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)].
We NOT Talking About

Flying objects used for **RECREATIONAL** purposes

**Toys**

- Interactive Toy Concepts, China, Vamp - Flying Bat
- ProxFlyer, Norway - Bladerunner
- Parrot, France - AR Drone 2

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

- Various model aircraft images

**Very Large Model Aircraft (> 150 kg)**

- Images of very large model aircraft
What are we talking about?

Remotely Piloted Aircraft Systems (RPAS)
The key word: Aircraft

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

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

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## AERIAL OPERATIONS - ◆ Indicates RPAS Operations

<table>
<thead>
<tr>
<th>Governmental</th>
<th>Military</th>
<th>Non-Military</th>
<th>Not State Flights</th>
<th>Security-related</th>
<th>Police</th>
<th>Customs</th>
<th>Border Guard</th>
<th>Coast Guard</th>
<th>◆ ◆ ◆ ◆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governmental</td>
<td>Military</td>
<td></td>
<td>State Flights</td>
<td>Security-related</td>
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<td>◆ ◆ ◆ ◆</td>
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<td>Non-Military</td>
<td></td>
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<td>Customs</td>
<td>Border Guard</td>
<td>Coast Guard</td>
<td>◆ ◆ ◆ ◆</td>
</tr>
<tr>
<td>Non-Military</td>
<td></td>
<td>Not State Flights</td>
<td>Safety-related</td>
<td>Civil Protection</td>
<td>Fire Fighters</td>
<td>◆ ◆</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Military</td>
<td></td>
<td>Public</td>
<td>European Union</td>
<td>Flights on behalf of a public EU agency (no national oversight)</td>
<td>◆</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Governmental</td>
<td>Public</td>
<td></td>
<td>Commercial Air Transport</td>
<td>Scheduled Air Service</td>
<td>Non-scheduled Revenue Ops.</td>
<td>Non-revenue Operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Governmental</td>
<td>Public</td>
<td></td>
<td>General Aviation Pleasure</td>
<td>Corporate Operations</td>
<td>Flight Training/Instruction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Governmental</td>
<td>Public</td>
<td></td>
<td>Aerial Work / Specialised Ops</td>
<td>Aerial Advertising</td>
<td>Aerial Observation</td>
<td>Aerial Patrol</td>
<td>Aerial Survey &amp; Mapping</td>
<td>Agriculture</td>
<td>Corporate Operations</td>
</tr>
</tbody>
</table>

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Selex ES, Italy - Sky X & Sky Y
Neuron Consortium, Europe – nEUROn
Thales, UK (U-TACS) – Watchkeeper
ADS-Ranger
EADS Deutschland, Germany – Talarion
Sagem, France - Patroller
EADS DS, France & IAI-Malat, Israel - Harfung

Fixed Wing
RPA
MTOM
> 150 kg

Neuron Consortium, Europe - nEUROn
Selex ES, Italy - Sky X & Sky Y
ADS-Ranger
EADS Deutschland, Germany – Talarion
Sagem, France - Patroller
EADS DS, France & IAI-Malat, Israel - Harfung

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<table>
<thead>
<tr>
<th>Company</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora Flight Sciences</td>
<td>Centaur</td>
</tr>
<tr>
<td>Boeing, USA</td>
<td>Phantom Eye</td>
</tr>
<tr>
<td>General Atomics ASI, USA</td>
<td>Predator</td>
</tr>
<tr>
<td>General Atomics ASI, USA</td>
<td>Reaper</td>
</tr>
<tr>
<td>Israel Aerospace Industries</td>
<td>Heron TP</td>
</tr>
<tr>
<td>Northrop Grumman, USA</td>
<td>FireBird</td>
</tr>
<tr>
<td>Northrop Grumman, USA</td>
<td>Global Hawk</td>
</tr>
</tbody>
</table>

**Fixed Wing RPA**

MTOM > 150 kg
Northrop Grumman, USA – Fire X
Boeing, USA – A160 Hummingbird

KARI, South Korea – SmartUAV

Saab, Sweden – Skeldar
LuxCopter, Luxembourg – LuxCopter

Schiebel, Austria – Camcopter S-100

Northrop Grumman, USA – Fire X

EADS Cassidian, France – Tanan

KARI, South Korea – SmartUAV

Indra Sistemas, Spain – Pelicano

Rotary Wing
RPA
MTOM
> 150 kg

© UVS International
SurveyCopter, France - Copter 4
Swiss UAV, Switzerland Koax X240

Delft Dynamics, Netherlands - RH2 Stern
Flying-Cam, Belgium - Sarah
CybAero, Sweden - APID

