SURVEY ON EUROPEAN UAS OPERATIONS & OPERATION RISK ASSESSMENT METHODS

CONCLUSIONS

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SCOPE & PURPOSE

The objective of the UAS OPS and OPS RISK surveys is to:

- Consult only European drone operators (*ECAC countries*) conducting flight missions in order to increase the validity & pertinence of the results.
- Identify the European drone operator community to the regulatory and standards communities, as well as to itsself.
- Apply an operation centric approach (not make a distinction between on the drones used based on airframe type, size, mass, or propulsion).
- Identify the drone operators by:
  a) Category of operation: Commercial and/or non-commercial
  b) Type of operator:
     - Corporate entity*:*
       - Drone manufacturer & operator
       - Drone operator
       - Flight school
       - Research organisation
       - Test & demonstration site management
       - U-Space service provider
     - Governmental entity:
       - Drone operator
       - Drone research organisation
     - Academia
     - Non-governmental entity (NGO)
- Identify the market sectors where non-military drone operations are currently taking place (*25 selections proposed*).
- Identify the flight missions currently being conducted (*33 selections proposed*).
- Concentrate on flight missions with the following operational parameters:
  a) VLOS, EVLOS & BVLOS
  b) Flight Altitude: < 500 ft
  c) Over densely and/or sparsely polpulated areas.
- Identify the evolution of the market sectors and the flight missions that are anticipated to take place in the near term (*1 to 2 years starting on 1st January 2021*).
- Indicate in which market sectors and for which flight missions BVLOS operations are anticipated to start or grow (*and will require the application of operation risk analysis*).
- Make a high level evaluation of the current comprehension and use of operation risk analysis methods.
- Based on the aforementioned points, identify & engage the drone operators with the expertise required to make a more detailed evaluation of the current use of SORA, and identify possibly associated difficulties, bottlenecks and gaps.
- Obtain information permitting to confirm the usefulness of the AW Drones "Open Standards Repository".
- Contribute to promoting awareness of the AW Drones Project with the European Drone Operator community.

Overview of the Scope & Purpose of the UAS OPS & OPS RISK Surveys

Designation	Applicability	Activity	Operation Parameters	Drone Operators	ECAC Countries
UAS OPS	**Current Situation** *(in compliance with applicable regulation)*	Identify the **market sectors** where drone flight operations are currently taking place.	**Control Distance: VLOS**, **EVLOS**, **BVLOS** **Flight Altitude: Below 500 ft** (150 m) above ground level **Overflown Areas**: **Densely** or **sparsely populated areas**		
		Identify the **mission purposes** of the flight operations currently taking place.			
	Near Future *1-2 years Starting 1 Jan. 2021*	Identify the **market sectors** where drone flight operations that are anticipated to take place **(new EU drone regulation)**.			
		Identify the **mission purposes** of the drone flight operations that are anticipated take **(new EU Drone regulation)**.			
	Obtain **limited high level feedback** on **current use** of **risk analysis methods** permitting the **qualification of the respondents** for participation in the **OPS RISK Survey**.				
OPS RISK	Obtain **more detailed feedback** on the **current use** of **SORA / Standard Scenarios / Predefined Risk Assessment and identify difficulties, bottlenecks & gaps.**				

RESPONDENTS

Total Quantity	247 from 22 countries						
Countries *(in order of quantity of respondents - between brackets)*	France	(64)	Belgium	(34)	Germany	(34)	Netherlands (30)
	Spain	(23)	Italy	(13)	Switzerland	(10)	UK (10)
	Ireland	(7)	Poland	(5)	Finland	(3)	Austria (2)
	Slovakia	(2)	Ukraine	(2)	Bulgaria	(1)	Denmark (1)
	Estonia	(1)	Greece	(1)	Lithuania	(1)	Portugal (1)
	Romania	(1)	Serbia	(1)			

Quality	Drone Operator (*nominally identified*)	
Category	Commercial Operators	188
	Non-Commercial Operators	59
Type	Corporate Entities (*6 sub-types*)	216
	Governmental Entities	12
	Research Organisation	5
	Association Federation, Union, TechCluster	6
	Academia	8

CURRENT SITUATION

GENERAL

1 Drone operations are taking place in all proposed Market Sectors (*except "Policy Compliance & Obtaining Legal Proof"*).

2 All proposed Flight Missions are taking place.

➔ See Tables 1 - 4 & Graphs 1 & 3 in the Annex 2.

COMMENTS

Market Sectors

1 The 10 out of 25 Market Sectors with the highest drone activity represent 86% of the total.

2 The 10 out of 25 Market Sectors with the lowest drone activity represent 6% of all conducted operations.

Flight Missions

1 All proposed Flight Missions are taking place.
2 The 10 principal Flight Missions represent 68% of the total of all possible flight missions.

Flight Envelopes

1 VLOS & EVLOS flights represent 59% of all flight missions.

2 BVLOS flights (*besides VLOS & EVLOS*) represent 41% of all flight missions.

Flight Zones

1	Flight missions flown only over densely populated areas	9%
2	Flight missions flown only over sparsely populated areas	45%
3	Flight missions over densely & sparsely populated areas	46%

CONCLUSIONS

1 The replies demonstrate a wide recognition of the perceived potential benefits of drone use (*commercial & non-commercial*) by corporate and governmental operators.

2 The replies are indicative of an immature & budding market and illustrate the Market Sectors where drone-related job creation is starting to taking place.

NEAR-FUTURE (1-2 YEARS)

GENERAL

1 It is anticipated that drone flight operations will be conducted in all proposed Market Sectors.

2 All proposed Flight Missions will be taking place.

➔ See Tables 5-8 & Graphs 2 & 4 in the Annex 2.

