities
- Several innovative approaches were adopted
 - UTM RFI Process
 - DRONE ENABLE Symposia



ICAO's UTM FRAMEWORK

- A framework and core capabilities of a “typical” UTM system
- Need to interact/integrate with ATM systems
- High level UTM requirements/considerations
- Not a technical solutions document
- Developed in collaboration with industry/academia



UTM FRAMEWORK - OBJECTIVES

- Foster common framework and harmonization of core UTM principles
- Maintain safety and minimize disruption to existing aviation system
- Support technological developments in UTM and UAS
- Provide safety-focused recommendations for UTM system development
- Address security and environmental risks
- Enable stakeholders to grow safely and efficiently





UTM FRAMEWORK – MAIN DOCUMENT

Provide key principles, scope and building blocks




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SAFETY

PRINCIPLES AND SCOPE

- Oversight is the responsibility of the regulator.
- Existing aircraft prioritization policies should be applicable, and practices unique to UTM should be compatible.
- Access to airspace should remain equitable.
- Key personnel should be trained and qualified.
- States should have unrestricted, on-demand access to critical UTM system data.
- The creation, adoption and maintenance of safety culture among the UTM community is essential.
- Free and open reporting of accidents and incidents should be facilitated for all stakeholders.

UTM FRAMEWORK – MAIN DOCUMENT

A white quadcopter drone is shown in flight, carrying a large white rectangular box suspended from its frame. The drone is positioned in the upper left quadrant of the slide. The background is a blurred cityscape at sunset or sunrise, with warm orange and yellow tones. Two text boxes are overlaid on the right side of the slide.

Provide key principles, scope and building blocks

Define/describe the various services to be provided

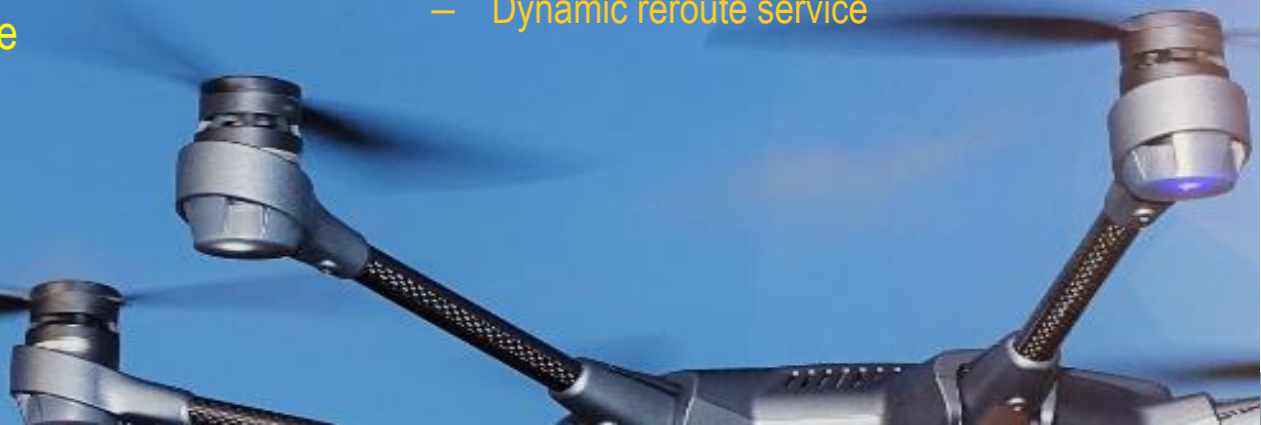


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SAFETY

SERVICES

- Activity reporting service
 - Aeronautical Information Management
 - Airspace authorization
 - Discovery service
 - Mapping service
 - Registration service
 - Restriction management service
 - Flight planning service
 - Identification service
 - Tracking and location service
 - Meteorological service
- Conflict management and separation service
 - Strategic deconfliction service
 - Tactical separation with manned aircraft service
 - Conflict advisory and alert service
 - Conformance monitoring service.
 - Dynamic reroute service



