Federating The International UAS Community

EASA UAS Workshop
Paris, France – Feb 1, 2008

UNMANNED AIRCRAFT SYSTEMS
The Current Situation

Peter van Blyenburgh

What is UVS International?

Federating The International UAS Community

1997	Non-profit association founded in Paris, France as Euro UVS
1999	EURO UVS is registered in Den Haag, The Netherlands
2004	Changed its name to UVS International – Global Scope
2007	256 Corporate & Institutional Members in 35 countries

108 Honorary Members - 24 countries & 7 international orgs

Reps of nat. mil. & CAAs + EASA + EDA + EUROCONTROL + FAA + NATO

Operates: Out of offices in Paris, France

www.uvs-info.com

World's largest open generic UAS web site

MEMBERS IN 35 COUNTRIES

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✪	Argentina
✪ ■	Australia
■	Austria
✪ ■	Belgium
✪	Botswana
✪ ■	Canada
■	China
✪ ■	Czech Rep.
✪ ■	Denmark
✪ ■	Finland
✪ ■	France
✪ ■	Germany

■	Greece
✪	Hungary
✪	India
■	Indonesia
■	Israel
✪ ■	Italy
■	Japan
✪ ■	Luxembourg
✪ ■	Netherlands
✪ ■	New Zealand
✪ ■	Norway
✪ ■	Portugal

■	Russian Fed.
✪	Singapore
✪ ■	Slovenia
✪ ■	South Africa
✪ ■	South Korea
■	Spain
✪ ■	Sweden
✪ ■	Switzerland
■	Turkey
✪ ■	UK
✪ ■	USA

✪ = Honorary Mbrs
■ = Members

Working Groups Instigated by UVSI
- UAV DACH
- IWGSUAS

Member of
- RTCA SC 203
- ESCO-UAS

Partner Organizations
- AESiNT, Spain
- ALV, Czech Rep.
- AVSB, Czech Rep
- CGArm, France
- Eurocontrol EC, France
- Eurosatory
- INTELI, Portugal
- Japan UAV Association
- PEMA UAV, Portugal
- UAVS, UK
- UVS Canada
- UVS Norway
- UVS N. Zealand Australia

Mutual Memberships
- ATCA, USA
- EUGIN, Belgium
- EUROCAE, France
- European Institute, USA

UAS – Unmanned Aircraft System

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Non-Recreational Purposes

Unmanned aircraft (UA)	**An aircraft designed to operate with no human pilot on board.**
Unmanned aircraft system (UAS)	**A UAS comprises the unmanned aircraft (UA), system elements necessary to enable the taxiing, take-off/launch, flight and recovery/landing of UA, and the elements required to accomplish its mission objectives.**
UA system elements	**- Control station (s)** **- Software** **- Health monitoring** **- Communication link (s) (command & control + data)** **- Data terminal (s) (payload exploitation)** **- Payload (s)** **- Launch & recovery systems** **- Flight termination system (s)** **- Support & maintenance equipment** **- Power generation, distribution & supply** **- Air traffic control communications equipment (voice + data)** **- Handling, storage & transport equipment** **- All required documentation related to aforementioned**

CATEGORIES

For differentiation of systems under development or currently existing.
Not for certification purposes.

		Mass	Range	Flight Alt.	Endurance
μ	Micro (μ)	< 5 kg	< 10 km	250 m	1 hour
Mini	Mini	< 20/25/30/150◆	< 10	150 m ◆	< 2
CR	Close Range	25-150	10 - 30	3.000	2 - 4
SR	Short Range	50-250	30 - 70	3.000	3 - 6
MR	Medium Range	150-500	70 - 200	5.000	6 - 10
MRE	MR Endurance	500-1500	> 500	8.000	10 - 18
LADP	Low Alt. Deep Penetration	250-2500	> 250	50 - 9.000	0,5 - 1
LALE	Low Alt. Long Endurance	15-25	> 500	3.000	> 24
MALE	Medium Alt. Long Endur.	1000-1500	> 500	5/8.000	24 - 48
HALE	High Alt. Long Endurance	2500-5000	> 2000	20.000	24 - 48
Strato	Stratospheric	>2500	> 2000	> 20.000	> 48
EXO	Exo-stratospheric	TBD	TBD	> 30.500	TBD
UCAV	Unmanned combat AV	>1000	+/- 1500	12.000	+/- 2
LET	Lethal	TBD	300	4.000	3 - 4
DEC	Decoys	150-500	0 - 500	50 - 5.000	< 4