Principal Market Sectors - Evolution

	Current	Near-Future	Growth	Other Growth Sectors	
1 Construction & Real Estate	13,31%	9,77%	-27%	Heritage Site & Historical	
2 Maintenance (All sectors)	11,94%	11,92%	stable	Monument Managementt	+ 63%
3 Aerial Photography, Audio-Visual				Insurance	+ 17%
Production, Advertising	11,63%	12,09%	+ 4%	Miscellaneous - Air Show	+ 9%
4 Security & Law Enforcement	8,11%	8,10%	stable	Policy Compliance &	
5 Research & Science	7,39%	8,02%	+ 9%	Obtaining Legal Proof	+100%
6 Agriculture, Fishery, Forestry	6,85%	8,61%	+25%	Remote Ops - Non-Sensing	+ 23%
7 Public Services & Safety	6,56%	6,29%	- 4%	Remote Ops - Sensing	+ 20%
8 Environmental Protection &				Transport	+ 53%
Wildlife Conservation	6,15%	5,10%	-17%	Utility Companies	+ 16%
9 Flight Training / Instruction	5,43%	6,06%	+12%		
10 Cinema & TV Industry	4,27%	3,23%	-24%		
Mining & Exploration	3,84%	3,37%	-12%		
Total	85,48%	82,56%			

Principal Flight Missions - Evolution

	Current	Near-Future	Growth	Other Growth Sectors	
1 Aerial Photography &				Deterring	+ 85%
Film/Video Footage	14,48%	12,49%	-14%	Dispensing	+ 19%
2 Inspection	11,16%	10,59%	- 5%	Identification	+ 19%
3 Surveying	7,12%	7,10%	Stable	Search & Rescue	+ 33%
4 Monitoring	6,75%	7,53%	+12%	Sky Painting	+123%
5 Observation	5,60%	5,48%	- 2%	Sky Writing	+ 61%
6 Localisation	5,51%	5,79%	+ 5%	Special Purpose	+ 8%
7 Measuring	5,26%	5,62%	+ 7%	Spraying	+294%
8 Testing	5,21%	4,73%	- 9%	Transport - Goods	+ 39%
9 Broadcasting	3,73%	2,73%	-27%	Transport - Persons	+ 38%
10 Validation	3,31%	4,35%	+31%	Water Bombing	+100%
Mapping	2,91%	3,47%	+19%		
Total	71,04%	69,88%			

COMMENTS

Market Sectors

1 It is anticipated that the percentage of drone flight operations taking place in the 10 principal current Market Sectors will decrease from 86% to 79**%**, which indicates that there is more activity in the other Market Sectors.

2 ‘‘Aerial Photography, Audio Visual Production, Advertising’’ has exchanged first position with ‘‘Construction & Real Estate’’. ‘‘Mining & Exploration’’ has replaced ‘‘Cinema & TV Industry’’ in the tenth position.

3 The activity volume in the following Market Sectors is anticipated to change as indicated:

- Maintenance Stable
- Agriculture, Fishery, Fish Farming, Forestry + 26%
- Research & Science + 9%
- Flight Training & Instruction» + 12%
- Construction & Real Estate» - 26%
- Security & Law Enforcement» Stable
- Public Services & Safety» Stable
- Environmental Protect. & Wildlife Conserv. - 17%

Flight Missions

1 The quantity of flight missions represented by the top ten is anticipated to remain stable.

2 The designation of the anticipated ten most conducted flight missions is relatively stable. However, it is foreseen that ‘‘Broadcasting’’ will be replaced by ‘‘Mapping’’.

Flight Envelopes

It is anticipated that the quantity of operators conducting operations with the following Flight Envelopes will change as indicated:

- Only VLOS - 44%
- VLOS & EVLOS + 17%
- VLOS & EVLOS & BVLOS + 66%
- Only EVLOS - 12%
- VLOS & BVLOS + 50%
- Only BVLOS + 16%
- EVLOS & BVLOS - 15%

Flight Zones

1 The quantity of drone operators concentrating on operations over densely populated areas is anticipated to remain stable.

2 Logically, the anticipated decrease (- 27%) of drone operators concentrating only on flight operations over sparsely populated areas will translate into an increase (+ 27%) of drone operators conducting operations over **both** densely and sparsely populated areas.

CONCLUSIONS

1 The survey respondents anticipate an evolution from VLOS & EVLOS flights to BVLOS flights (61%), but VLOS & EVLOS flights will continue to be of interest for a significant number of applications (39%).

2 Consequently, the use of safety risk analysis methods will become increasingly important to a steadily growing number of drone operators.

3 This increase in BVLOS flights will create an increase in demand for services from flight training schools (+12%) and flight training sites.

SAFETY RISK ANALYSIS METHODS

GENERAL

➔ See review of survey results in Table 9 in the Annex 2.

COMMENTS

1 The extistance of the SORA is generally known, but only 53% of the respondents indicate they have read SORA.

2 76% of the respondents indicate that they have read the English edition, and 24% indicate that they have read an edition translated into their national language.
Note: The question should be asked if unreliable/inaccurate web-based translations have been used?.

3 36% of the respondents indicated that the SORA guidelines have been translated into their national language by their National Aviation Authority (NAA). However, consultation with the relevant NAAs has brought to light that none of them have translated the SORA guidelines into their native languages.

4 In most cases, the respondents obtained the SORA guidelines from a source other than EASA, JARUS or their NAA.

5 49% of the respondents indicate that they master the SORA terminology.

6 64% of the respondents state that they understand the SORA methodology.

7 35% of the respondents state they currently use SORA, but only 23% state they have submitted a SORA to their NAA.

8 The respondents currently carry out an operation safety risk assessment by means of:
- A process approved by their NAA 56%
- A Predefined Risk Assessment (PDRA) 7%
- A national standard scenario 12%
- ‘‘Another method’’ 23%

9 14% of the respondents use an independent third party to undertake their safety risk assessments, namely
- Qualified Entities 26%
- NAA-approved organisations/consultants 31%
- Notified Bodies 3%
- Organisations/consultants not approved by NAA (31%)

10 92% of all respondents indicated that an online tool to guide them through the establishment of a SORA would be of interest to them and 65% of them preferred to have this tool in their national language.

