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RPAS: The European Approach

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On recommendation of ICAO, the terms Remotely Piloted Aircraft (RPA) & Remotely Piloted Aircraft Systems (RPAS) are used in this presentation [instead of Unmanned Aircraft (UA) & Unmanned Aircraft System (UAS)].



Presentation Outline



- 1 What are we NOT talking about?
- 2 What are we talking about?
- 3 Aerial Operations
- 4 RPAS Examples
- 5 Regulatory Responsibility
- 6 National Aviation Authorities
- 7 Current Regulatory Status
- 8 Survey on Civil RPAS Operations
- 9 European RPAS Roadmap
- 10 Recommendation to the
Photogrammetry Community

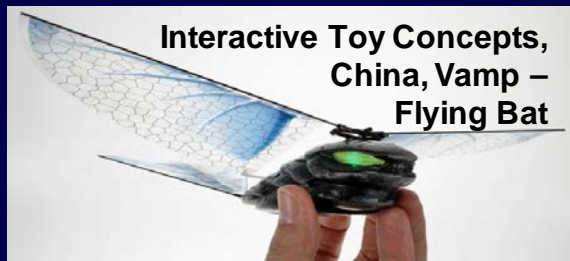


We NOT Talking About



Flying objects used for RECREATIONAL purposes

Toys



Model Aircraft (<20-25 kg & >20/25 & <150kg)



Very Large Model Aircraft (> 150 kg)





What are we talking about?



Remotely Piloted Aircraft Systems (RPAS)


The key word: **Aircraft**

RPAS	RPA & Payload		Pilot Station	Data Link	(Launcher)	
RPA Types	RPA	OPA (Optionally Piloted A/C)		CPA (Converted Piloted A/C)		
Airframe Types	Fixed Wing Multi Rotor	Rotary Wing Flapping Wing	Parafoil Wing Tethered	Light-than-Air +		
Take-off Mass	17 gr - 14.630 kg (incl. Fuel) (<i>currently operational RPA</i>)					
Flight Control	Manual	Automatic	Manual & Automatic		VFR	IFR
Command & Control	VLOS	E-VLOS	VLL BVLOS (alt. <500 ft)		RLOS	BRLOS
	< 500 ft	< 500 ft	BVLOS (alt. >500 ft)		(Relay & Satellite)	

Affordable Flight Hour Cost = **Viable Business Case**
Societal Benefits **Job Creation**



AERIAL OPERATIONS – ♦ Indicates RPAS Operations

Governmental	M U T U A L I Z A T I O N	Military			◆	N O N M I L I T A R Y R P A S O P E R A T I O N S		
		Non-Military	State Flights <i>Security-related</i>	Police Customs Border Guard Coast Guard	◆ ◆ ◆ ◆			
			Not State Flights <i>Safety-related</i>	Civil Protection Fire Fighters	◆ ◆			
Non-Governmental	Public	European Union	Flights on behalf of a public EU agency (no national oversight)	◆				
	Commercial Air Transport		Scheduled Air Service Non-scheduled Revenue Ops. Non-revenue Operations					
	General Aviation Pleasure		Corporate Operations Flight Training/Instruction					
	Aerial Work / Specialised Ops <i>Commercial & Non-Commercial & Corporate</i>		Aerial Advertising Aerial Observation Aerial Patrol Aerial Survey & Mapping Agriculture Corporate Operations Fire Fighting Logging / Forestry Photography Search & Rescue Other	◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆	Initially Mainly VLOS & E-VLOS OPS			



EADS Deutschland, Germany – Talarion



Sagem, France - Patroller

**Fixed Wing
RPA
MTOM
> 150 kg**



Thales, UK (U-TACS) – Watchkeeper



Selex ES, Italy - Sky X & Sky Y



EADS DS, France & IAI-Malat, Israel – Harfang



Neuron Consortium, Europe – nEUROn



RUAG, Switzerland & IAI-Malat, Israel
ADS-Ranger



EuroHawk, Germany – EuroHawk
(Northrop Grumman & EADS Deutschland)