◆ = According to national legal restrictions

International UAS Activity

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259 Producers - 57 Countries

	✪	■	■	■
Algeria	✪			
Argentina	✪	■	■	
Australia	✪	■	■	
Austria		■	■	
Bahrain	✪			
Belgium	✪	■	■	
Botswana	✪			
Brazil			■	■
Bulgaria	✪	■		
Canada	✪	■	■	
Chile		■	■	
China (PR)	✪	■	■	
Colombia			■	■
Croatia		■	■	■
Czech Rep.	✪	■	■	
Egypt	✪			
Equator		■	■	
Finland	✪	■	■	
France	✪	■	■	
Germany	✪	■	■	
Greece	✪	■	■	
Hungary	✪		■	■
India	✪	■	■	
Indonesia	✪		■	■
Iran	✪	■	■	
Israel	✪	■	■	
Italy	✪	■	■	
Japan	✪	■	■	
Jordan	✪	■	■	
Malaysia	✪	■	■	
Mexico		■	■	
Netherlands	✪	■	■	
New Zealand		■	■	
Norway		■	■	
Pakistan	✪	■	■	
Poland	✪	■	■	
Portugal			■	■
Qatar	✪			
Romania	✪	■	■	
Russia	✪	■	■	
Serbia			■	■
Singapore	✪	■	■	
Slovenia			■	■
South Africa	✪	■	■	
South Korea	✪	■	■	
Spain	✪	■	■	
Sri Lanka	✪			
Sweden	✪	■	■	
Switzerland	✪	■	■	
Syria	✪			
Taiwan	✪	■	■	
Thailand	✪	■	■	
Turkey	✪	■	■	
UAE	✪		■	■
UK	✪	■	■	
Ukraine	✪	■	■	
USA	✪	■	■	

✪ = UAS in Inventory	■ = Producing Countries	■ = Ongoing R&D	■ = Future Producers?
45	42	49	9

23 International Industrial Cooperation Developments

UAS Categories (I)

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Allied Aerosp., USA
LADF

NRL, USA
Mite

Mavionics, Germany
Carolo C40

AeroVironment, USA
Wasp I

Miraterra, USA
DragonSlayer

Micro (μ)

Diehl, Germany
SensorCopter

SurveyCopter, France
Copter 1

EADS MAS, France
Tracker

Elbit Systems, Israel
SkyLark I

Mini

PixScene, France
Airstar

Skive Aviation, Switzerland
Skive

Gates Technologies, France
GT AirCat

Mini (Lighter-Than-Air)

UAS Categories (II)

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Yamaha, Japan
RMax II

EMT, Germany
Luna

Schiebel, Austria
Camcopter

CybAero, Sweden
CR

Close Range (CR)

Elbit Systems Israel
SkyLark II

Singapore Technologies, Singapore
SkyBlade II

Adv. Ceramics Research, USA
Silver Fox

ATE, South Africa
Vulture MK II

Schiebel, Austria
S-100

VTUL a PVO, Czech Rep
Sojka III

Aerovision, Spain - ***Fulmar***

Short Range (SR)

UAS Categories (III)

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Aurora FS, USA
GoldenEye 50

BAE Systems, UK
Phoenix

Yakovlev, Russia
Pchela

Sagem, France
Crecerelle

Short Range (SR)

AAI Corp., USA
Shadow 200

Sagem, France
Sperwer

RUAG, Switzerland
Ranger

Northrop Grumman, USA
FireScout

Medium Range (MR)

Rheinmetall DE, Germany
KZO

IAI-Malat Div., Israel &
Northrop Grumman, USA
Hunter

Bell Helicopter, USA
Eagle Eye

UAS Categories (IV)

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Thales, UK & Elbit Systems, Israel
Watchkeeper

Sagem, France
Sperwer B

IAI-Malat Div., Israel
E-Hunter

Denel Aerospace, S.Africa
Seeker II

Galileo Avionica, Italy
Falco

AAI Corp, USA
Shadow 600

Medium Range Endurance (MRE)

EADS, France &
Galileo Avionica, Italy
Carapas

EADS MAS France &
EADS MAS Germany
CL289

Galileo Avionica
Italy
Nibbio

Low Altitude Deep Penetration (LADP)

UAS Categories (V)