CONCLUSIONS

1 The SORA guidelines are currently only used by a relatively small minority of the European drone operators.

2 The knowledge of and experience with SORA permitted to qualify only 14% of the UAS OPS respondents to receive an invition to contribute to the OPS RISK survey. Only 8% actually completed the survey.

3 The use of risk assessment methods other than SORA (*e.g. nationally approved processes, national standard scenarios, predefined risk assessment*) currently has the preference of the majority of the drone operators.

4 The availability of the SORA guidelines in the national European national languages will, without any doubt, make the SORA methodology more accessible and understandable to many more operators, which would increase its use.

5 The current situation (*SORA is only available in English - no official nor courtesy translations have been made by any NAA*) does not give the operators in each EU Member State an equal opportunity to understand and use the SORA guidelines, as the English language is not evenly mastered in all EU countries.

RESPONDENTS

Total Quantity — **Invited**: Invited (*after qualification*): 34 *(14% of the total)*
Replied: 20 (*8% of the total*) from 12 countries

Countries *(in order of quantity of respondents - between brackets)*

Belgium	3	Italy	3	Netherlands	3	Bulgaria	2
Poland	2	France	1	Germany	1	Ireland	1
Spain	1	Sweden	1	Switzerland	1	UK	1

Quality — Drone Operator (*nominally identified*)

Category

Commercial Operators	75%
Non-Commercial Operators	25%

Type

Corporate Entity - Drone Operator	35%
Corporate Entity - Drone Manufacturer & Operator	25%
Corporate Entity - Flight School	15%
Corporate Entity - Research	15%
Governmental Entity - Drone Operator	10%

GENERAL

1 The very low amount of (*pre-qualified*) respondents (*8% of the total*) clearly indicates that SORA is not widely understood & used.

2 National Standard Scenarios (STS) and Predefined Risk Assessment (PDRA) and "other means" seem to be the preferred operation safety risk assessment methods.

➔ See Table 10 in the Annex 2.

COMMENTS

1 There is consensus amongst all respondents relative to the interest of having a Light UAS Operator Certificate (LUC).

2 85% of the respondents indicated being conversant in English and understanding the SORA terminology.

3 On average, 91% of the respondents indicated to be aware of the requirements in their country relative security, privacy & data protection, environmental protection, and the use of the radio frequency spectrum.

4 55% of the respondents have drawn up a ConOps, used national standard scenarios and conducted a SORA.

5 On average, 70% of the respondents indicate that they can conduct a SORA for each of their missions and are capable of applying GRC and ARC miligations.
Note: The respondents have a minimal understanding of the application of standards.

6 25% of the respondants have used a Predefined Risk Assessment, and only 10% have used an EU standard scenario.

7 20% of the respondents indicate that they can detect other aircraft in uncontrolled airspace.

8 80% of the respondents indicate that they report drone incidents.

9 Practically all respondents use third parties when required by the OSOs.

10 In the context of SORA, the respondents indicate use of the following standards:

EUROCAE	25%	ICAO	20%	EUROCONTROL	20%	ASD-STAN	15%	CEN	10%
ISO	10%	ANSI	5%	ETSI	5%	RTCA	5%	Other	**40%**.

11 The responents indicate that they have experienced difficulties with the following:

- Showing compliance with the safety objectives due to an absence of standards (or knowledge of the standards) 40%
- Operational Safety Objectives (OSOs) 100%
- Strategic mitigations 88%
- Technical information to be obtained from the drone manufacturer 88%

12 The respondents indicated that their operations were associated with:

SAIL 1	20%	SAIL 2	40%	SAIL 3	25%	SAIL 4	5%
SAIL 5	5%	SAIL 6	5%	SAIL 7	5%	Not known	**55%**

13 The respondents indicated that they can currently demonstrate compliance up to the following levels:

SAIL 1	15%	SAIL 2	35%	SAIL 3	20%	SAIL 4	20%
SAIL 5	10%	SAIL 6	5%	SAIL 7	5%	Not known	**45%**

CONCLUSIONS

1 Whereas English is the "lingua franca" of the European and international aviation community, this is not the case in the European drone operator community (*constituted by a majority of micro companies & SMEs/SMIs*). There are wide variations in the English language competencies between the drone operators in the EU Member States. This situation could lead to unequal opportunities for drone operators in different countries, which in turn could have a negative influence on the sector's job creation potential.
Note: The EU drone regulation does not impose a minimal level of English competency.

2 The possibility to access EU airspace should be equal for all qualified drone operators in all EU Member States. However, this is not the case when a large segment of the European drone operator community cannot grasp and comprehend the Acceptable Means of Compliance (AMCs) (*e.g. SORA*), because they have not been translated into the EU national languages. It is standard EASA procedure that the translation of AMCs into the national EU languages is left up to the discretion of the NAAs.
Note:
- If such documents are not made available to drone operators in their national languages, this could negatively impact the development of the EU drone market, as well as its job creation potential.
- In an ideal situation, making the referred to documents available in the EU national languages would be taken on by the national drone associations, but unfortunately they lack the resources for this task.

3 The NAAs of the EU Member States do not have the resourses (*and possibly, in some cases, the translators with the necessary competence*) to undertake the task of translating AMCs, Guidance Material (GM) and other critical documents (*e.g. the "Easy Access Rules for UAS"*) into their national language(s).

4 The same difficulty will arise concerning the access to and comprehension of the required standards, as most Standard Developing Organisations (SDOs) only publish standards in English.

5 In view of the aforementioned, it is anticipated that the use of independent third parties to conduct SORAs, and apply GRC mitigation & ARC mitigation strategies, will increase.

6 The aforementioned reinforces the potential for online tools (*in the EU languages*) to facilitate the safety risk analysis procedures for drone operators.

