



RPAS : Status, Needs & Challenges

**By Peter van Blyenburgh
UVS International**

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In agreement with the ICAO UAS SG, 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)].

REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS)

Purpose-Built Aircraft

Converted Aircraft

Civil

State (Military & Non-Military)

Europe

< 150 kg

> 150 kg

LRPAS

RPAS

OP-RPAS





The RPAS Market in EU



Non-Military Applications

Classification & Identification

All RPA airframe types & all sizes

Application Classes

Nr of
Application
Categories &
Sub-Categories

Security Related

39

Safety Related

35

Science & Research Related

31

Contractor-Supplied Flight Services

38

Civil/Military Coordination (Mutualisation)

34

Based on existing reports & studies & discussions with current & potential users



The RPAS Market in EU



Non-Military Applications

Security-Related [39 application (sub-)categories]

- Anti-looting control (post riot)
- Anti-poaching control
- Border surveillance
- Crime scene (surveillance, recording, situational awareness)
- Criminal car tracking
- Crowd surveillance
- Hostile protest control
- Illegal immigrant & human trafficking control (local, regional, national)
- Illegal activity control (dumping & waste burning, historic site & heritage looting, drug cultivation, excavation, logging, illegal mining, ship bilge venting)
- International summit surveillance
- Maritime surveillance (regional area, sea lane, wide area)
- Police applications (various)
- Riot control
- Smuggling control
- Surveillance of public gatherings (pop concerts, sporting events)
- Urban law enforcement
- Other
- Anti-piracy operations
- Anti-terrorist operations
- Coastal surveillance
- Critical infrastructure surveillance
- Fight against drugs
- Regional surveillance
- Road traffic surveillance
- Wildlife crime control



The RPAS Market in EU



Non-Military Applications

Safety-Related [35 application (sub-)categories]

Avalanche survivor search

Dike monitoring

Emergency communications network (incl. relay) (local, regional, national, EU)

Fire scene inspection (pre-fire, during fire, post fire)

Fishery control

Forest Fire fighting (detection, monitoring, support)

Iceberg monitoring

Maritime search & rescue

Disaster site monitoring & mapping (earthquake, floods, icing rain storms, landslide, mud slide, plane crashes, ship collisions, storm & hurricane, train crashes, tsunami & tidal surge, volcano eruption)

Nuclear accident monitoring (contamination measurement, contamination tracking & monitoring)

Post-disaster relief operations

Road & highway traffic monitoring

Search for missing persons

Volcanic ash cloud (analysis, measurement, tracking & monitoring)

Other



The RPAS Market in EU



Non-Military Applications

Scientific & Research-Related [31 application (sub-)categories]

Aerial photogrammetry

Agricultural (crop monitoring & management, plant growth vigour mapping)

Algae proliferation detection

Arctic research

Atmospheric monitoring

Coastal mapping

Environmental monitoring

Geophysical survey

Hurricane tracking

Invasive species identification/analysis

Meteorological research

Ozone measurements

Sand bank shift measurements/mapping

Tidal zone mapping

Volcano monitoring

Wildlife census

Archaeological site mapping

ATM Research

Climate monitoring

Coastal zone studies

Forestry management & research

Glacier & ice cap monitoring

Iceberg monitoring

Marine mammal monitoring

Ocean & sea research support

Salt water infiltration detection

Sea ice monitoring

Vegetation identification

UAS sensor research

Other



The RPAS Market in EU



Non-Military Applications

Contractor Supplied Flight Services [38 application (sub-)categories]

Advertising (lighter-than-air UAS) (indoor, outdoor)

Aerial photography

Aerial news broadcasting

Agricultural (EU Common Agricultural Policy control, crop monitoring & management, fertilizer dispensing, hydrometric mapping, insecticide spraying, monitoring for selective harvesting, plant growth vigour mapping)

Bird (strike) control

Cargo transport (small - large)

Cinema (aerial shots & special effects)

Forestry (tree growth & illness monitoring)

Inspection, monitoring, surveying, mapping [aerial terrain mapping (urban environment, non-urban environment, industrial site), critical infrastructure inspection, dike inspection, forest fire operations support, gas burn-off funnel tip inspection, geophysical survey, historical monument inspection, illegal crop cultivation detection, magnetic field survey (mineral search), magnetic mapping, oil & gas pipeline inspection, photogrammetry, power cable inspection, radiation measurement & monitoring, railway track bed inspection, thermal isolation analysis, wind turbine blade inspection]

Test bed (testing, validation, qualification of sensors, avionics, S&A, ATM, etc)

Other



The RPAS Market in EU



Non-Military Applications

Civil/Military Cooperation – Mutualisation

Mutualisation = The operation of military UAS assets by the military for non-military governmental applications.