General Atomics ASI, USA – Predator



General Atomics ASI, USA – Reaper

**Fixed Wing
RPA
MTOM
> 150 kg**



Boeing, USA – Phantom Eye



OPA

Aurora Flight Sciences, USA – Centaur



Israel Aerospace Industries, Israel – Heron TP



Boeing, USA – Phantom Ray



OPA

Northrop Grumman, USA – FireBird



Northrop Grumman, USA – Global Hawk



Saab, Sweden – Skeldar



LuxCopter, Luxembourg – LuxCopter

**Rotary Wing
RPA
MTOM
> 150 kg**



Schiebel, Austria – Camcopter S-100



Northrop Grumman, USA – Fire X



Boeing, USA – A160 Hummingbird



EADS Cassidian, France – Tanan



KARI, South Korea – SmartUAV



Indra Sistemas, Spain – Pelicano



SurveyCopter, France – Copter 4



Swiss UAV, Switzerland Koax X240

**Rotary Wing
RPA
MTOM
< 150 kg**



Delft Dynamics, Netherlands – RH2 Stern



Flying-Cam, Belgium – Sarah



CybAero, Sweden - APID



Yamaha Motor, Japan – R-Max



HighEye, Netherlands – Chanachopper



Infotron, France - IT 180



AeroVironment, USA – Raven



Flying Robots, Switzerland – Swan

**Various
Airframe
Types
All but one
< 25 kg**



Insitu, Inc, USA – ScanEagle



Gatewing, Belgium – X100



Novadem (for COFICE), France - Helicofice



Skive Aviation, Switzerland – ADS-12



SmartPlanes, Sweden – SmartPlane



IAI-Malat, Israel - Ghost



AeroVironment, USA - Qube

**Multi-Rotor
RPA
MTOM
< 5 kg**



Draganfly, Canada - Draganflyer X6



Microdrones, Germany - MD4-200



AirRobot, Germany - AR120



Aeryon, Canada - Scout



Aermatica, Italy - Anteos

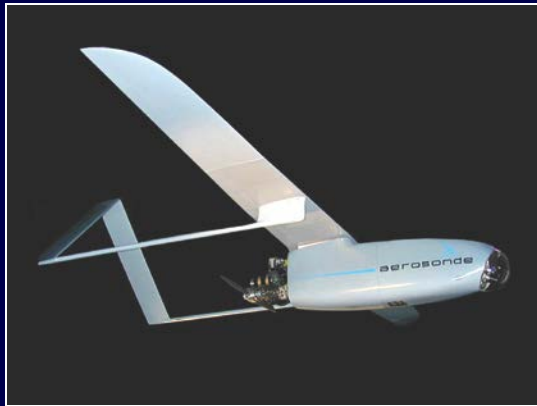


Mikrokopter, Germany - Oktokopter



Astounding Technology

**Small
IS
Beautiful**



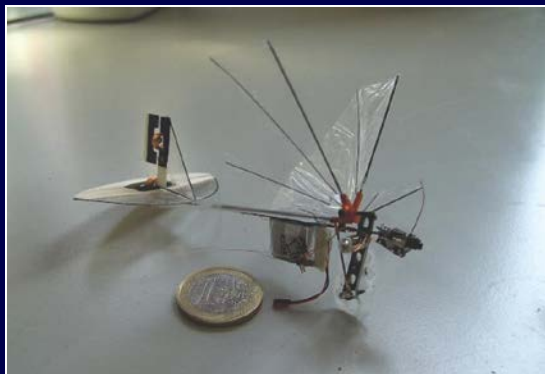
AAI Corp., USA – Aerosonde
(crossed the Atlantic on 5 kg of fuel)



Clear Flight Solutions, Netherlands – Robird
(for scaring birds away from airports)



AeroVironment, USA - Hummingbird



TU Delft, Netherlands - Delfly



ProxDynamics, Norway – Black Hornet
(in service with UK forces in Afghanistan)



UAVFactory, Latvia – Penguin B
(54 hours flight endurance)



EU Regulatory Responsibility



Aircraft MTOM	< 150 kg	> 150 kg
Initial Law	National rules	EASA (Policy 2009 – Part 21)
RPAS	National rules	EASA (not yet available)
Operator Certificate	National rules	EASA (not yet available)
Remote Pilot Certificate	National rules	EASA (not yet available)
Nat. Flight Authorisation	National rules	National rules
Internat. Flight Author. ♦	Amendment 43 *	Amendment 43 *
State Missions	National rules	National rules
Public EC Missions	National rules ?	EASA ?