7 An additional reason for the anticipated increase in the demand for services by independent third parties (*Qualified Entities / Conformity Assessment Bodies / Notified Bodies*) is that the volume of work involved in the fields relative to Training, Airworthiness, Operations Manual qualification can only in some rare cases be taken on by the NAAs.

8 Currently, the actual use of standards is minimal. The necessity to use standards will increase with the increase of drone operations in the specific category. Independent third parties can be expected to have access to the required standards, which implies that their clients (*drone operators*) would not have to purchase the standards from the SDOs.

9 The identication by drone operators of the standards applicable (*partially or in their totality*) to a specific mission, is currently problematic for all drone operators in the context of:
- Showing compliance with the safety objectives of a specific mission 40%
- Operational Safety Objectives (OSOs) 100%
- Strategic mitigations 88%

Note: The standards applicable to the open category are currently expected by December 2021.

10 Obtaining the required technical information from drone manufacturers is currently problematic for most (88%) of the drone operators. Manufacturers simply do not answer requests, or refuse to give the information.

11 Practically all respondents indicate they have encountered difficulties with:
- Complying with OSOs
- Strategic mitigations

12 On the average, 50% of the respondents do not know:
- To what SAIL level their drone operations are associated.
- Up to what SAIL level they can demonstrate compliance.

13 80% of the respondants consider that the detection of other aircraft in uncontrolled airspace (< *500 ft*) is currently impossible.

1 The drone operators expect drone flight missions to increase in all market sectors. This increase is principally foreseen for BVLOS missions in the specific category. To make this possible and maintain, if not increase, the current volume of jobs in these market sectors, the following will have to be improved:

- Grasp and comprehension of the applicable operational risk analysis methods;
- Availability & acceptance of: ♦ Independent third parties; and/or
  ♦ Online tools to facilitate the safety risk analysis procedures;
- Availability & comprehension of the required standards;
- Availability of the required technical information from the relevant drone manufacturers/ distributors;
- Detection of other aircraft in uncontrolled airspace.

2 The AW Drones' "Drone Standards Information Portal" will facilitate the identification of applicable standards, which is going to be useful to:

- English speaking drone operators,

but also, and especially, for:

- "Independent third parties" (*Qualified Entities / Conformity Assessment Bodies / Notified Bodies*), which will probably be growing in importance.

ANNEX 1

SURVEY RESPONDENTS (Contriobuting Operators)

@ye.filmsbretagne-vidéos.fr	France
360images.be	Belgium
Actibot	Belgium
Actua Drone	France
AEA Energy	Ireland
Aerial Pictures	France
Aerial Ventures	Denmark
Aero Enterprise	Austria
Aeromedias	France
Aero Pyxis	France
Aéro-Nautic Formation	France
Aertec Solutions	Spain
African Drone Forum	UK
Air Drone Melide	Spain
Air Mobility by Setec	France
Airbus Defence and Space	Germany
Alpha Link Engineering	Germany
Altametris	France
Alticlip.fr	France
Altinime	France
Alto Drones	Italy
AML Technology	UK
ANWB Medical Air Assistance	Netherlands
AOZ-LFPM	France
Applied IPR	UK
Association À l'OuestImages	France
ATE Akademie/ Drone Safety	Germany
Atechsys	France
Athanor	France
Atlantique Expertises Drones	France
Atmoview Drone - AniWalls Production	Belgium
AuG Kiel	Germany
Autonomous Flight Technology	Romania
AVCA Logistics	Spain
AVR Ingénierie	France
Avtrain	Ireland
Azur Drones	France
BAM Galère	Belgium
bavAIRia	Germany
BE Drone & Engineering	Belgium
Bionic Eye (The)	UK
Boskalis Nederland	Netherlands
Bouygues E&S EnerTrans	Switzerland
Bureau de géomètres - Experts Morimont	Belgium
BVdrone	Finland
BVL de Winter	Netherlands
Calepsum Aeronautics	France
Capture4cad	France
CARAH	Belgium
Casper Smit Fotografie	Netherlands
Centre de formation Olivier Careau-EspaceModélismeArgelesSur Mer	France
Centre Drones Services	France
City of Jyväskylä	Finland
Civil Aviation Authority	Poland
Cofferon - Self Employed	Ireland
Colibrex	Germany
Condor IMS	Germany
Copter Squad UAS UG	Germany
Copterphot	Switzerland
D3E Electronique	France
Dany Starck	Belgium
DB Engineering & Consulting	Germany
Dcomdrone by DProds	France
DELAIR	France
Delta Advice	Germany
Delta Perspectives	Belgium
DeltaCopter / European Drone School	Belgium
Doks Innovation	Germany
Domdrone	France
Drona InTheAirForYou	Spain
Drone Class	Netherlands
Drone Déjà Vu	Netherlands
Drone Effect	France
Drone Engineering	France
Drone et Patrimoine	France
Drone Euskadi	Spain
Drone Photo and Video Services	Ireland
Drone R'Gie	Belgium
Drone Supervision	France
Drone2vues	France
Dronea	France
Drone Dreams!	Netherlands
Dronewatch	Netherlands
Dronify	Netherlands
Droning You	Spain
Dronivo	Germany
Dronotique	France
Dronude	Netherlands
Dunareade Jos University of Galati	Serbia
Dutch Filmgroup	Netherlands
Eagle Drones UK	UK
EBS Construction	Ireland
ecdrone	Italy
E-Drone-Tech	France
Emerald Style Company	Ireland
ENAC - EcoleNationalede l'AviationCivile	France
Engie	France
Eska Drones	France
ESSP - SAS	Spain
ESTACA	France
EuroUSC-Benelux	Belgium
Faculty of Aeronautics	Slovakia
FADA-CATEC	Spain
FADA-CATEC - Atlas Test Range	Spain
Fellner Organisation	Poland
Ferrovial	Spain
Feuerwehr	Germany
FG Services Aériens	France
FHU eMPiPiotr Małecki	Poland
Firefighter Department Trento	Italy
Flying Manta	France
FlyNex	Germany
Flyover di Vania Di Francesco	Italy
Forstliche Versuchs & Forschungsanstalt Baden-Wuerttemberg	Germany
Fotokite	Switzerland
Fotostudio Stebler	Switzerland
France Survol	France
Fraunhofer IFAM	Germany
Freiwillige Feuerwehr Hechingen	Germany
FuVeX	Spain