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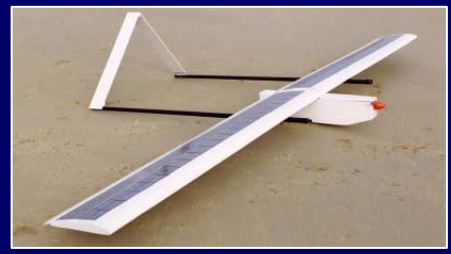
Boeing & InSitu Group, USA
ScanEagle

Aerosonde (AAI), Australia
Aerosonde Mk III



Teknisolar-Seni, France
Libellule

Low Altitude Long Endurance (LALE)

General Atomics, USA
Predator A

EADS MAS, France
Eagle 1

Elbit Systems, Israel
Hermes 1500

Medium Altitude Long Endurance (MALE)

Boeing, USA
A-160 Hummingbird

Denel Aerospace, South Africa
Bateleur

IAI-Malat Div., , Israel
Heron TP

UAS Categories (VI)

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General Atomics, USA
Altair

AeroVironment, USA
Global Observer

General Atomics, USA
Predator B

TGR Helicorp, New Zealand
Snark

Medium Altitude Long Endurance (MALE)

EADS MAS, Germany &
Northrop Grumman, USA
EuroHawk

Northrop Grumman, USA
Global Hawk

High Altitude Long Endurance (HALE)

UAS Categories (VII)

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BAE Systems, UK
Corax

EADS MAS, Germany
Barracuda

Saab, Sweden
Sharc

Alenia Aeronautica, Italy
Sky-X

Dassault, France + Euro consortium
Neuron

Unmanned Combat Aerial Vehicle (UCAV)

Boeing, USA
X-45A

Northrop Grumman, USA
X-47B

Boeing, USA
X-46

Northrop Grumman, USA
X-47A

UAS Categories (VIII)

Federating The International UAS Community

Sagem & ONERA, France (Stemme, Germany)
Busard

BAE Systems, UK
(J&AS Aero Design, Poland)
***Herti 1D** **

***Herti 1A** **

Boeing, USA
LittleBird

Excelnet, Malaysia
Eagle

Rheinmetall DE, Germany/
(Diamond, Austria) - ***Opale***

Sirehna//Sonovia/EADS
(Dyn'Aero), France
MCR/Surveyor 2500

Irkut, Russia (Stemme, Germany)
Irkut 850

Optionally Piloted Aircraft (OPA) & Converted Manned Aircraft *

Out-of-Country Military Deployments

Bosnia ’93-’96	
France	Crecerelle
UN	Fox AT
USA	Gnat 750
	Pioneer
	Predator

Kosovo ’98-’99	
France	CL-289
	Crecerelle
	Hunter
Germany	CL-289
UK	Phoenix
USA	Hunter
	Pioneer
	Predator

Kosovo ’05	
Belgium	Hunter

Australia ’01 +++	
USA	Global Hawk

Djibouti/Yemen ’02	
USA	Predator

East Timor ’02	
Australia	Aerosonde III

Afghanistan ’01-now	
Australia	ScanEagle
Canada	Sperwer
	SkyLark
France	Skorpio
Germany	Aladin
	LUNA
Netherlands	Aladin
	SkyLark
	Sperwer
U.A.E.	S-100
UK	DesertHawk
	Herti
	Predator B
USA	Dragon Eye
	Global Hawk
	Pointer
	Predator
	Shadow 200

Solomon Islands ’03	
Australia	Aerosonde III
	Avatar

South Korea ’03	
USA	Shadow 200

Angola ’03 - now	
IL contract	Aerostar

Ivory Coast ’04	
IL contract	Aerostar

Iraq ’03 -now	
Australia	ScanEagle
	SkyLark
Italy	Predator
Japan	RMax
Romania	Shadow 600
UK	DesertHawk
	Hermes 450
	Phoenix
USA	Desert Hawk
	DragonEye
	Global Hawk
	I.Gnat
	Hunter
	Pioneer
	Predator
	Puma
	Raven
	ScanEagle
	Shadow 200
	SilverFox
	SnowGoose
	Tern
	Wasp

Democratic Rep. of Congo ’06	
Belgium	Hunter

Ivory Coast ’06	
France	Skorpio

Lebanon ’06	
France	Sperwer

Model Aircraft

Recreational Purposes

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










Very Large Model Aircraft (> 150 kg)

UAS Segmentation

Non-Recreational Applications

A Possible Pan European Approach

To Be Regulated by National CAAs

Light UAS	MTOM > 150 kg	**Flight Alt. < 150 m AGL**	**< 500 m from pilot**	**Flight In Visual LOS**
		Flight Alt. > 150 m AGL	**> 500 m from pilot**	**Flight Beyond Visual LOS**

