CIVIL/MILITARY
"Working Together for a Common Future"

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NATO Headquarters, Brussels, Belgium

24 March 2015

NATO Structure – NATO International Staff

Purpose – Why are RPAS important to NATO

NATO RPAS Structure

NATO's Standardization Efforts

NATO Alliance Ground Surveillance (AGS)

NATO RPAS Airspace Integration IPT

North Atlantic Council

All matters related to use of airspace & operation of airports

ICAO
EC/DG MOVE
EUROCONTROL
EDA
U.S. FAA
IATA

Air Traffic Management Committee (ATMC)

NATO Military Authorities
Other NATO Committees, Bodies and Agencies

DI/A&ACap

NATO International Staff
International Military Staff
NATO Military Authorities

NATO's interface with civil aviation

Including:
- **Procedures for safe and expeditious air operations**;
- **Airspace design, management and control**;
- **Provision of air navigation and airport services during NATO-led operations**;
- **Military-Military interoperability, standardisation and civil-military coordination**;
- **Airborne/ground aeronautical communication, navigation and surveillance (CNS)**;
- **Remotely Piloted Aircraft/Unmanned Aircraft Systems.**

"Major world powers are expected to have much larger drone fleets by 2022, and unmanned systems could make up 50 percent of the aircraft of some militaries by 2030"

"Projections that research and development spending on UAS — a key indicator of acquisition trends — will reach about $5.2 billion by 2022 for Western European countries, including France, Italy and Britain. But it notes that fiscal considerations could limit those nations."
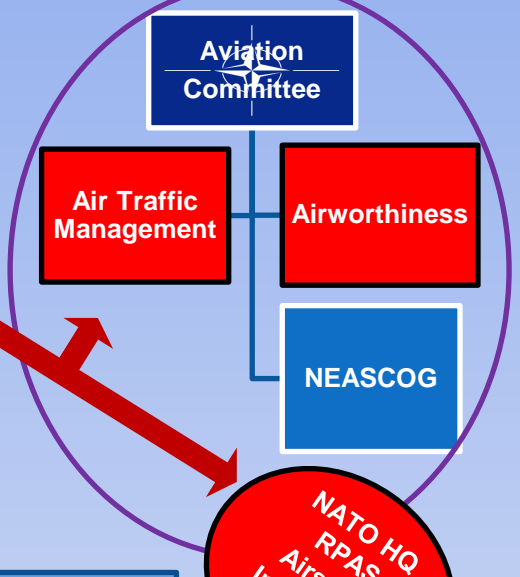
Source: Forecast International
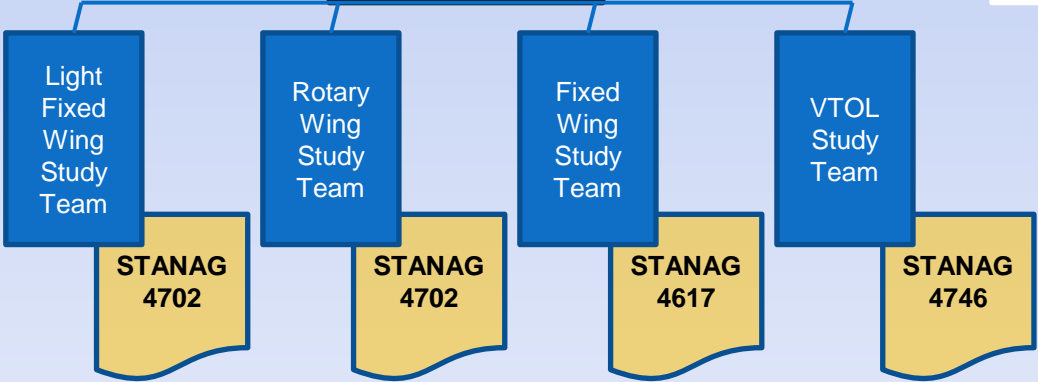
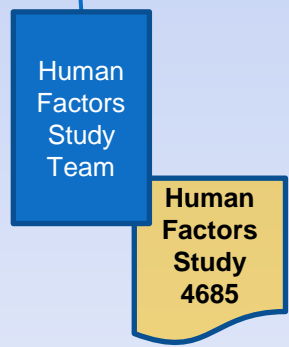NATO's RPAS Structure
"Abundance of RPA Activities"