Geo Infra	Netherlands
Geodron Solutions	Spain
Georesearch Forschungsgesellschaft	Austria
GEOsat	Germany
GeoTech	Belgium
GeoZICHT - Drone Projecten	Netherlands
Germandrones	Germany
Goldy Aviations	Belgium
Gran Sasso Science Institute	Italy
Grijs Groen Advies	Netherlands
HD for YOU	Belgium
Heijdens Karwei Producties	Netherlands
Heliseo SAGL	Switzerland
Henri Coanda Labs	Italy
Hit & Run	Belgium
Hivebotics	France
Holding The Drones	Netherlands
Hubschrauberzentrum	Germany
IAV	Germany
ID2MOVE	Belgium
ILT - Human Environment & Transport Inspectorate	Netherlands
Insensiv	Germany
Instadrone Pau	France
Interconsulting	Italy
ISE	Spain
KEMEA	Greece
Knuckles5	Ukraine
Koetter Group	Germany
Kolordrone	France
Kopter-Profi	Germany
Kragten	Netherlands
Lancs Fire Service	UK
Leica Geosystems	Germany
Leitek Innovative Solutions	Portugal
Leondron	Spain
Liebenau Gebäude- & Anlagenservice	Germany
Live Emotions Studio	Belgium
Logiroad	France
Luchtbeeld.nl	Netherlands
Lukas	France
LZCreation	Belgium
Martin Detry	Belgium
Martin Keydel - Aerial Karlsruhe	Germany
MB-Drones	Netherlands
MD Drone	Belgium
Minute Drone	France
National Aviation University	Ukraine
Neva Aerospace	France
NLR - Netherlands Aeropace Centre	Netherlands
NOI Techpark	Italy
Oasis	UK
Oceansport Limited	Ireland
Office National des Forêts	France
OO-Drones	Belgium
Origin Stories	Netherlands
Paisajes Gallegos	Spain
Pascal Themans Productions	Belgium
Perlaux Graphics	Belgium
Phoenix Aerial	Italy
Pilgrim Technology	France
Pix-D	Belgium
PixxelAIR	Germany
PJF Drone	Spain
Prodrones	France
Realizacja Obrazu Marcin Kules	Poland
Rijkswaterstaat	Netherlands
Rijkswaterstaat	Netherlands
RM Drones	Spain
Roberto Pavoni	Italy
Rohner Bedachungen & Spenglerei	Switzerland
Rotterdam Brands and more	Netherlands
RPAS Services	Netherlands
Rusca	Italy
Rutger Lamers Fotoreportages	Netherlands
SATS	Finland
SBB CFF FFS - Swiss Federal Railways	Switzerland
Scandrone	France
SDIS - Service Départemental d'Incendie et de Secours 11	France
SDIS - Service Départemental d'Incendie et de Secours 58	France
Seateam Aviation	France
Securitas Belgium	Belgium
Shetland Flyer Aerial Media	UK
Siemens	Germany
Silent Wings	Germany
Silesian Aviation Cluster	Poland
Sky4D	Belgium
Skycorp	Estonia
SkyFun	Belgium
Skyledrone	Netherlands
Skyline	Italy
Snowdrop UAS	UK
SOTREFI	Belgium
Space53	Netherlands
Space Factory	Spain
Sport Turf Consulting	Italy
Star Engineering	France
Stichting Kenniscentrum Reeën	Netherlands
STRABAG	Germany
SupAirVision	France
SVZD - Swiss Federation of Civil Drones	Switzerland
Tech Drone Audiovisual Services	Spain
Technical University of Košice	Slovakia
Techn. Hochschule Ostwestfalen-Lippe	Germany
Télépilote	France
Tethered Drone Systems	UK
Thales Avionics	France
Thales AVS	France
Thrust Intelligent UAV Systems	Lithuania
Thyssengas	Germany
Tomedia	Belgium
UAS Consulting	Belgium
UAV Navigation	Spain
UAV Works Group	Spain
Universal Drone	France
Universität Rostock	Germany
Université de Liège	Belgium
Unmanned Systems Bulgaria	Bulgaria
Vecteur Tech	France
Visiodrone	Belgium
VisioFly	France
Visual Sky	Switzerland
Webinfomd	Belgium
Yannick Andrea	Switzerland
Zangano	Spain
Zenit Drones	Spain
Zetta Drones	France
Zipline	France

ANNEX 2

UAS OPS - CURRENT SITUATION

Table 1 - Principal Market Sectors		
1	Construction & Real Estate	13,31%
2	Maintenance	11,94%
3	Aerial Photography, Audio-Visual Production, Advertising	11,63%
4	Security & Law Enforcement	8,11%
5	Research & Science	7,39%
6	Agriculture, Fishery, Fish Farming, Forestry	6,85%
7	Public Services & Safety	6,56%
8	Environmental Protection & Wildlife Conservation	6,15%
9	Flight Training / Instruction	5,43%
10	Cinema & TV Industry	4,27%
Jointly representing 86% of the total		

Table 2 - Principal Flight Missions		
1	Aerial Photography & Film / Video Footage	14,48%
2	Inspection	11,16%
3	Surveying	7,12%
4	Monitoring	6,75%
5	Observation	5,60%
6	Localisation	5,51%
7	Measuring	5,26%
8	Testing	5,21%
9	Broadcasting	3,73%
10	Validation	3,31%
Jointly representing 68% of the total		

