

Seminário Internacional de VANT - 2010

SIVANT 2010



27 a 29 de outubro de 2010
São José dos Campos - SP

Realização



**Organização Brasileira
para o Desenvolvimento
da Certificação Aeronáutica**

Apoio



ANAC



Patrocínio



An Internationally Coordinated Endeavour



Federating
The
International
UAS
Community

**GLOBAL
ACCESS
INITIATIVE**

UAS Brazil 2010 Conference
Sao José dos Campos, Brazil – 28 Oct. 2010

LUAS: The European Approach
Status March 2009 – For Reference

By Peter van Blyenburgh



WHAT ARE THE PROBLEMS?

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EUROPE

EUROPEAN LEVEL - 1/2

Light UAS (<150) are regulated by national aviation authorities
Europe : 27 countries **Risk of 27 non-harmonized regulations**

No standards No airworthiness norm
No certification norms No ATM regulations
Involved communities do not speak the same language

The Critical Issues :

- Sense & Avoid
- Spectrum & Bandwidth
- Insufficient R&D funding

Flight in non-segregated airspace is impossible

Result : The markets for the following 3 sectors cannot emerge:
- non-military government - scientific - commercial



ADDITIONAL PROBLEMS

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EUROPEAN LEVEL - 2/2

Insufficient political awareness at national & European Commission (EC) levels of:

- the current & future non-military UAS applications
- the cross-over potential of the relevant technologies

Insufficient coordination between EC Directorate Generals prior to the launch of UAS-related study contracts

No central repository of EC funded study results

Insufficient European academic R&D coordination

Insufficient importance accorded to UAS within the framework of SESAR

Insufficient contact between potential European national users groups

Insufficient active participation of EASA in EUROCAE WG73 (funding problem)

A clear European Vision at EC level is missing



WHAT SHOULD BE DONE ?

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NATIONAL LEVEL

UAS-RELATED REGULATORY MATTERS

- ◆ **National approaches with cooperation between:**
 - Industry - CAAs - Gvmt Authorities - Stakeholder Orgs - Academia
- ◆ **National efforts to concentrate on standards (functional requirements) for Light UAS (<150 kg) (non-military applications)**
- ◆ **National Visions to be harmonized at the earliest possible stage**
- ◆ **National Visions to be coordinated to form a European Vision on Light UAS**
- ◆ **Regulatory approach to light UAS should be coordinated at European level by national CAAs in coordination with EUROCAE WG73 with participation of EASA, Eurocontrol, Air Navigation Service Providers, and Industry**
- ◆ **A common terminology in the national languages should be defined**



WHAT SHOULD BE DONE ?

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EUROPEAN LEVEL - 1/2

UAS-RELATED REGULATORY MATTERS

- ◆ **European National Visions (all classes of UAS) should be harmonized to create a European Vision (in coordination with SESAR)**
- ◆ **UAS should be recognized as a relevant stakeholder within SESAR**
- ◆ **The role of European Defence Agency (EDA) should be clearly defined**
- ◆ **The European Vision (civil & military) should be coordinated with NATO**
- ◆ **European standards (functional requirements) to be consensually defined by EUROCAE WG73 with active participation of EASA, national CAAs & Air Navigation Service Providers, Industry & other Stakeholders**
- ◆ **A common terminology in English should be defined**

Europe should actively contribute to creating a Trans-Atlantic UAS Vision



WHAT SHOULD BE DONE ?