- Military Committee
- Conference of National Armaments Directors
- Military Committee Air Standardization Board
- NATO Naval Armaments Group

Joint Capability Group on UAS (JCGUAS)

- Operations
- Technical

Flight in Non-Segregated Airspace (FINAS)

- ICAO Annex Gap Analysis
- NATO Industry Advisory Group SAA Study

Aviation Committee
- Air Traffic Management
- Airworthiness
- NEASCOG

NATO HQ RPAS Airspace Integration IPT

Airworthiness Standards
- Light Fixed Wing Study Team — STANAG 4702
- Rotary Wing Study Team — STANAG 4702
- Fixed Wing Study Team — STANAG 4617
- VTOL Study Team — STANAG 4746

Human Factors
- Human Factors Study Team — **Human Factors Study 4685**

Sense & Avoid
- Sense & Avoid Study Team — Human Factors Sub-Group
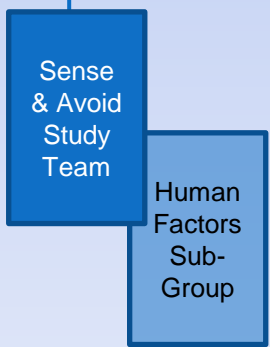
NATO Standardization Activities

Airworthiness,
Light VTOL
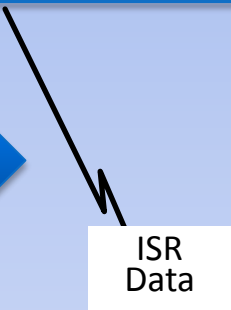(STANAG 4746)

Airworthiness,
"Lite" UAS
(STANAG 4703)

Airworthiness,
Rotary Wing
(STANAG 4702)

Airworthiness,
Fixed Wing (STANAG 4671)
Weapons Integ. (STANAG 4737)

Interoperability,
(STANAG 4586)

Data Link
(STANAG 4660)

ISR
Data

C2

NATO UAS CLASSIFICATION

Class	Category	Normal Employment	Normal Operating Altitude	Normal Mission Radius	Primary Supported Commander	Example Platform
Class III (> 600 kg)	Strike/Combat*	Strategic/National	Up to 65,000 ft	Unlimited (BLOS)	Theatre	Reaper
	HALE	Strategic/National	Up to 65,000 ft	Unlimited (BLOS)	Theatre	Global Hawk
	MALE	Operational/Theatre	Up to 45,000 ft MSL	Unlimited (BLOS)	JTF	Heron
Class II (150 kg - 600 kg)	Tactical	Tactical Formation	Up to 18,000 ft AGL	200 km (LOS)	Brigade	Hermes 450
Class I (< 150 kg)	Small (>15 kg)	Tactical Unit	Up to 5,000 ft AGL	50 km (LOS)	Battalion, Regiment	Scan Eagle
	Mini (<15 kg)	Tactical Subunit (manual or hand launch)	Up to 3,000 ft AGL	Up to 25 km (LOS)	Company, Platoon, Squad	Skylark
	Micro ** (<66 J)	Tactical Subunit (manual or hand launch)	Up to 200 ft AGL	Up to 5 km (LOS)	Platoon, Squad	Black Widow

Command & Control

Training
(STANAG 4670)

Human Systems
Integration
(STANAG 4685)

NATO RPAS Engagement Snapshot

Airspace Integration

IPT
Short-Term Operational Solutions

- *SOPs*
- *Exercise Programme*
- *Engagement Teams*
- *Diploclearences*
- *Trans-Atlantic link*