To be certified by EASA

UAS	**MTOM > 150 kg Incl. Option. piloted aircraft**	**Flight Alt. > 150 m AGL**	**> 500 m from pilot**	**Flight Beyond Visual LOS**

Quantity of UAS Models Produced in Europe

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	LUAS	UAS	Total		LUAS	UAS	Total
Austria		2	2	Netherlands	6	1	7
Belgium	1		1	Norway	5	2	7
Bulgaria	1		1	Poland	4		4
Croatia		3	3	Portugal	2	1	3
Czech Rep		1	1	Romania	1	1	2
Finland	1		1	Serbia	3	1	4
France	34	22	56	Slovenia	4	1	5
Germany	22	9	31	Spain	6	3	9
Greece		1	1	Sweden	1	3	4
Hungary	1		1	Switzerland	8	2	9
Italy	10	9	19	UK	30	15	45

European Total	Light UAS	140
	UAS	77

108 UAS Manufacturers in Europe

Austria	Schiebel
Belgium	FlyingCam
	Verhaert
	VITO
Bulgaria	Aviotechnica
Croatia	Defence Res. Est.
	Soko
Czech Rep.	VTUL à Pvo
Finland	Patria
France	ABS AeroLight
	Aerodrones
	Alcore Ind.
	Bertin Ind.
	Dassault Aviation
	EADS
	ECT Industries
	Euro MC
	Flying Robots
	Gates Techno.
	Infotron
	KYU Microdrones
	Novadem
	Onéra
	PixAir
	PolyAvionics
	PR Automation
	PY Design
	Sagem
	Sirehna
	SurveyCopter
	Technisolar
	Vertivision
Germany	AirRobots
	Diehl BGT Def.

Germany	EADS
	EMT
	Imar Navigation
	Mavionics
	MicroDrones
	Rhienmetall DE
	SIM Security
	UAV S&S
Greece	EADS
Hungary	HI Aero
Italy	A2Tech
	Alenia Aeronautica
	CIRA
	Internat.Aviation Supply
	Nautilus
	Nimbus
	Selex Galileo
	UTRI
Netherlands	Dutch Space
	E-Producties
	HighEye
	UAV Europe
Norway	CE Stephanson
	ET-Air
	Norut IT
	ProxFlyer
	Scandicraft
	Simicon
Poland	AF Inst.of Techn.
	Res.&Devlp Centre
	WB Electronics
Portugal	Uni. Of Porto
	Minho
Romania	Centrul de Invetica
	Electromecanica

Serbia	EMA
	Utva Aircraft Ind.
Slovenia	AvioTech
Spain	Aerovision
	Aitem
	EADS
	INTA
	SRC
	UAV Navigation
Sweden	CybAero
	Saab
	SmartPlanes
Switzerland	Aeromedia
	Aeroscout
	Skive Aviation
	MiniZepp
	RUAG Aerospac
	SwissCopter
	Swiss UAV
UK	Autonomous Vehicles
	BAE Systems
	CyberFlight
	Dragonfly Air Syst.
	FanWing
	GFS Projects
	Kestrel Aerospace
	MagSurvey
	Meggitt
	Merlin ISC
	QinetiQ
	Roke Manor
	Selex
	SkyShips
	Tasuma
	Thales
	U-Tacs
	VTOL Techn.
	Warrior

Quantity of Military UAS Types in Service in Europe per Country

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	LUAS	UAS	Total
Albania			
Austria			
Belgium		1	1
Bosnia			
Bulgaria		1	1
Croatia			
Cyprus			
Czech Rep.		1	1
Denmark			
Estonia			
Finland	1	1	2
France	2	3	5
Germany	1	2	3
Greece		1	1
Hungary	1*		1
Ireland		1*	1
Italy		3	3

	LUAS	UAS	Total
Latvia			
Lithuania			
Luxembourg			
Malta			
Macedonia			
Montenegro			
Netherlands	2	1	3
Norway			
Poland	1	1	2
Portugal			
Romania		1	1
Serbia			
Slovakia			
Slovenia	1*		
Spain		1 + 1*	1
Sweden		1	1
Switzerland		1	1
UK	1	3 + 1*	4

Total Nr System Types SUAS 10
UAS 25

* = On order

WHAT ARE THE PROBLEMS?

