RPAS ATM CONOPS

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RPAS ATM CONOPS Status

Aim

- Providing very high level common understanding about the "What"
- The "How" is not part of this CONOPS

Storyline…

- March 2016: Initial draft from EUROCONTROL
- May 2016: Commented by some States
- June 2016: Draft 2 proposed to JARUS
- Currently being commented by JARUS members
- Reviewed draft expected by October 2016

Problem statement

- RPAS are
  - Affecting current aviation traffic
  - Creating new traffic
  - Interacting with population at a larger scale than current aviation

- Other new airspace users have the same kind of impact (Suborbital)

- A dedicated Air Traffic Management CONOPS is required to
  - ***Pave the way*** to future procedures and regulations
  - ***Foster RPAS activity*** whilst providing adequate safety levels for airspace users and ground third parties
  - ***Guarantee that the current airspace users*** will be impacted only if absolutely necessary
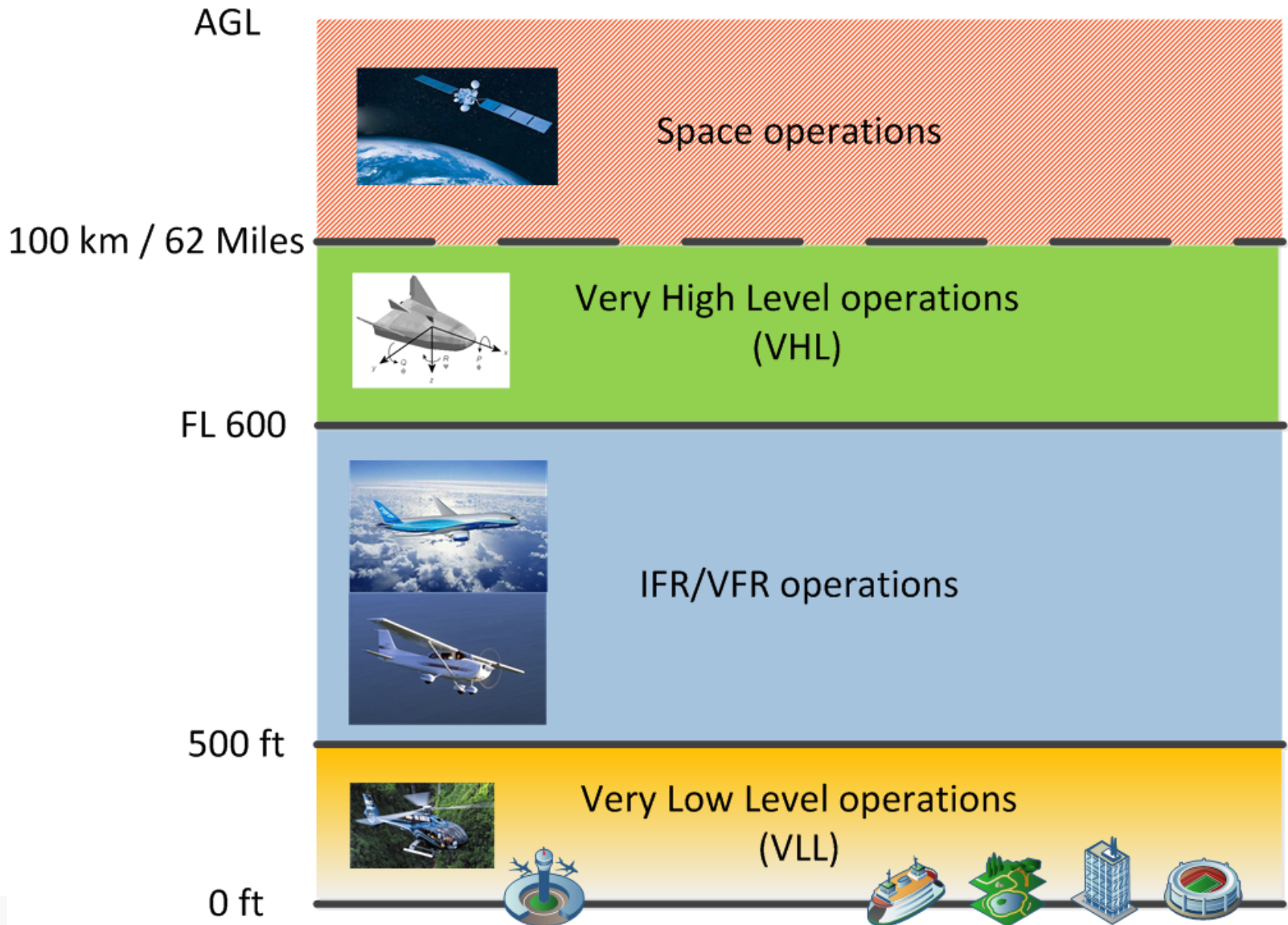
Integration requirements for RPAS: 4 items