FINAS
Standards and Technical Enablers

- *Airworthiness requirements*
- *Human Factors*
- *Sense/detect and avoid*
- *Criteria to mitigate safety risks*

ATMC
Procedures

- *Airfield operations*
- *"Due regard" policy*
- *Security - Counter UAS*
- *OATTS*
- *NATO Airworthiness Policy*

Capability Integration

JCGUAS
Technical Standards

- *Weapons employment*
- *Standard interfaces for C2*
- *Casualty evacuation*
- *C-IEDs*
- *Counter UAS*
- *Cargo*
- *Air-to-Air refuelling*
- *Air-to-Air combat*
- *Minimum Navigation Performance*

ATMC-C3B
CNS requirements

- *CNS equipage*
- *PBN*
- *Frequency spectrum*

Operational Interoperability

JCGUAS
Operational Standards

- *Concept of operations*
- *Doctrine and TTPs*
- *Employment standards*
- *UAS Classification*
- *Terminology*
- *Integration in coalition operations*
- *Crew training and employment*
- *Logistics*

CNAD
Joint Main Armaments Groups

- *Defence against Slow and Small Unmanned Aircraft*

Better Coordination- Better Synergies

NATO Alliance Ground Surveillance (AGS)

- NATO is acquiring an Alliance Ground Surveillance (AGS) system that will give commanders a comprehensive picture of the situation on the ground;

- As part of the AGS system, NATO will acquire five remotely piloted aircraft – Global Hawks and associated command and control stations;

- In addition, UK and FR are providing "Contributions in Kind;"

- Enables Alliance to perform persistent surveillance over wide areas from high-altitude, long-endurance, unmanned aerial platforms operating at considerable stand-off distances and in any weather or light condition;

- Main operating base will be located at Sigonella Air Base in Italy, which will serve a dual purpose as a NATO Joint Intelligence, Surveillance & Reconnaissance (JISR) deployment base and data exploitation and training centre.