Table 3 - Flight Envelopes	
VLOS	48,26%
EVLOS	2,05%
BVLOS	10,51%
VLOS & EVLOS	8,62%
VLOS & BVLOS	10,41%
EVLOS & BVLOS	0,67%
VLOS & EVLOS & BVLOS	19,49%
In percentage of the total of the flight operations conducted	

Table 4 - Flight Zones	
Densely Populated	8,84%
Sparsely Populated	45,07%
Densely & Sparsely Populated	46,09%

UAS OPS - NEAR-FUTURE (1-2 years)

Table 5 - Principal Market Sectors		
1	Aerial Photography, Audio-Visual, Production, Advertising	12,09%
2	Maintenance	11,92%
3	Construction & Real Estate	9,77%
4	Agriculture, Fishery, Fish Farming, Forestry	8,61%
5	Security & Law Enforcement	8,10%
6	Research & Science	8,02%
7	Public Services & Safety	6,29%
8	Flight Training / Instruction	6,06%
9	Environmental Protection & Wildlife Conservation	5,10%
10	Mining & Exploration	3,37%
Jointly representing 79% of the total		

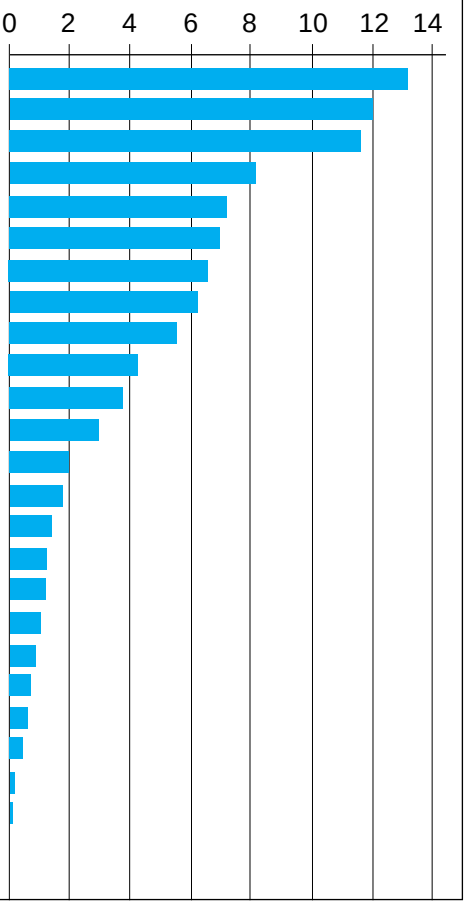
Table 6 - Principal Flight Missions		
1	Aerial Photography & Film/Video Footage	12,49%
2	Inspection	10,59%
3	Monitoring	7,53%
4	Surveying	7,10%
5	Localisation	5,79%
6	Measuring	5,62%
7	Observation	5,48%
8	Testing	4,72%
9	Validation	4,35%
10	Mapping	3,47%
Jointly representing 67% of the total		

Table 7 - Flight Envelopes	
VLOS	27,12%
EVLOS	1,81%
BVLOS	12,20%
VLOS & EVLOS	10,06%
VLOS & BVLOS	15,59%
EVLOS & BVLOS	0,57%
VLOS & EVLOS & BVLOS	32,66%
In percentage of the total of the anticipated flight operations	

Table 8 - Flight Zones	
Densely Populated	8,79%
Sparsely Populated	32,97%
Densely & Sparsely Populated	58,24%

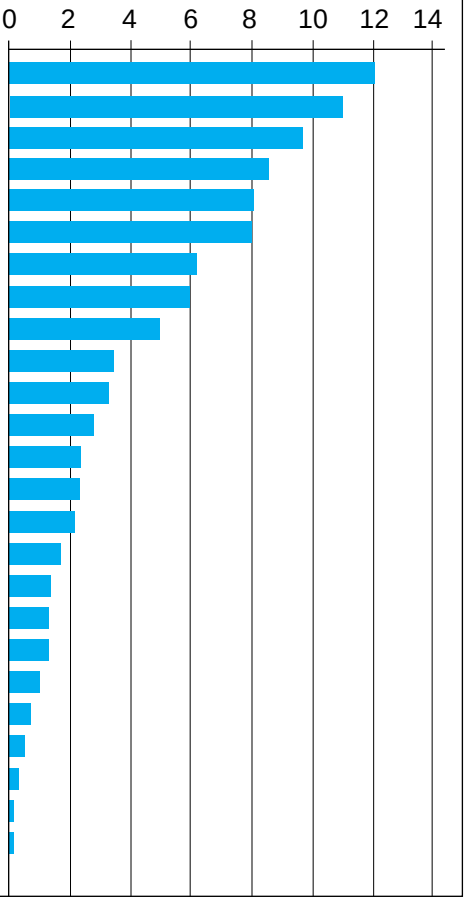
Graph 1 - Market Sectors - CURRENT

1	Construction & Real Estate	13,31%
2	Maintenance (all sectors)	11,94%
3	Aerial Photography, Audio-Visual, Production, Advertising	11,63%
4	Security & Law Enforcement	8,11%
5	Research & Science	7,39%
6	Agriculture, Fishery, Fish Farming, Forestry	6,85%
7	Public Services & Safety	6,56%
8	Environmental Protection & Wildlife Conservation	6,15%
9	Flight Training / Instruction	5,43%
10	Cinema & TV Industry	4,27%
11	Mining & Exploration	3,84%
12	Aircraft System or Sub-system Production	2,96%
13	Utility Companies (Public & Private)	2,06%
14	Remote Operations - Non-Sensing	1,88%
15	Entertainment, Artistic Expression & Sport	1,47%
16	Heritage Site & Historical Monument Management	1,31%
17	Humanitarian Aid	1,29%
18	Transport	1,11%
19	Remote Operations - Sensing	0,80%
20	Miscellaneous - Demonstration	0,64%
21	Insurance (Accident & Claim Investigation)	0,46%
22	News Gathering & Broadcasting	0,39%
23	Miscellaneous - Air Show	0,10%
24	Miscellaneous - Ferry/Positioning	0,05%
25	Policy Compliance & Obtaining Legal Proof	0,00%
	Total	100,00%