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EUROPEAN LEVEL - 2/2

INDUSTRIAL + R&D MATTERS

- ◆ **Political awareness of unmanned systems, unmanned system-related technologies & their potential should be increased**
- ◆ **Unmanned system-related technologies (air, ground, naval, space) should be recognized as being of strategic importance for Europe**
- ◆ **Definition of requirements for R&D, studies, and technology demonstrations should be better coordinated amongst all EC DGs & EC agencies in order to avoid duplication**
- ◆ **Increased funding required for R&D, study contracts & tech. demos**
- ◆ **EASA should be given the financial means of their ambitions**
- ◆ **Importance of SMEs & SMIs should be recognized**
- ◆ **Access to EC study results should be improved**
- ◆ **Number of European technology demonstrations should be increased**
- ◆ **Public awareness of unmanned systems & their societal benefits should be improved**



EUROPEAN STAKEHOLDERS

THE PAN EUROPEAN APPROACH

Civilian Orgs

- GD Enterprise
- GD TREN
- GD Research
- EASA
- EUROCONTROL
- JAA

Multi-Nat. Orgs

- AEA
- CANSO
- EARTO
- ERA
- EREA
- EUGIN
- Eurocockpit Assn
- Euro Air Sport Assn
- IATA
- IFALPA
- IFATCA
- IOPA
- SESAR ExecCom
- SESAR J.U.

Military Orgs

- EDA – Euro. Defence Agency
- EMAAG - EuroMilitary Aviation Authorities Group
- JMAG - Joint Military Airworthiness Group
- NATO:
 - FINAS (USAR)
 - JCG UAV
 - JAPCC
 - NATMC
- OCCAR

National Orgs

- Min. of Transport
- Min. of Interior
- Min. of Defence
- Air Navigation Service Providers
- CAAs
- Model A/C Assns
- Technology Platforms
 - ASTRAEA, UK
 - NIMUP, Netherlands
 - Pégase, France
 - PLATINO, Spain

Prof. Orgs & WGs

- ASD
- EUROCAE WG73
- (Multi)-National WGs
 - UAV DACH
 - UAV Germany, DE
 - former Castor, Sweden
- National Assns:
 - AVBS, Czech Rep.
 - PEMA UAV, Portugal
 - UAVS, UK
 - UAS Norway
 - UVS France
 - Ass. of Aerospace Universities, UK

Existing Multi-National Tech. Platforms

- ACARE
- ERTRAC
- EUROP

Industry

20 out of 27 Countries

Research

- Competence poles & Centres of excellence
- Academia



EUROPEAN INSTITUTIONAL UAS-RELATED ACTIVITIES

ACADEMIC

- NATIONAL:**
- Belgium
 - Bulgaria
 - Czech Rep.
 - France
 - Germany
 - Greece
 - Italy
 - Netherlands
 - Poland
 - Portugal
 - Romania
 - Slovenia
 - Spain
 - Sweden
 - Switzerland
 - UK
- MULTI-NATIONAL**

NATIONAL

Austria	CAA & Min. of Interior
Czech Rep	Min. of Transport & CAA
Finland	- FDF & CAA - Artic Test Range
France	- DGA-CEV - USAR-FW - USAR-VTOL - DGA (MoD) UAV-REG - DGAC (CAA) NAVDROC - Min. of Interior - Pégase
Germany	- BWB-WTD - DFS - Min. of Transport - UAV DACH - UAV Germany NTP
Italy	- DGAA & ENAC
Netherlds	- CAA - NIMUP NTP - RNLAF
Norway	UAS Norway
Slovenia	Uni. Of Ljubljana
Spain	PLATINO NTP
Sweden	- FMV & CAA UAV Vision - Saab & LFV Castor
Switzerl.	- CAA & Swiss AF - Min. of Interior
UK	- ASTRAEA NTP - CAA-DAP CAP722 - DoT & NATS - Min. of Interior - MoD-DPA - ParcAberporth - RAF UAV Battle Lab - UAVS Association

MULTI-NATIONAL

ASD	ASG - UAV WG
CANSO	UAV WG
EARTO	
EASA	A.NPA
EC-DGTREN	INOUI Programme
EC-DGEnter	Market Study
ECAP	Certification Group
EDA	- C&C + S&A studies - Staff rqmt study - UAS Roadmap
EMAAG	
EUROCAE	WG-73 on UAS
Eurocontrol	- ANT - UAV-OAT TF
Eurocontrol Experimental Centre	
ICAO	Formal WG on UAS
IWGSUAS	
JAA/Eurcontrol	UAV TF
JMAG (now includes ETAP)	
NATO	- AG7 FINAS - FINAS-USAR-ST - JAPCC - NATMC - RTO
SESAR	
USEP	Security & Environmt

NTP = National Techn. Platform



WHAT SHOULD BE DONE ?