Air

RPA   Command & Control

Ground

Mobile   Transportable   Mission Ops Support   Maritime

Support

RPA Training   Ground Training   Initial Spares

NATO OTAN

AEROSPACE CAPABILITIES

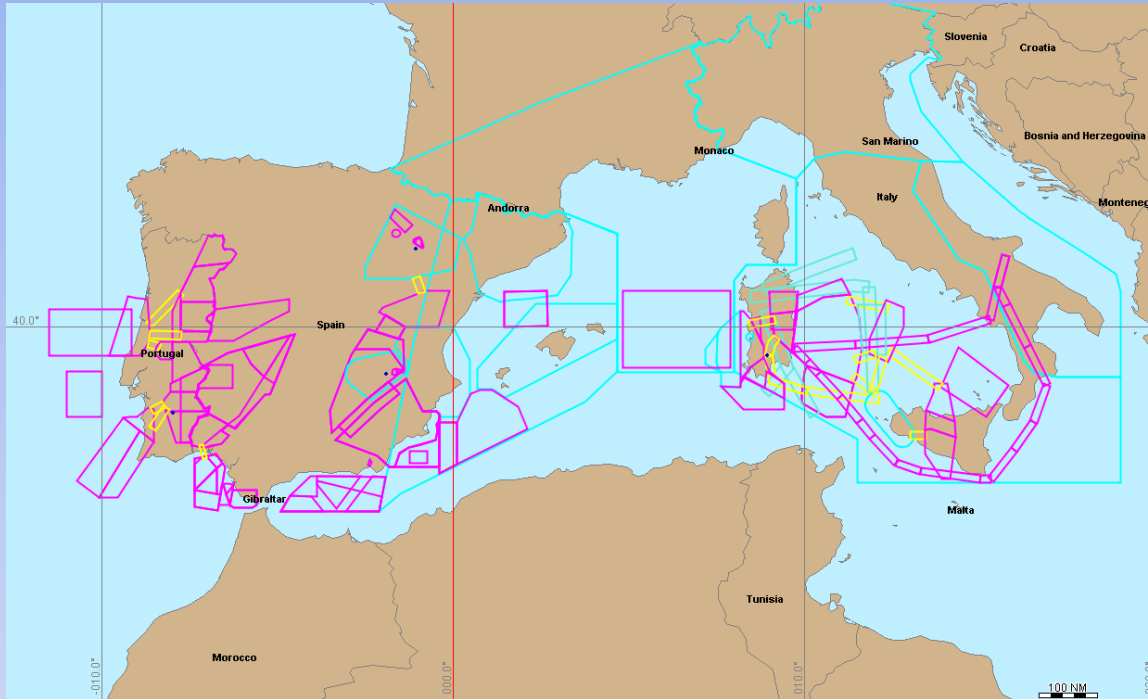## Key Issues Identified

- ❑ AGS SOP Testing
- ❑ National Aviation Laws
- ❑ Diplomatic Clearance
- ❑ Airworthiness Certificates
- ❑ Safety criteria
  - ➤ Avoid Congested areas
  - ➤ Night flights
- ❑ Air traffic data
- ❑ Airspace structures
- ❑ Contingencies
- ❑ Divert Airfields
- ❑ Ditching Points
- ❑ Transfer Control Points
- ❑ Frequency Clearance
- ❑ Aeronautical Information
- ❑ Flight Plan
- ❑ Plotting of detailed route and contingencies
- ❑ Timelines – detailed travel time

Near-time and specific goals for UV14:
- ➤ Gain agreement from nations to activate and operate routing(s) for U.S. Global Hawk flights from Sigonella to neighboring nations in support of UV14;
- ➤ Agree to handle U.S. GH in accordance with any U.S./national bi-lateral agreements, NATO SOPs and other applicable national regulations.

- ❑ Major exercise agreed at NATO SUMMIT held in Chicago, USA, 2012
- ❑ TRJE15 LIVEX part will take place between 21Oct and 05 Nov 2015 in the airspace of Portugal, Spain, France and Italy.
- ❑ Practice close cooperation, coordination, and liaison with Host Nations and local authorities, as well as international and non-governmental organizations, within the context of NATO's contribution to a Comprehensive Approach.

- ➢ Use current procedures – Use airspace as per AIP
- ➢ RPAS Airspace Integration
  - ➢ Procedures
  - ➢ Areas
  - ➢ Cooperation with EUROCONTROL/NM

Short-term operational solutions for airspace integration

Chapter 1 – General Guidance

- **Purpose**
- **Applicability and Scope Organisation and Command Definitions**
- **Interpretation of Words**
- **National Arrangements**
- **Crewmember Responsibility**
- **Deviations**
- **Waivers**
- **Applicability**