- The integration of RPAS shall not imply a significant impact on the current users of the airspace;

- RPAS shall comply with existing and future aviation regulations and procedures;

- RPAS integration shall not compromise existing aviation safety levels nor increase risk: the way RPAS operations are conducted shall be equivalent to that of manned aircraft, as much as possible;

- RPAS specifics must be transparent to ATC and other airspace users

EUROCONTROL RPAS ATM CONOPS

- Is *flexible*: it is independent from continuously evolving scenarios

- Is *generic*: it addresses any RPAS category or technology

- Is *operationally oriented*: it provides an operational ATM perspective based on areas of operations

- Is opening the door to ***standardized contingency procedures***

- Is *based* on the following logic
  - Area of operation
    - **<u>Class of traffic</u>**
      - Class of airspace
        - Category of RPAS (from EASA CONOPS)

NB: *<u>This CONOPS is a draft, it is as of today not validated</u>.*

Areas of operations as used in this CONOPS

AGL

Space operations

100 km / 62 Miles

Very High Level operations
(VHL)

FL 600

IFR/VFR operations

500 ft

Very Low Level operations
(VLL)

0 ft

What is a "Class of RPAS traffic" ?

As RPAS are very difficult to categorise due to the large variety of shapes, sizes, performance and operations; different traffic classes have been developed to support the management of large numbers of RPAS operations.

A "***Class of RPAS traffic***" is a set of flying rules, operational procedures and system capabilities applicable to

- the RPAS

- to the RPAS operator when operating the RPAS in a portion of the airspace.

- to the Services applicable in that airspace

Services supporting RPAS traffic

Services are external to the operator and they are the backbone of the RPAS ATM system:

- Such services are not unique, but they are interoperable and interdependent;
- CNS services may be separated in C, N and S services;
    - The C service is providing C2 Link service and may contribute to N and S service;
    - The S service is creating the air situation picture of all the tracked RPAS;
- A UTM overarching system is providing the backbone for all the required services; it encompasses several services tailored to the Traffic Classes.
- Those services are separated from the oversight Authority;
- The relevant Authorities (not only aviation) have access on demand and in real time to the services information based on labels and privileges.

RPAS Very Low Level (VLL) operations
Assumptions

- The rules of the air will not be adapted for low level RPAS operations at this altitude, thereby **maintaining the 500ft boundary** as implemented around the world already.

- A **dedicated supporting RPAS low level ATM management system** is required. Relying on the mobile phone network to reduce the implementation costs is an option.

- A **C2 service** is provided;

- "**Detect and avoid**" and **self separation** capability is implemented;

- The State has executed an **airspace assessment**, defining where RPAS can operate and where not. Geo-fencing is in place;