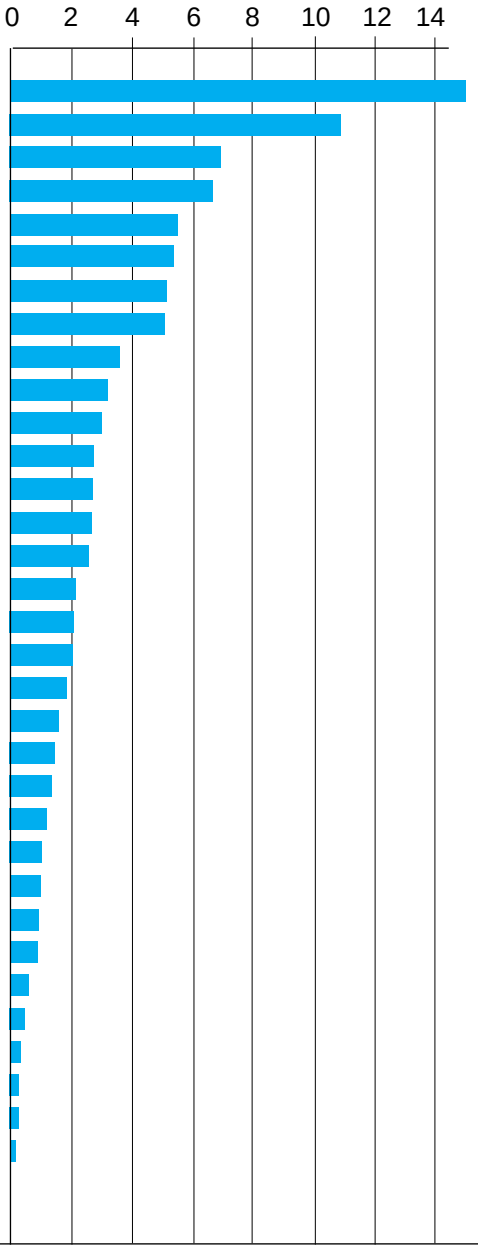
Graph 2 - Market Sectors - NEAR FUTURE

1	Aerial Photography, Audio-Visual, Production, Advertising	12,09%
2	Maintenance (all sectors)	11,92%
3	Construction & Real Estate	9,77%
4	Agriculture, Fishery, Fish Farming, Forestry	8,61%
5	Security & Law Enforcement	8,10%
6	Research & Science	8,02%
7	Public Services & Safety	6,29%
8	Flight Training / Instruction	6,06%
9	Environmental Protection & Wildlife Conservation	5,10%
10	Mining & Exploration	3,37%
11	Cinema & TV Industry	3,23%
12	Aircraft System or Sub-system Production	2,75%
13	Utility Companies (Public & Private)	2,38%
14	Remote Operations - Non-Sensing	2,32%
15	Heritage Site & Historical Monument Management	2,13%
16	Transport	1,70%
17	Humanitarian Aid	1,28%
18	Entertainment, Artistic Expression & Sport	1,22%
19	Insurance (Accident & Claim Investigation)	1,22%
20	Remote Operations - Sensing	0,96%
21	Miscellaneous - Demonstration	0,60%
22	News Gathering & Broadcasting	0,40%
23	Policy Compliance & Obtaining Legal Proof	0,34%
24	Miscellaneous - Air Show	0,11%
25	Miscellaneous - Ferry/Positioning	0,03%
	Total	100,00%



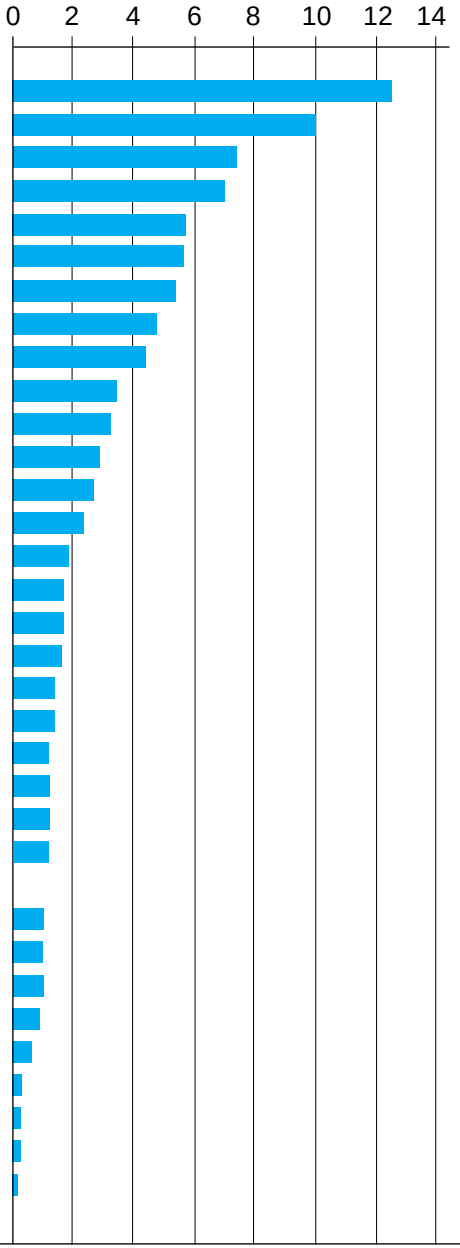
Graph 3 - Flight Missions
CURRENT

1	Aerial Photography & Film / Video Footage	14,48%
2	Inspection	11,16%
3	Surveying	7,12%
4	Monitoring	6,75%
5	Observation	5,60%
6	Localisation	5,51%
7	Measuring	5,26%
8	Testing	5,21%
9	Broadcasting	3,73%
10	Validation	3,31%
11	Mapping	2,91%
12	Spotting	2,86%
13	Relief Flight	2,79%
14	Security	2,77%
15	Identification	2,72%
16	Surveillance	2,13%
17	Search & Rescue	2,13%
18	Tracking	2,04%
19	Sensing	1,80%
20	Aerobatics, Special Effects & Sport	1,67%
21	Manipulation	1,64%
22	Dispensing	1,44%
23	Special Purpose	1,31%
24	Patrolling	1,27%
25	Advertising	1,16%
26	Transport - Goods	1,09%
27	Exploration	0,73%
28	Deterring	0,54%
29	Spraying	0,36%
30	Transport - Persons	0,21%
31	Sky Writing	0,18%
32	Sky Painting	0,13%
33	Water Bombing	0,05%
	Total	100,00%