Chapter 2 – Operating Procedures

- **General**
- **Operational requirements and Air Traffic Rules**
- **Access to airspace**
- **Mission Planning**
- **Airfields**
- **Ground Operations Departure and Arrival**
- **En-route flights**
- **Collision Avoidance**
- **Communications, Navigation and Surveillance Functionalities**
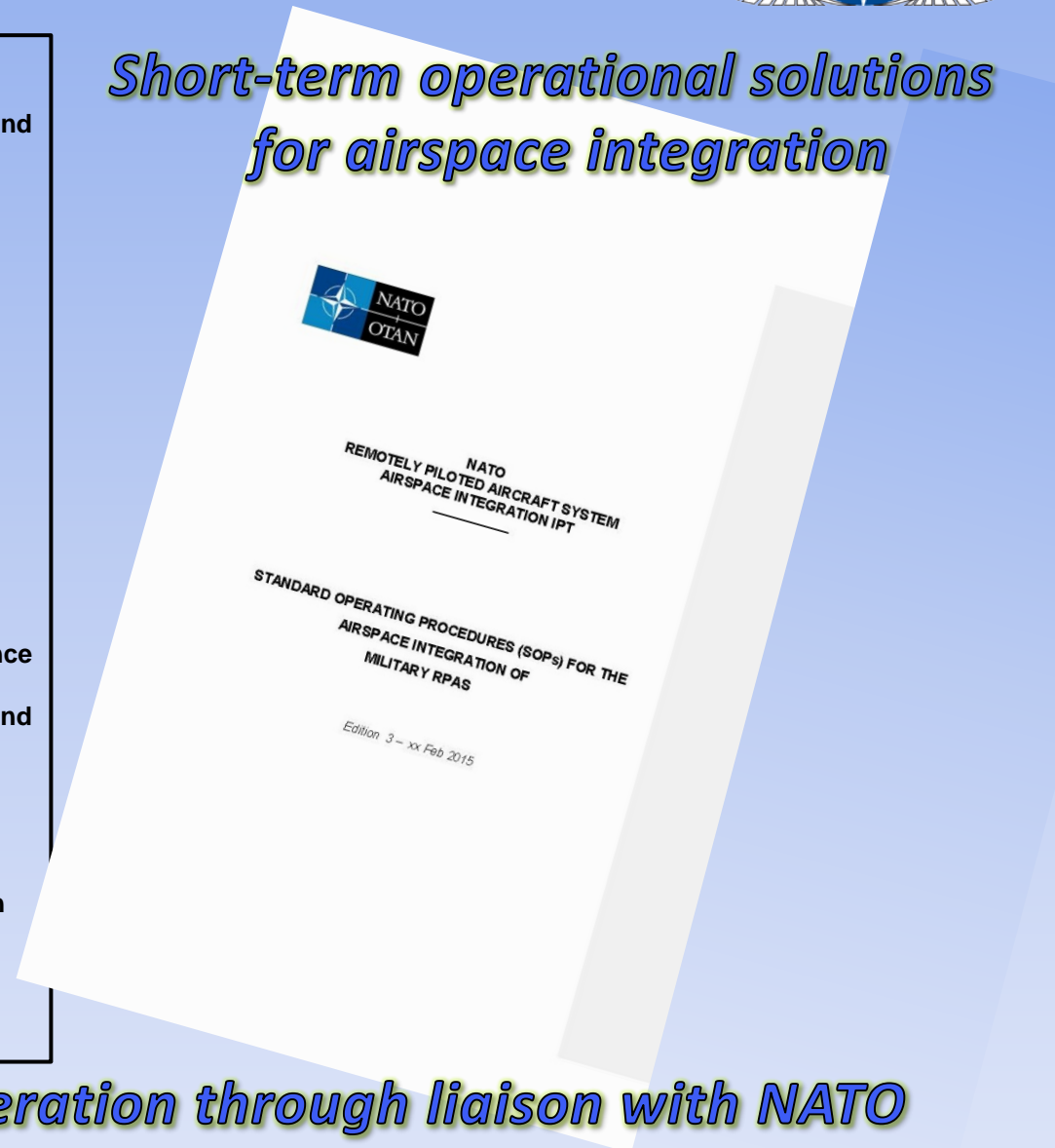- **Radio Communication between Pilot-in-Command and ATC**

Chapter 3 – Emergencies

- **General guidance for Emergency situation**
- **Diversions**
- **Contingences**

Chapter 4 – Documentation and Aeronautical Information

- **En-route Chart and Approach Procedures**
- **Approaches,**
- **Departures and Go-arounds**
- **Termination Points**

NATO
OTAN

NATO
REMOTELY PILOTED AIRCRAFT SYSTEM
AIRSPACE INTEGRATION IPT

STANDARD OPERATING PROCEDURES (SOPs) FOR THE
AIRSPACE INTEGRATION OF
MILITARY RPAS

Edition 3 – xx Feb 2015

Coordination and Cooperation through liaison with NATO

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