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INTERNATIONAL LEVEL

UAS-RELATED REGULATORY MATTERS

- ◆ Global approaches **to be harmonized at earliest possible stage**
- ◆ **Approaches on** both sides of the Atlantic **should be** coordinated
- ◆ **Coordination between** Eurocontrol + EASA & FAA
- ◆ **Coordination between** EUROCAE & RTCA & SAE & ASTM **etc**
- ◆ **Coordination between** SESAR & NextGen
- ◆ **Efforts to be** coordinated internationally **(beyond Europe & USA)**
with: Australia, Brazil, Canada, China, India, Japan, N.Zealand, Russia, **Singapore**, South Africa, South Korea, UAE
- ◆ **Standards** (functional requirements) **to be agreed on at** ICAO level
- ◆ **A common terminology in English should be defined**

Europe & USA should be the dynamo to create a Global Vision



Current Status Coordination & Cooperation

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- ◆ **Eurocontrol & FAA are playing dynamically federating & leading roles**
- ◆ **UAS standards work in EUROCAE WG73 & RTCA SC203 is progressing**
- ◆ **EUROCAE & RTCA are endeavouring to coordinate their UAS activities**
- ◆ **Global Access Initiative** ◆ **Interim Working Group on LUAS**
- ◆ **International Coordination Council** ◆ **International Test Range Directory**
- ◆ **National CAAs have formed JARUS to coordinate & harmonize their activities re: Light UAS**
- ◆ **ICAO has started up an official UAS Study Group with the participation of 14 States (CAA: Australia, Austria, Canada, Czech Rep., France, Germany, Italy, Netherlands, Russian Fed., Singapore, South Africa, Sweden, UK, USA) & 8 international organizations (CANSO, Eurocae, Eurocontrol, IAOPA, ICCAIA, IFALPA, IFATCA, UVS International)**

Conclusion: A coordinated international approach is becoming reality

**INTERIM
WORKING
GROUP
ON LIGHT
UAS**

Interim WG on Light UAS

Instigated by UVS International

**THE PAN
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22 Participants

- **Austrocontrol, Austria**
- **CAA, Belgium**
- **CGArm, France**
- **EADS DS, France**
- **Gates Technology, France**
- **Honeywell, Czech Rep.**
- **IVW (CAA), Netherlands**
- **Nimbus, Italy**
- **SurveyCopter, France**
- **University of Ljubljana, Slovenia**
- **West Wales UAV Centre, UK**
- **Barnard Microsystems, UK**
- **CAA, UK**
- **CybAero, Sweden**
- **European Air Sports Assn.**
- **Ghent University, Belgium**
- **HighEye, Netherlands**
- **LFV (CAA), Sweden**
- **Novadem, France**
- **UAS Consulting & Services, France**
- **UVS International**
- **Eurocontrol**

2 Observers

- FAA, USA

- RTCA SC203, USA

4 One day meetings

Start: Sept 2007

End: Jan 2008

Undertake initial work for EUROCAE WG73 in order to make it possible to effectively tackle the elaboration of proposed standards for Light UAS (<150kg).

Prepare a guidance document for EUROCAE WG73 on how to accomplish the aforementioned taking into account the financial & time & personnel limitations of the small and medium-sized industry & enterprises (SMI & SME) that constitute the backbone of the small UAS community.

- Review the Joint JAA/Eurocontrol UAS Task Force Final Report;
- Identify & group the currently existing regulatory documents;
- Produce a list of required Terms & Definitions;
- Identify the regulatory work re SUAS currently ongoing in Europe;
- Describe the current European market situation re SUAS for all applications;
- Identify the relevant European stakeholders;
- Propose a basic document describing the best way forward;
- Propose an initial work plan.