♦ = Transporting an RPAS in a car from one EU country to another to operate it there, is an international flight

Not Harmonised

* = To Chicago Convention Annex 2
Applicable since 12 Nov 2012



National Aviation Authorities



Civil RPAS-related Responsibilities

The **National Aviation Authorities** (NAAs) of the 28 member states of the European Union are responsible for the **rulemaking, certification, and operational approval of civil RPAS with a MTOM of less than 150 kg, RPAS flight crews** (*pilots*) and **RPAS operators** (*persons, organizations or enterprises engaged in or offering to engage in an RPAS operation*) in their country.

Civil RPAS-related Regulations

■ Adaption UK regulation

■ Adaption Swedish regulation

In place: Czech Rep. ♦, France ♦, **Ireland** ♦, Italy ♦, Sweden ♦, Switzerland ♦, UK ♦

In preparation: Austria ♦, Belgium ♦, **Denmark** ♦, Netherlands ♦, **Norway** ♦, Spain ♦

(flight authorisations are granted on exception/experimental basis)

None: Finland ♦, Germany ♦ (Länder level), Latvia, Portugal, Slovenia

[flight authorisations are granted on exception/experimental basis (on Länder level in Germany)]

None: Bulgaria, Croatia, Cyprus, Estonia, Germany ♦ *(at federal level)*, Greece ♦, Hungary, Lithuania, Luxembourg, Malta ♦, Poland, Romania, Slovak Rep.,

None of these countries **have harmonized their regulations**.

NAAs of many of these countries are a **member of JARUS** (see ♦).

National Qualified Entity

In place: UK (2)
Considered: Netherlands

Quantity of Approved RPAS Operators

France:	250	Ireland:	12
Sweden:	120	UK:	130 +



10 Sept. 2013

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Current Civil Regulatory Status

Outside of Europe

Regulations in Place

- Australia ♦
- Canada ♦
- Israel (only Mil airspace) ♦
- Japan (+/- 14.000 pilots)

Upcoming Regulations

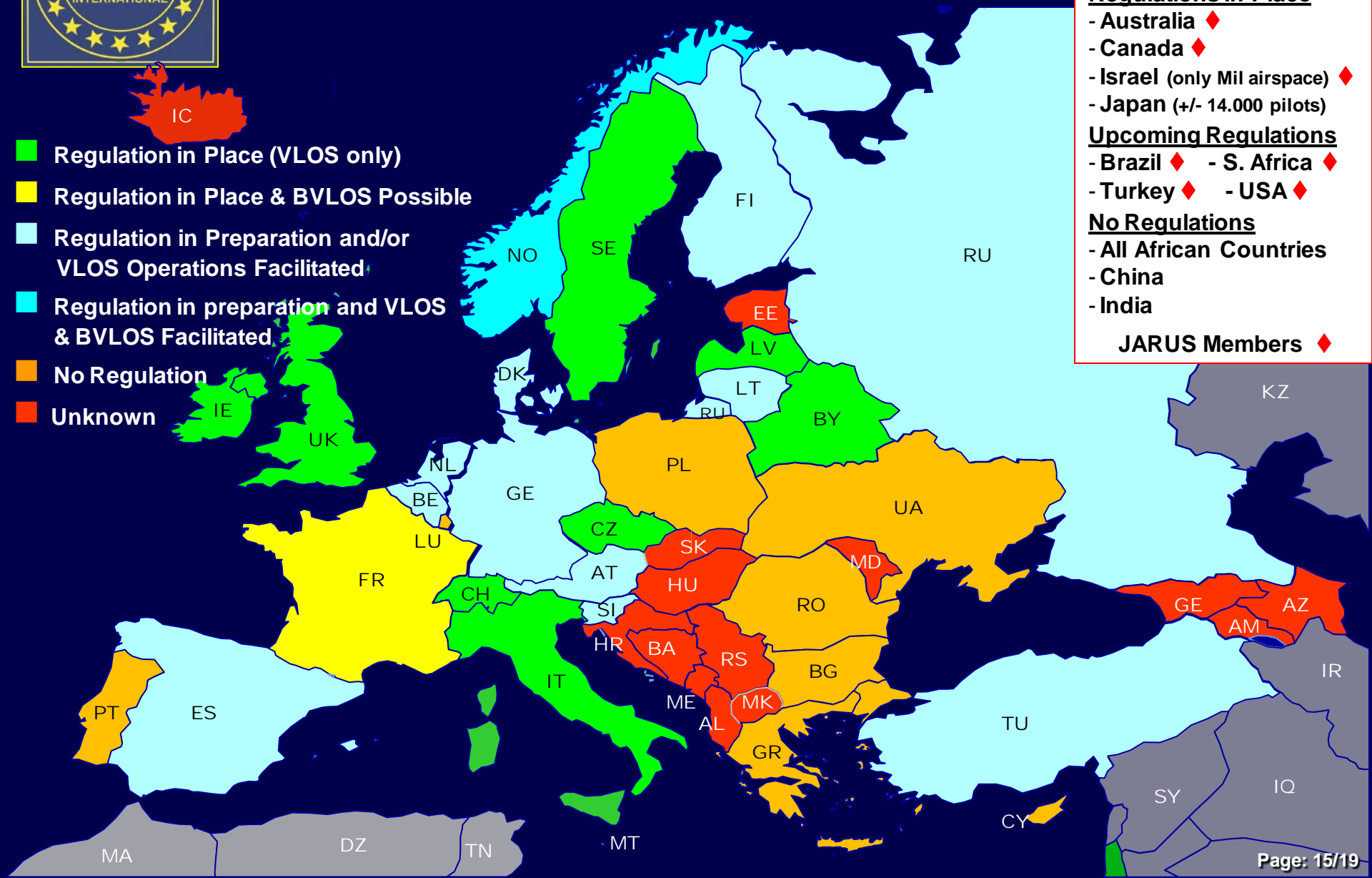
- Brazil ♦
- S. Africa ♦
- Turkey ♦
- USA ♦