UTM FRAMEWORK – MAIN DOCUMENT



Provide key principles, scope and building blocks

Define/describe the various services to be provided

Identify complementary concurrent activities




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SAFETY

CONCURRENT/ENABLING ACTIVITIES

- Develop a regulatory approach that is performance- and risk-based
- Development of and compliance with standards data management
- Optimization of common and shared airspace
- Optimization of frequency spectrum
- Application of appropriate assurance standards (e.g. cybersecurity or software assurance level)
- Prescribe/promote appropriate education, guidance and usage standards
- Ensure AIS or GIS data is trusted, accurate and timely
- Develop common horizontal, vertical and temporal reference sources

UTM FRAMEWORK – MAIN DOCUMENT



Provide key principles, scope and building blocks

Define/describe the various services to be provided

Identify complementary concurrent activities

Identify gaps/issues/challenges

GAPS/ISSUES/CHALLENGES

GAPS

- Airspace classification
- Rules of the Air
- Airspace access
- Operational procedures
- Liability determination
- UTM system certification
- Data standards
- Contingency management



GAPS/ISSUES/CHALLENGES

ISSUES

- Airspace/procedure design
- Frequency spectrum availability and supportability
- Provision of service may change airspace classification
- UTM and ATM interface
- Data exchange and privacy protocols




GAPS/ISSUES/CHALLENGES

CHALLENGES

- Capability to identify/detect and avoid conflicting aircraft
- Enhanced detectability/conspicuity of UA by manned aviation
- Development of separation standards within the UTM
- Policies to address means of compliance or system approval
- Implementation/maintenance of a safety management system
- Forecasting and dissemination of micro-weather



UTM FRAMEWORK – MAIN DOCUMENT



Provide key principles, scope and building blocks

Define/describe the various services to be provided

Identify complementary concurrent activities

Identify gaps/issues/challenges

Appendices address specific topics or problem areas

UTM FRAMEWORK – RFI BASED CONTENT

EDITION 1

- Registration, identification and tracking
- Communications systems
- Geofencing-like systems
- Potential architectures

EDITION 1

UTM FRAMEWORK – RFI BASED CONTENT

EDITION 2

- UTM-ATM boundaries and transitions
- Information exchange between ATM and UTM

EDITION 2

UTM FRAMEWORK – RFI BASED CONTENT

EDITION 3

- Structure and approval processes for UTM service providers
- Separation and deconfliction in UTM
- UTM risk assessment/contingency procedures

EDITION 3

UTM FRAMEWORK – RFI BASED CONTENT

EDITION 4 (RFI STAGE)