IWGLUAS ceased to exist after it delivered its recommendations in Feb 2008 and

IWGLUAS participants

Become

WG73 SG4 LUAS participants

LIGHT UAS

Should be the Nr 1 Priority

They are here NOW

- ◆ INDUSTRY (Products & Services) = PRINCIPALLY SMIs & SMEs
- ◆ **Traditionally not recognized UAS stakeholders (commercial RC & model aircraft communities) should be involved**
- ◆ **European CAAs should agree on a common approach (JARUS)**
- ◆ **National approaches with co-operation between:**
 - **Industry (producers & services)** - **CAAs** - **Air Nav. Service Suppliers**
 - **Government Authorities** - **Academia** - **Stakeholder Organizations**
- ◆ National associations & Working Groups & Centres of Competence **to be used to organize national inputs**
- ◆ **EUROCAE should federate players around a common approach (SG4)**
- ◆ **A common terminology in English should be defined**
- ◆ **Minimize travel & out-of-country meetings**

LIGHT UAS in EUROPE

- ◆ **Matrix regarding** European rules & regulations for model aircraft
 - ◆ Review of the Joint JAA/Eurocontrol UAS TF Final report
 - ◆ On-line library of regulatory docs = www.uvs-info.com
 - ◆ List of current & potential applications
 - ◆ **Identification of the European stakeholders:**
 - **Industry (products & services)** - **CAAs** - **Air Nav. Service Suppliers**
 - **Government Authorities** - **Academia** - **Stakeholder Organizations**
 - ◆ **List of agreed Terms & Definitions**
 - ◆ **Light UAS segmentation, phased approach and definition of the initial work to be undertaken**
-
- ◆ **Proposal to use a “sanitized” version of UK CAA’s CAP722 as the baseline document around which to bring the European CAAs together with the intent to start work towards a harmonized approach.**



USEP Study

Security & Environmental UAS Applications

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Detailed generic application scenarios defined in discussions with potential EU non-military government users

Governmental non-military applications	
- Customs Authorities	4
- Police Authorities	18
- Civil Security	9
- Environmental	9
- Flight Services (supplied by civil flight service providing companies)	7
Total of Scenarios	47

**Light
UAS**

0
9
3
7
4
23

For USEP report & scenarios see: 2007 UAS Yearbook & www.uvs-info.com



Potential **Governmental** **Non-Military UAS Applications** **Identified by USEP**

Customs Authorities

Coastal patrol
On-shore border patrol
EU maritime surveillance
EU on-shore border patrol

Civil Security

Avalanche survivor search
Coastal water surveillance
Maritime search & rescue
EU Civil Security
Maritime surveillance

Regional Fire Brigade

Forest fire surveillance
National Fire Brigade
Forest fire surveillance
Natural disaster monitoring

Civil Security & National Police

Contamination measurement
Systematic search ops
Natural disaster monitoring
Emergency medical/food supply

Police Authorities

Information gathering (in buildings)
Special ops, anti-terrorist
Urban law enforcement
Pre-intervention info gathering
Urban riot control
Perimeter defence
Hostile protest control
Criminal investigation (several days)
Surveillance of public gatherings
Road traffic surveillance
Delivery of non-lethal disabling means
Coastal border immigration control
Ship lane surveillance
Permanent police surveillance
Land border immigration control
Maritime immigration control
EU land border immigration control

Environmental

Local science missions
Atmospheric measurements
Wild game surveillance
Fishery control
Ozone measurements
Weather assessment
Crop monitoring
Sandbank shift measurement
Glacier & ice cap monitoring