- **RPAS have tracking capability.**
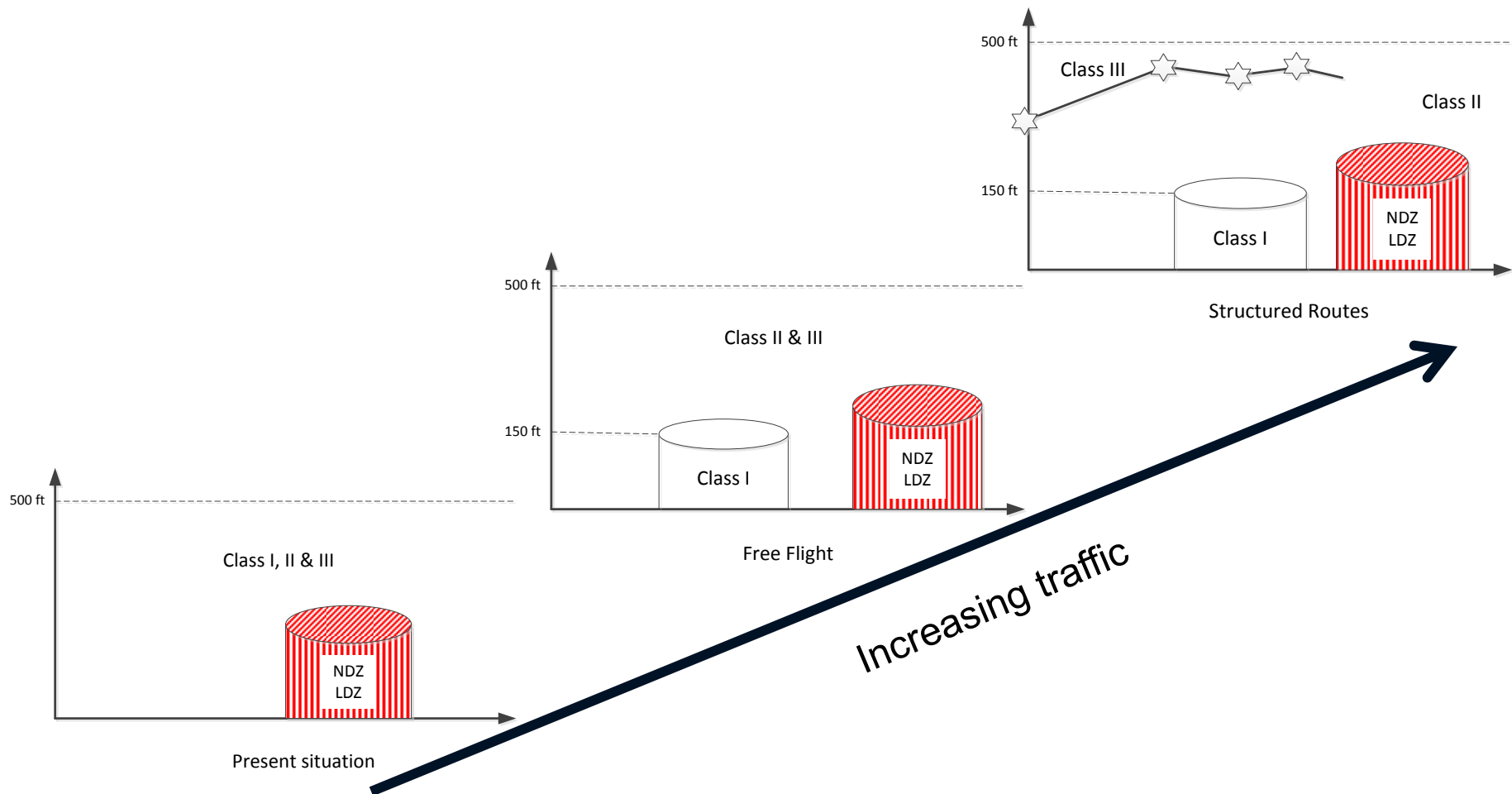
RPAS VLL operations
→ *4 RPAS Classes of traffic*

As RPAS are very difficult to categorise due to the large variety of shapes, sizes and performance, different traffic classes have been developed to support the management of large numbers of RPAS operations.

- Class I: Reserved for RPAS EASA cat A (VLOS only);
- Class II: Free route (VLOS and BVLOS);
- Class III: Organized commercial medium/long haul traffic (BVLOS);
- Class IV: Special operations (this category of RPAS traffic conducts very specific types of operation that will be assessed on a case by case basis. (VLOS and BVLOS).

VLL operations
Operational options supported by the RPAS classes

RPAS VLL operations
Focus on Class IV traffic

Class IV traffic:

- Class IV traffic can operate within the layer between ground and 500ft. This category is designed for highly specialised operations and as such not many of these types RPAS are expected. These can be civil, state or military operations and as such:
    - Should be addressed on case by case basis;
    - Require special authorisation;
    - Could require tracking capability;
    - Must be able to remain clear of all other traffic;
    - May have priority on manned aviation depending on the mission type

IFR/VFR CONOPS
2 RPAS Classes of traffic

Class V:

- Class V is IFR/VFR operations outside the Network not flying SIDs and STARs. In this environment, RPAS not meeting Network performance requirements will be able to operate without negatively impacting manned aviation. Operations at airports will be accommodated through segregation of launch and recovery.

Class VI:

- Class VI is IFR operations, including Network, TMA and Airport operations with RPAS capable of flying SIDs and STARs as designed for manned operations. These are either manned transport aircraft enabled to fly unmanned with similar capabilities or new types able to meet the set performance requirements for the Network, TMA and airports.