Basic advantages of mutualisation:

- Offers the military additional RPAS flight training opportunities;
- Supplies added value to military flight training exercises;
- Permits to increase the return on investment for military RPAS by using them for non-military governmental missions with societal benefits (incl. European external border surveillance);
- Gives non-military governmental authorities access to capabilities they may not be able to afford otherwise and thereby increases national security & safety;
- Allows to spread the cost of such RPAS missions over various government organisations;
- Can contribute to familiarizing non-military governmental organisations with the use and advantages of RPAS.



The RPAS Market in EU



Non-Military Applications

Civil/Military Cooperation – Mutualisation [34 application (sub-)categories]

Anti-piracy operations

Coastal surveillance

Emergency communications network (incl. relay): (local, regional, national, EU)

Fishery control

Illegal drug cultivation detection

Illegal ship bilge venting detection

International summit surveillance

Maritime search & rescue

Natural disaster site monitoring

Sea lane surveillance

Surveillance of large sporting events

Border surveillance

Critical infrastructure surveillance

Forest fire fighting (detection, monitoring, support)

Illegal immigrant control (local, regional, national, EU)

Maritime surveillance

(earthquake, floods, icing rain storms, landslide, mud slide, plane crashes, ship collisions, storm & hurricane, train crashes, tsunami & tidal surge, volcano eruption)

Surveillance of public gatherings

Other



Pointers:

- New legitimate aviation stakeholder group
- 500 Manufacturers in 51 Countries
- Producing > 1400 different types of systems
- Currently principally military applications
- Large spectrum of non-military applications
- Posed to supply significant societal benefits

The Challenge:

Integrating a totally new aircraft concept
into the Global ATM System
and
maintaining the current level of safety



RPAS Segmentation (EU)



Light RPA

Regulated by National CAAs

Class I

Fixed Wing
Rotary Wing
Lighter-t-Air

Micro	MTOM < 1,5/2 kg	Flight Alt. < 150 m AGL	< 500 m from pilot	Flight In Visual LOS & Extended Visual LOS
Grp A	MTOM > 1,5/2 kg & < 7 kg			
Grp B	MTOM > 7 kg & < 25 kg			
Grp C	MTOM > 25 kg & < 150 kg			

Class II

Fixed Wing
Rotary Wing
Lighter-t-Air

Micro	MTOM < 1,5/2 kg	Flight Alt. > 150m AGL	> 500 m from pilot	Flight Beyond Visual LOS
Grp A	MTOM > 1,5/2 kg & < 7 kg			
Grp B	MTOM > 7 kg & < 25 kg			
Grp C	MTOM > 25 kg & < 150 kg			

RPA

National Operating Rules & EASA Certification

MTOM > 150 kg Incl. Optionally-piloted aircraft	Flight Alt. > 150 AGL	> 500 m from pilot	Visual LOS & BLOS
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MTOM = Maximum Take Off Mass AGL = Above Ground Level LOS = Line of sight



WG93 on Light RPAS

Inputs, Comments & Information Flow



Australia, Austria, Belgium, Brazil, Canada, Czech Rep., Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, UK, Europe Air Sports, Minimal Risk UAS WG, RCAPA

UAVS International's ICC Community Inputs

Individual Companies & Organisations

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

WORKING GROUP 93 on Light RPAS

JARUS

WG73

ASTM

RTCA SC203

SAE International

ICAO – International Civil Aviation Org.

European Commission - DG MOVE

European Commission - DG ENTR

SESAR

EASA

EUROCONTROL

European Defence Agency

EU Nat. Military Authorities

SESAR JU

NATO

NATIONAL CIVIL AVIATION AUTHORITIES

National Implementation

National Qualified Entities





FOR ADDITIONAL INFORMATION:

**UVS International
Peter van Blyenburgh
86 rue Michel Ange
75016 Paris
France**

Tel.: 33-1-46.51.88.65

Fax: 33-1-46.51.05.22

pvb@uvs-international.org - pvb@uvs-info.com

www.uvs-international.org

www.uvs-info.com

www.uasvision.com