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Most military UAS are still "user specific"
High development costs + low volume production =
High acquisition cost & high ownership cost

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

Critical Issues : Sense & Avoid, Spectrum & Bandwidth
Insufficient R&D funding

Flight in non-segregated airspace is impossible
Uncoordinated individual national & multi-national initiatives
Insufficient international consensus on how to proceed

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

WHAT SHOULD BE DONE ?

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♦ INDUSTRY SHOULD BE THE DYNAMO

- ♦ National **approaches with co-operation between:**
  - Industry - Gvmt Authorities - Stakeholder Orgs - Academia
- ♦ **National efforts (**civil **&** military**) in** Europe **should be** coordinated **to form a European approach (**European Vision**)**
- ♦ **Approaches on** both sides of the Atlantic **to be** coordinated
- ♦ **Efforts to be** coordinated internationally **(beyond Europe & N. America): Australia, China, India, Japan, N.Zealand, Russia, S. Africa, Singapore, UAE**
- ♦ **International approaches to be harmonized at earliest possible stage**
- ♦ **Standards (**functional requirements**) to be consensually defined with more implication of national CAAs & ANSPs than is currently the case**
- ♦ **A** common terminology **in English should be defined**
- ♦ **ICAO should be implicated**

EUROPEAN STAKEHOLDERS

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Civilian Orgs

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

Multi-Nat. Orgs

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

Military Orgs

- EDA – Euro. Defence Agency
- EMAAG - Euro Military 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 Assn.
- Technology Platforms
  - ASTRAEA, UK
  - NIMUP, Netherlands
  - Pégase, France
  - PLATINO, Spain

Prof. Orgs & WGs

- ASD
- EUROCAE WG73
- Euro Air Sports Assn.
- (Multi)-National WGs
  - UAV DACH, A+ CH + DE + NL
  - UAV Germany, DE
  - former Castor, Sweden
- National Assns:
  - AESiNT, Spain
  - AVBS, Czech Rep.
  - PEMA UAV, Portugal
  - UAVS, UK
  - Ass. of Aerospace Universities, UK

Existing Multi-National Tech. Platforms

- ACARE
- ERTRAC
- EUROP
- SESAR JU

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
Germany	- BWB-WTD - DFS
	- Min. of Transport
	- UAV Germany NTP
Italy	- DGAA & ENAC
Netherlds	- CAA - NIMUP NTP
	- RNLAF
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
	- MoD-DPA
	- ParcAberporth
	- RAF UAV Battle Lab
	- UAVS Association

MULTI-NATIONAL

ASD	ASG-UAV WG
CANSO	UAV WG
EASA	A.NPA
EC-DGTREN	INOUI Programme
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	
UAV DACH	(A, CH, D, NL) ■
USEP	Security & Environt ■

■ Instigated by UVSI
■ Coordinated by UVSI

NTP = National Techn. Platform

● Contracts awarded to UVSI

NON-EUROPEAN
INSTITUTIONAL UAS-RELATED ACTIVITIES

OTHER COUNTRIES

Australia	- CASA - Civil Aviation Safety Authority
	- Department of National Defence
	- Defence Science & Technology Org.
	- University Initiatives
Canada	- CCUVS – Canadian Centre for UVS
	- DND – Department of National Defence
	- TC – Transport Canada
	- UVS Canada
Japan	- JAAA - Japan Agricultural Aviation Auth.
	- CAA
	- JAXA - Jap. Aerospace Exploration Agncy
	- Japan UAV Assn.
India	Min. of Defence & CAA & NASP
N.Zealand	UVS NZA Assn. & CAA
Russia	Min. of Emergency Situations (ERMERCOM)
Singapore	- Defence Science & Technology Agency
	- Min. of Defence & CAA
S. Africa	Min. of Defence & CAA
S. Korea	Korea Aerospace Industries Assn.
	KARI – Korea Aerospace Research Inst.
UAE	- CAA & UAE Air Force
	- UAV Centre of Excellence

USA

AIAA	Inst. of Aeronautics & Astronautics
AIA	Aerospace Industries Assn.
AOPA	Aircraft Owners & Pilots Assn.
ATCA	Air Traffic Control Assn.
DARPA	
DHS	Department of Homeland Security:
	- US Coast Guard
DOC	Department of Commerce :
	- NOAA
DOD	Department of Defense:
	- OSD (Office of Secretary of Defense)
	- Policy Board on Federal Aviation
	- US Army & US Army Research Lab
	- US Air Force & USAF Research Lab
	- US Navy & Navy Research Lab
DOT	Department of Transport :
	- FAA UAS Program Office
JPDO	Joint Planning & Development Org.
JIPT	Joint Integrated Project Team (US Army, US Air Force, US Navy):
	- Near Term: Advance COAs
	- Long Term: Access to the NAS
NASA AMES & NASA DFRC	
NGATS Next Generation Air Traffic System	
Standards Organizations :	
	- ASTM & RTCA & SAE
UAS Task Force	
University Initiatives	

Potential
Governmental Non-Military UAS Applications

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 ?