Contractor Supplied Flight Services

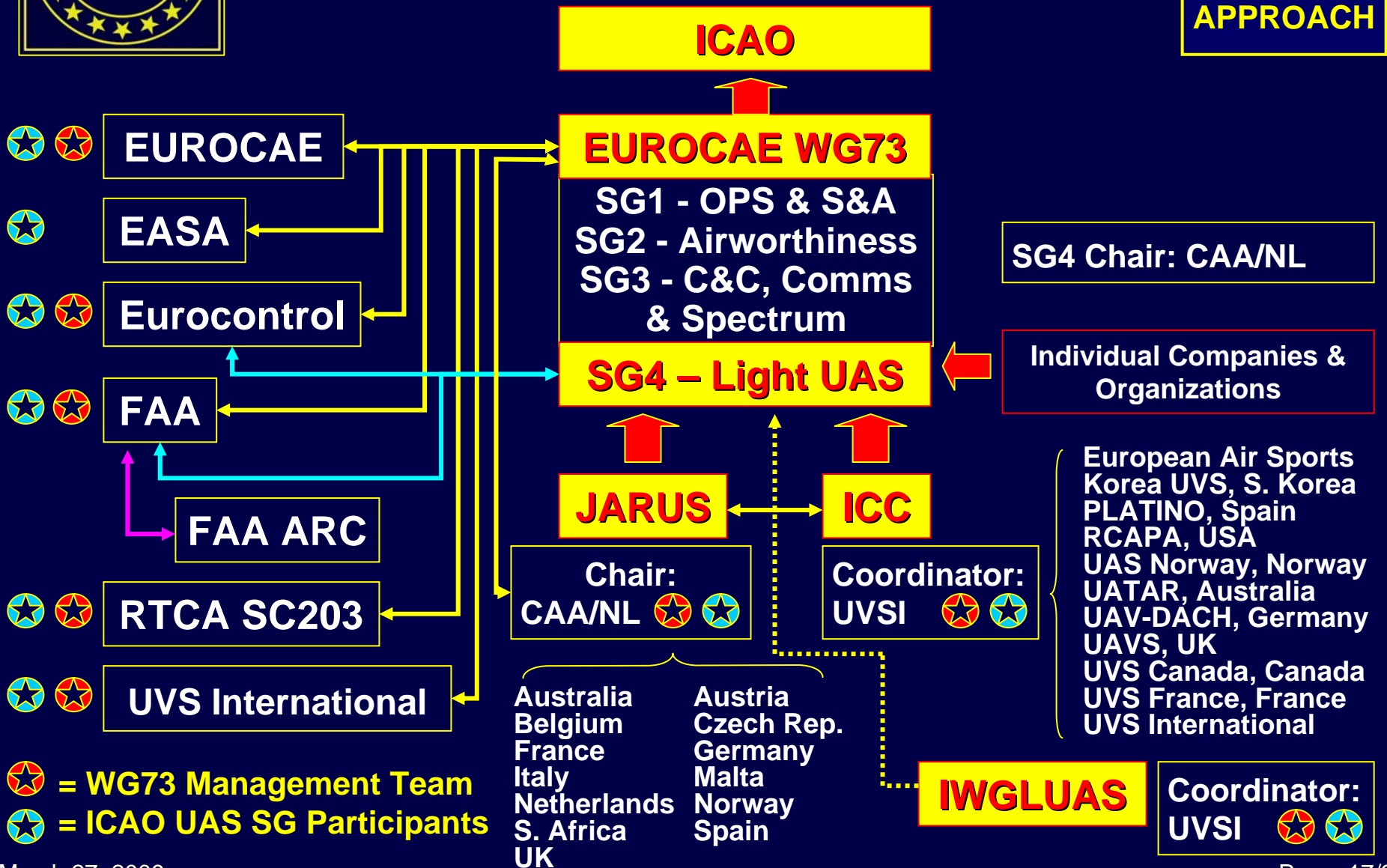
Training
Terrain mapping
Aerial photography
Monument inspection
Network comms relay
(small theatre)
Network comms relay
(large theatre)
Emergency comms
network

The seeds of a totally
new service industry ?