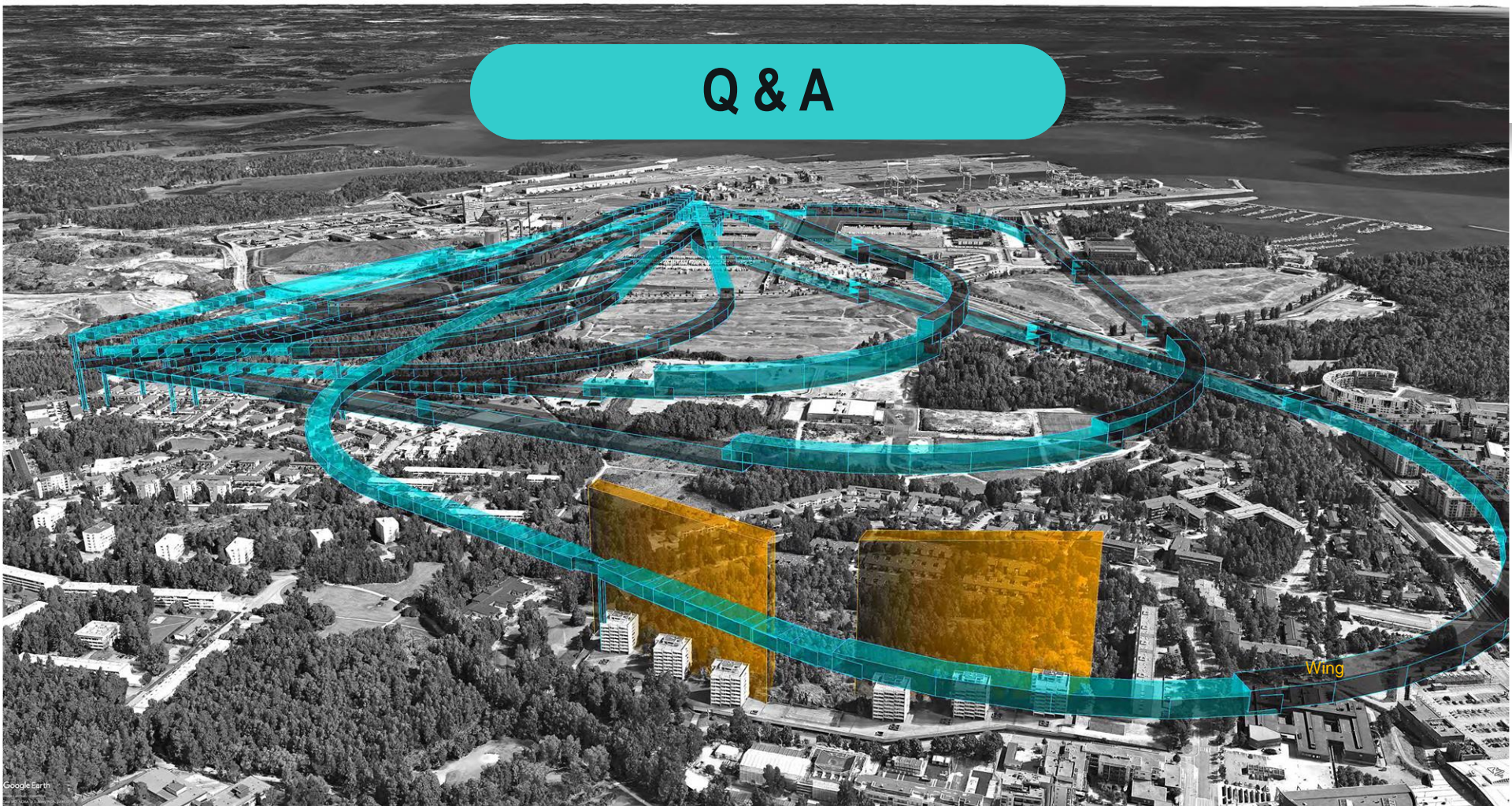
- UA performance requirements in a UTM environment
- UTM system certification requirements
- UTM integration into aerodrome environments/activities
- Update to earlier Appendices

EDITION 4
DRAFT STAGE

RFI available on ICAO's Unmanned Aviation page

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

Q & A





ICAO

SAFETY

www.icao.int/safety/UA

Model UAS Regulations

***Humanitarian Aid &
Emergency Response
Guidance***

UTM Guidance Edition 2

UAS Toolkit



The screenshot shows the ICAO Safety Unmanned Aviation website. At the top, there is a navigation bar with links for English, Français, ICAO Store, and a shopping cart icon. Below this is a search bar. The main header features the ICAO logo and the word 'SAFETY' in large, bold letters. A horizontal menu contains links for About ICAO, Global Priorities, Meetings and Events, Information Resources, Careers, UnitingAviation, and Subscribe. The breadcrumb trail reads 'ICAO / Safety / Unmanned Aviation'. The left sidebar lists various resources under the heading 'Guidance', including Model UAS Regulations, Humanitarian Aid & Emergency Response Guidance, UTM Guidance, Edition 2, UAS Toolkit, RPAS CONOPS, UAS for Humanitarian Aid and Emergency Response Guidance or U-AID, Expert Groups, Remotely Piloted Aircraft Systems Panel (RPASP), Task Force on Unmanned Aircraft Systems for Humanitarian Aid and Development (TF-UHAD), Unmanned Aircraft Systems Advisory Group (UAS-AG), Unmanned Aviation Bulletin, ICAO's upcoming Meetings and Events page, and RPAS Workshops. The main content area is titled 'Unmanned Aviation' and contains two paragraphs: 'This website has been designed to showcase ICAO's ongoing developments related to the full breadth of unmanned aviation.' and 'This site also facilitates the exchange of unmanned aviation related information, meetings and resources.' Below the paragraphs are social media sharing icons for Facebook, Twitter, LinkedIn, and YouTube. At the bottom right, there is a URL bar showing 'https://www.icao.int/sa'.



DRONE ENABLE 2021 (Virtual)

13, 14, 15, 20, 21 April 2021

www.icao.int/Meetings/DRONEENABLE4

THANK YOU FOR YOUR PARTICIPATION