Very High Level operations
Subcategory of IFR operations → Class VII

Very High Level (VHL) Operations

➢ Suborbital unmanned flights operating at altitudes above FL 600 will be growing fast in numbers as private companies have projects to use that upper airspace. Business range goes from Telecommunication service to space tourism

➢ No VFR is anticipated because of high speed or low manoeuvrability of the vehicles

Class VII:

▪ Class VII consists solely of IFR operations **above FL600 and transiting in non-segregated airspace**.

▪ These types of RPAS are solely designed for operations at very high altitudes. The launch and recovery of fixed-wing RPAS can be from dedicated airports and outside congested airspace.

Update on harmonized civil regulations and standards

JARUS documents status

Web publication Ref	N°	Doc	WG	Title	Description	Status	Date published
JAR doc	01	JAR-DEL	WG3	**Certification Spec for LURS**	Certification Specification for Light Unmanned Rotorcraft Systems	Published	30/10/2013
JAR doc	02	JAR-DEL	WG5	**RPAS C2 Link RCP**	Guidance material to explain the concept of C2 link RCP and identify the requirements applicable to the provision of C2 communications.	Published	10/10/2014
JAR doc	03	JAR-DEL	WG1	**FCL Recommendations**	The document aims at providing recommendations concerning uniform personnel licensing and competencies in the operation of RPAS	Published	09/09/2015
JAR doc	04	JAR-DEL	WG6	**AMC RPAS 1309 (package)**	Document developed as an integral part of a type-certification process. It is a means of compliance to a 1309 airworthiness requirement.	Published	01/11/2015
JAR doc	05	JAR-DEL	WG3	CS-LUAS	It provides recommendations for States to use for their own national legislation, concerning Certification Specification for Light Unmanned Aircraft Systems.	Internal Consultation	
JAR doc	06	JAR-DEL	WG6	SORA	Specific Operations Risk Assessment. Recommends a risk assessment methodology to establish a sufficient level of confidence that a specific operation can be conducted safely.	Internal Consultation	

JARUS documents status

Web publication Ref	N°	Doc	WG	Title	Description	Status	Date published
JAR doc	**07**	**JAR-DEL**	**WG5**	**CPDLC**	The Controller Pilot Data Link Communications document is meant to summarize the most relevant information about CPDLC and the supported ATS services, and to associate them with RPAS operations.	Published	20/06/2016
JAR doc	08	JAR-DEL	WG4	Detect and Avoid	This document describes the methods to derive design objectives for DAA systems based on airspace requirements.	Internal Consultation	
JAR doc	09	JAR-DEL	WG7	RPAS Operational Categorization	Categorization scheme that describes the level of regulatory involvement for the varying types of UAS and UAS operations.	Internal Consultation	
JAR doc	10	JAR-DEL	WG1	FCL GM	Guidance material to the JARUS FCL Recommendation	Internal Consultation	
JAR doc	11	JAR-DEL	WG4	Detect & Avoid CONOPS for VLL operations	It is intended to allow for further developments and elaboration of the operational concept for UAS at VLL	Internal Consultation	
JAR doc	12	JAR-DEL	WG5	Required Link Performance RLP	This documents updates JAR-DEL-02 to be consistent with ICAO terminology used in ICAO RPAS Panel	Internal Consultation	

ICAO documents status

Publication Ref	N°	Doc	WG	Title	Description	Status	Date published
ICAO Circular	**328**	**Circular**	**UASSG**	**Unmanned Aircraft Systems (UAS)**	This circular was the first attempt to provide a global understanding of UAS	Published	2011
ICAO Manual	**10019**	**Manual**	**UASSG**	**Manual on Remotely Piloted Systems (RPAS)**	This documents provides a detailed description of the RPAS functionalities, subsystems and operational interactions.	Published	2011
ICAO Annex	all	Annex	RPASP	Update of the annexes to the Chicago Convention	The introduction of the RPAS as a new airspace user implies significant changes in several annexes and especially annexes 2, 6, 8 and 11.	Candidate SARPS to be provided by November 2017	Expected publication 2020
ICAO Manual	10019 V2.0	Manual	UASSG	Manual on Remotely Piloted Systems (RPAS)	To reflect the changes in the Annexes	On going	Expected publication 2019