Yamaha Motor, Japan - R-Max
HighEye, Netherlands - Chanachopper
Infotron, France - IT 180

Rotary Wing
RPA
MTOM
< 150 kg
Various Airframe Types
All but one < 25 kg
Aermatica, Italy – Anteos

Mikrokopter, Germany - Oktocopter

Draganfly, Canada – Draganflyer X6

AeroVironment, USA - Qube

IAI-Malat, Israel - Ghost

AirRobot, Germany – AR120

Multi-Rotor RPA
MTOM < 5 kg

Draganfly, Canada - Draganflyer X6

Microdrones, Germany - MD4-200

Aeryon, Canada - Scout

Aermatica, Italy - Anteos

Microdrones, Germany - MD4-200

AirRobot, Germany - AR120

Mikrokopter, Germany - Oktocopter

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Page: 11/19
### Astounding Technology

- **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

<table>
<thead>
<tr>
<th>Aircraft MTOM</th>
<th>&lt; 150 kg</th>
<th>&gt; 150 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Law</td>
<td>National rules</td>
<td>EASA (Policy 2009 – Part 21)</td>
</tr>
<tr>
<td>RPAS</td>
<td>National rules</td>
<td>EASA (not yet available)</td>
</tr>
<tr>
<td>Operator Certificate</td>
<td>National rules</td>
<td>EASA (not yet available)</td>
</tr>
<tr>
<td>Remote Pilot Certificate</td>
<td>National rules</td>
<td>EASA (not yet available)</td>
</tr>
<tr>
<td>Nat. Flight Authorisation</td>
<td>National rules</td>
<td>National rules</td>
</tr>
<tr>
<td>Internat. Flight Author. ♦</td>
<td>Amendment 43 *</td>
<td>Amendment 43 *</td>
</tr>
<tr>
<td>State Missions</td>
<td>National rules</td>
<td>National rules</td>
</tr>
<tr>
<td>Public EC Missions</td>
<td>National rules ?</td>
<td>EASA ?</td>
</tr>
</tbody>
</table>

♦ = 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

- **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+
Current Civil Regulatory Status

- 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

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 ♦

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Survey on Civil RPAS Ops


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 - Commercial (not RPAS manufacturer)
- Operator - Non-Commercial
- Commercial Air Transporter
- Corporate (internal corporate use)
- Flying Club / School
- General Aviation - Air Service Supplier
- Governmental Organization/Agency (non-military)
- Research Organization
- RPAS Manufacturer (experimental use)
- Sales / Rental / Service Org.
This survey will shed light on the following aspects of ongoing RPAS operations:

<table>
<thead>
<tr>
<th>Operator Qualification</th>
<th>Pilot &amp; Payload Operator Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Pilot Qualification</td>
<td>Maintenance Manual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mission Category</th>
<th>Payload Downlink</th>
<th>C2 Frequencies Used</th>
<th>Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overflown Territory</td>
<td>(population density)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flight Occurrence</td>
<td>(day/night/both)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deployment Time</td>
<td>(set-up, operation, pack-up)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Flight Alt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Parameters</td>
<td>(speed, endurance, radius)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flight Approval</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Payloads Used

To contribute, complete the survey form available online at [www.uvs-info.com](http://www.uvs-info.com)
182 Persons (incl. NAAs): Austria, Belgium, Brazil, Chile, Czech Rep., Finland, France, Germany, Greece, Hong Kong, Israel, Italy, Japan, Netherlands, Norway, Portugal, S. Africa, Spain, Sweden, Switzerland, UK, USA & European Air Sports Ass.

NAAs: Australia, Austria, Belgium, Brazil, Canada, Colombia, Czech Rep., Denmark, EASA, Eurocontrol, Finland, France, Germany, Ireland, Israel, Italy, Malta, Netherlands, Norway, Russian Fed., South Africa, Spain, Switzerland, Turkey, UK, USA

UVS International’s ICC Community Inputs

Individual Companies & Organisations (Eurocafe Mbrs)

WORKING GROUP 93 on Light RPAS

National Aviation Authorities

National Implementation

National Qualified Entities

EUROPEAN RPAS ROADMAP

Oversight

European Commission

EU Aviation Stakeholders

EC UAS Panel
DG ENTER
DG MOVE
DG Research
EASA
ECAC
EUROCONTROL
JARUS
SESAR JU
EDA
ASD
ECA
EREA
UVS International

ULTRA Consortium

Coordination & Harmonisation

European RPAS Steering Group

Integration & Coordination
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Fax: 33-(0)1-46.51.05.22
pvb@uvs-international.org - pvb@uvs-info.com

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
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