EUROCAE WG73 SG4 on LUAS

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EUROCAE WG73 SG4 on LUAS

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UAS Segmentation

Non-Recreational

LIGHT UAS

Regulated by National CAA

Class I

Micro	MTOM <1,5 kg	Flight Alt. < 150 m AGL	< 500 m from pilot	Flight In Visual LOS
Grp A	MTOM >1,5 kg & <7 kg			
Grp B	MTOM > 7 kg & <20/25 kg			
Grp C	MTOM >20/25 kg & < 150 kg			

Class II

Micro	MTOM <1,5 kg	Flight Alt. > 150m AGL	> 500 m from pilot	Flight Beyond Visual LOS
Grp A	MTOM >1,5 kg & <7 kg			
Grp B	MTOM > 7 kg & <20/25 kg			
Grp C	MTOM >20/25 kg & < 150 kg			

UAS

National Operating Rules & EASA Certification

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



EUROCAE WG73 SG4 on LUAS

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UAS Segmentation

Non-Recreational

Light UAS

MTOM <150 kg

Regulated by National CAA

**Class I
All Groups**

- Visual LOS flight altitude control
- Visual LOS flight path control
- Outside of ATC
- Flight altitude: < 150m/400 ft AGL
- Max. flight dist.: < 500m from pilot
- Confined airspace
- Daytime VMC (visual meteorological conditions)

**Class II
All Groups**

Flight beyond visual LOS
and
Coordination with ATC
and
Rules of the Air apply
and
Which do not fall under Light
UAS Class I definition

Topics to be dealt with

- Operational approval including:
- Proof of safe flight
 - Approved documentation
 - Licensing & Training
 - Limitations, etc
 - Occurrence reporting mandatory

- Full set of regulations
- AOC – Aircraft Operators Certificate
- Registration
- Certification of Airworthiness
- Licensed pilot
- Type certification
- Maintenance Part 66 & 145
- Approval of Design Org, & Production Org, or demonstration of capability



Light UAS Class I = The Priority

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Light UAS
Class I

**MTOM
< 150 kg**

- Visual LOS flight altitude control
- Visual LOS flight path control
- Outside of ATC (air traffic control)
- Flight altitude: < 150m/400 ft AGL
- Max. flight dist.: < 500m from pilot
- Confined airspace
- Daytime VMC (visual meteorological conditions)

Topics to be dealt with

- Operational approval including:
- Proof of safe flight
 - Approved documentation
 - Licensing & Training
 - Limitations, etc
 - Occurrence reporting mandatory

Micro	MTOM <1,5 kg	Flight In Visual LOS	
Grp A	MTOM >1,5 kg & <7 kg		
Grp B	MTOM > 7 kg & <20/25 kg		
Grp C	MTOM >20/25 kg & < 150 kg	Flight Altitude < 150 m Above Ground Level	< 500 m from pilot

Light UAS Class I offers significant international market potential

Minimal impact on Air Traffic Management (ATM)

Will permit confidence building with regulatory authorities



First SG4 Deliverable

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OBJECTIVE

Create a baseline guidance document around which to bring the European CAAs together & propose a harmonized approach to the operation of LUAS in Europe.

A “sanitized” version of the latest update of UK CAA’s CAP722 has been reviewed and commented on by the ICC participants.

Consolidation & review of the received comments is currently taking place.

The consolidated document will be reviewed by the members of JARUS & EUROCAE WG73 SG4 on Light UAS and the final guidance document will be produced.

The final guidance document will be submitted to EUROCAE WG73.

After approval by the EUROCAE Council, the final guidance document will be made available to all European and non-European CAAs, as well as all other interested parties.



CONCLUSIONS

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UAS access to non-segregated airspace is a global issue.

Significant national & international efforts underway.

No single country can come up with the “global” solution.

International coordination & cooperation is crucial.

Experience, study results & information should be shared.

- RA
- Ind
- Mil
- Gvt
- Sec
- Uni
- Sci



ALL international stakeholders should be involved.

Europe will play an ACTIVE international role.

Light UAS should be dealt with on a PRIORITY basis.

Obtaining High Level Political Support Is now imperative.

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Federating, Instigating, Coordinating, Cooperating,
Promoting, Disseminating Information for the Benefit of the
International Unmanned Systems Community