No Regulations

- All African Countries
- China
- India

JARUS Members ♦

- Regulation in Place (VLOS only)
- Regulation in Place & BVLOS Possible
- Regulation in Preparation and/or VLOS Operations Facilitated
- Regulation in preparation and VLOS & BVLOS Facilitated
- No Regulation
- Unknown





Survey on Civil RPAS Ops



Sept. 2012

Oct. 2013

Produced By

UVS International

To be Supplied To

EC RPAS Steering Group &
ICAO & other interested parties

Objective

Worldwide survey of non-military RPAS operators & applications.

- Reach out to the current civil RPAS operators' community;
- Permit the current civil RPAS operators' community to identify itself;
- Identify the types of the civil RPAS currently being used;
- Identify the types of missions currently being flown;
- Evaluate the quantity of currently on-going & anticipated civil RPAS operations;
- Identify wishes of the civil RPAS operators' community in the field of regulatory & operational developments relative to their anticipated future activities;
- Supply conclusions for consideration in the European RPAS Roadmap.

Operators

This survey categorises the RPAS operators' as follows:

- **Operator – Commercial** (RPAS manufacturer)
- **Operator – Non-Commercial**
- **Corporate** (internal corporate use)
- **General Aviation – Air Service Supplier**
- **Research Organization**
- **Sales / Rental / Service Org.**
- **Operator - Commercial** (not RPAS manufacturer)
- **Commercial Air Transporter**
- **Flying Club / School**
- **Governmental Organization/Agency** (non-military)
- **RPAS Manufacturer** (experimental use)



Survey on Civil RPAS Ops



This survey will shed light on the following aspects of ongoing RPAS operations:

Operator Qualification
Remote Pilot Qualification

Pilot & Payload Operator Manual
Maintenance Manual

Mission Category
Overflown Territory (population density)
Flight Occurance (day/night/both)
Deployment Time (set-up, operation, pack-up)
Operational Flight Alt.
Operational Parameters (speed, endurance, radius)
Flight Approval

Type of aircraft
Propulsion
Dimensions & Mass
Payload Capacity
Command & Control
Frequencies
Navigation