Current UAS Applications

Scientific Applications

Climate monitoring
Marine mammal monitoring
Cryospheric research (Artic/Antarctic)
Glacier & ice cap monitoring
Iceberg surveillance & tracking
Atmospheric chemistry measurements
Atmospheric radiation measurements
Open ocean research support
Land/forestry research
Ice pack patrol
Plant growth vigour mapping
Salt water infiltration detection
Crop monitoring
Volcano monitoring
Aerial pollution monitoring
Aerial photogrammetry
Coastal zone studies
Coastal mapping
Vegetation identification
Invasive species identification & analysis
Wildlife census
Thermal building imaging (heat wastage)

Security Related Applications

Border surveillance (AU, IL, USA)
International summit surveillance (CA, FR)
Road traffic surveillance (CH)
Sea lane surveillance (BE)
Regional surveillance (GASA) (IL)
Aerial crowd surveillance (voting offices) (ZA)
Forest fire surveillance (HU, US)
Experimentation (AU, CA, CH, FR, DE, ES, GB, IT, MY, NL, SG, PT, SE, ZA)

Contractor Supplied Flight Services

Operational (flight) training
Terrain mapping
Agricultural insecticide spraying
Agricultural fertilizer dispensing
Crop monitoring
Critical infrastructure inspection
Historical monument inspection
Magnetic field survey
Survey of drilling sites for oil & gas industry
Oil & gas pipeline monitoring
Forest fire operations support
Aerial mineral exploration
Aerial photography & video
Cinematographic aerial shots & special effects
Advertising (light-than-air UAS)(indoor & outdoor)

Operational Scenarios

Federating The International UAS Community

USEP - Generic scenarios defined in discussions with potential EU government users

Governmental non-military applications		Small UAS
- Customs Authorities	4	0
- Police Authorities	18	9
- Civil Security	9	3
- Environmental	9	7
- Flight Services (supplied by civil flight service providing companies)	7	4
Total of Scenarios	**47**	**23**

For details see: 2007 UAS Yearbook & www.uvs-info.com

Global Access Initiative

Instigated by UVS International **in co-ordination with** ACCESS 5 **(Aug 05)**

Encourage creation of national UAS industry working groups, organizations & associations to create National Visions.

Reach out to all relevant stakeholders on a global scale.

Facilitate the international exchange of information.

Promote & co-ordinate collaboration on international scale.

Promote early stage international harmonisation of UAS-related standards, rules & regulations.

www.uvs-info.com

Make all information pertaining to work ongoing internationally regarding the introduction of UAS into non-segregated airspace available to ALL .
Reference docs [military – regulatory authorities – studies - white papers (scientific, government & commercial user groups)]

CONCLUSIONS

Federating The International UAV Community

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

Significant 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
SC
Mil
Gvt
Sec
Uni
Sci

National Visions → European UAS Vision / North American Vision → Global UAS Vision

ALL international stakeholders should be involved.

Is a European Civil/Military Coordination Group required ?

USA & Europe should co-operate to prepare for the future.

URGENT PRIORITY: Light UAS (<150 kg)

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Federating, Instigating, Coordinating, Co-operating, Promoting, Disseminating Information for the Benefit of the International Unmanned Systems Community

UAS Segmentation

Non-Recreational Applications

Federating The International UAS Community

SUAS — Regulated by National CAA

Micro	MTOM <1,5 kg	Flight Alt. < 150 m AGL	< 500 m from pilot	Flight In Visual LOS
I II	MTOM >1,5 kg & <7 kg MTOM > 7 kg & <20/25 kg	Flight Alt. > 150m AGL	> 500 m from pilot	Flight Beyond Visual LOS
III	MTOM >20/25 kg & < 150 kg			

UAS — To be certified by EASA

UAS	MTOM > 150 kg Incl. Option. piloted aircraft	Flight Alt. > 150 AGL	> 500 m from pilot	Flight Beyond Visual LOS