Payloads Used

Payload Downlink

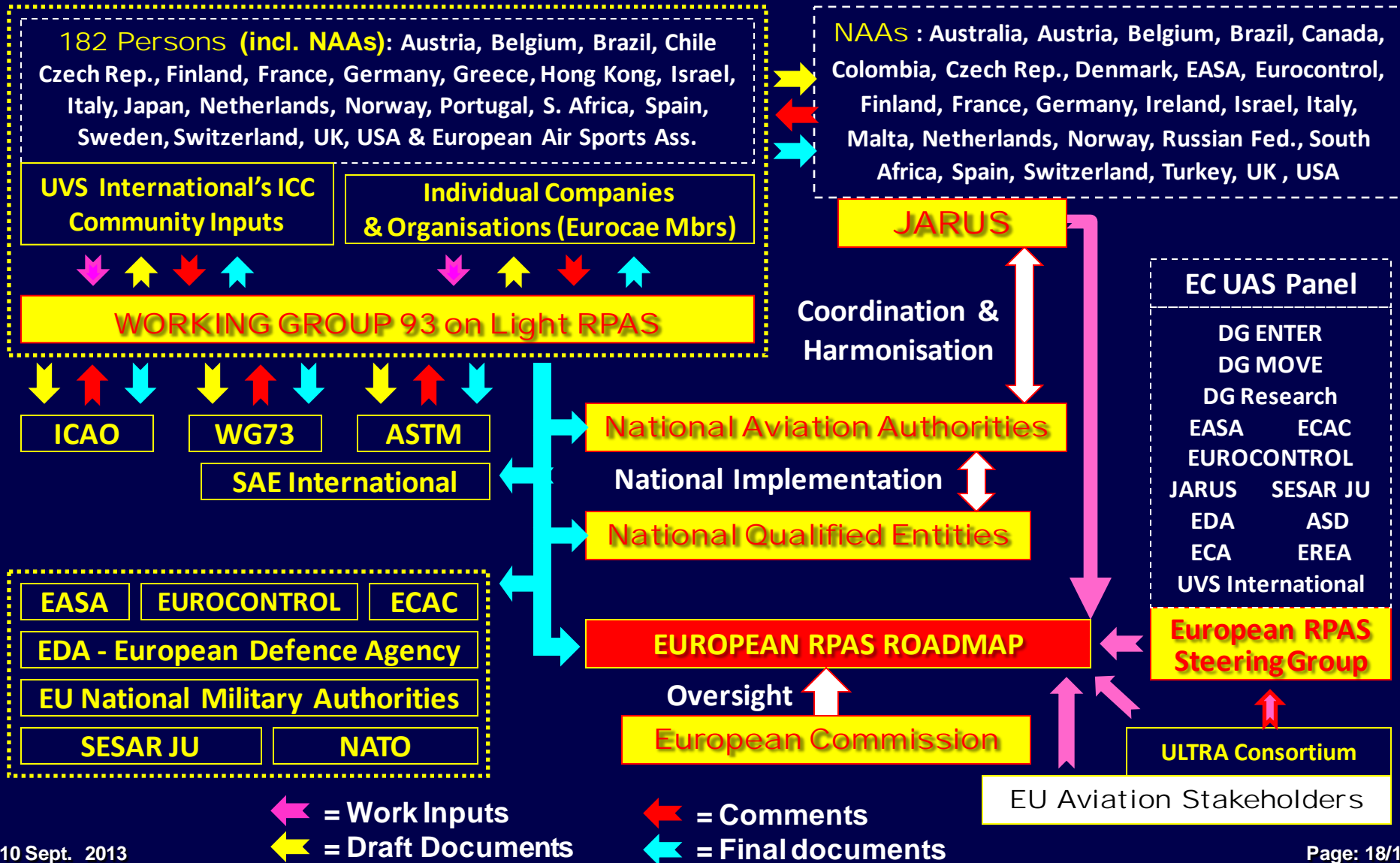
C2 Frequencies Used

Insurance

To contribute, complete the survey form available online at www.uvs-info.com



L-RPAS Inputs to European RPAS Roadmap





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RPAS 2013

Brussels, Belgium – 24-27 June 2013
www.rpas-2013.org

UAS CHINA 2013

Beijing, China – 25-28 Sept. 2013
www.uas-china-2013.org

UVS Tech 2013

Moscow, Russian Fed. – 22-25 Oct. 2013
www.uvs-tech.org

RPAS Latin America 2013

San José d. C., Brazil – 29-31 Oct. 2013
www.rpas-latin-america.org

European RPAS Operators' Forum

Brussels, Belgium – 9-11 Dec. 2013
www.rpas-civilops.org

ICAUV 2014

Bangalore, India – 21 & 22 Feb. 2014
www.icauv-2014.org