Graph 4 - Flight Missions
FUTURE

1	Aerial Photography & Film / Video Footage	12,49%
2	Inspection	10,59%
3	Monitoring	7,53%
4	Surveying	7,10%
5	Localisation	5,79%
6	Measuring	5,62%
7	Observation	5,48%
8	Testing	4,72%
9	Validation	4,35%
10	Mapping	3,47%
11	Identification	3,24%
12	Search & Rescue	2,84%
13	Broadcasting	2,73%
14	Spotting	2,36%
15	Surveillance	1,91%
16	Sensing	1,82%
17	Manipulation	1,82%
18	Dispensing	1,71%
19	Tracking	1,54%
20	Transport - Goods	1,51%
21	Security	1,45%
22	Spraying	1,42%
23	Special Purpose	1,41%
24	Relief Flight	1,39%
25	Aerobatics, Special Effects & Sport	1,17%
26	Deterring	1,00%
27	Advertising	0,94%
28	Patrolling	0,89%
29	Exploration	0,69%
30	Water Bombing	0,34%
31	Sky Painting	0,29%
32	Sky Writing	0,29%
33	Transport - Persons	0,23%
	Total	100,00%



UAS OPS - SAFETY RISK ASSESSMENT

Table 9 - Review of Respondent Replies (*in % of the total*)

Has heard of SORA:	81%
Knows what SORA is:	69%
Possesses an electronic copy:	45%
- Has read the English version:	76%
- Has read a translated edition:	24%
Has obtained the SORA guidelines from:	
- EASA web site:	17%
- JARUS web site:	3%
- Its NAA web site:	11%
- Another source:	59%
Its NAA has translated SORA:	37%
Its NAA is in process of translating:	33%
Does not understand the SORA terminology:	51%
Understands the SORA methodolgy:	64%
Currently uses SORA:	35%
Has submitted a SORA to its NAA:	25%

Uses safety risk assessment method (other than SORA):	
- Process approved by its NAA:	56%
- National standard scenario	12%
- Predefined Risk Assessment (PDRA)	7%
- Other means:	23%
Uses a third party to produce safety risk assessment:	14%
Type of third party used:	
- Qualified Entity:	26%
- Notified Body:	3%
- Organisation/Consultant	
● NAA-approved:	31%
● Not-NAA approved:	31%
Would favor an online tool to produce SORA:	92%
Desired language of online SORA tool:	
- National languange:	66%
- English is acceptable:	34%

OPS RISK SURVEY

Table 10 - Review of Respondent Replies *(in % of the total)*

Company/organisation:	
- Has a LUC:	20%
- Plans to apply for a LUC:	75%
Company/organisation conversant in English:	85%
All SORA-related terms are understood:	85%
Is aware of requirements applicable to:	
- Security:	85%
- Privacy & data protection:	100%
- Environmental protection:	95%
- Use of radio frequency spectrum:	85%
Has already:	
- Drawn up a ConOps:	55%
- Used a national standard scenario:	55%
- Used an EU Standard Scenario (STS):	10%
- Used a Predefined Risk Assessment:	25%
- Conducted a SORA:	55%
Is capable of:	
- Conducting a SORA for each mission:	70%
- Applying GRC mitigation strategies:	76%
- Applying ARC mitigations	78%
ARC mitigation measures - Application of standards produced by:	
- RTCA SC-228:	15%
- EUROCAE WG-105:	15%
- ASD-STAN:	10%
Detection of other aircraft in the operational airspace volume:	
- ADS-B:	45%
- FLARM:	10%
- Transponder:	15%
- 4G/5G-based solution:	20%
- Web-based tracking system:	40%
- Other:	35%
Can detect all other air traffic in uncontrolled airpsace:	20%
Drone incidents are reported:	80%
Third parties used when required by the OSO:	
- National Aviation Authority (NAA):	75%
- Organisation approved by NAA:	20%
- Organisation not approved by NAA:	5%
- None:	20%

Entities allowed to authorize drone operations based on SORA:	
- Qualified Entity - Training	40%
- Qualified Entity - Airworthiness	30%
- Qualified Entity - Ops Manual	45%
- Conformity Assessment Body - Training:	0%
- Conformity Assessment Body - Airworthiness	5%
- Conformity Assessment Body - Ops Manual	5%
- Notified Body - Training	5%
- Notified Body - Airworthiness	15%
- Notified Body - Ops Manual	15%
- U-Space Service Provider - Training	5%
- U-Space Service Provider - Airworthiness	10%
- U-Space Service Provider - Ops Manual	15%
From which Standard Development Organisation do you use standards to demonstrate compliance:	
- EUROCAE	25%
- ICAO	20%
- EUROCONTROL	20%
- ASD-STAN	15%
- CEN	10%
- ISO	10%
- ANSI	5%
- ETSI	5%
- RTCA	5%
- Other	40%
Has encountered difficulties to show compliance with required safety objectives due to lack of standards:	40%
Has encountered difficulties relative to the following:	
- Operational Safety Objective (OSO)	100%
- Strategic mitigations	88%
- Technical drone information (manufacturer)	88%

Drone operations associated to SAIL level:

- SAIL 1	20%	- SAIL 5	5%
- SAIL 2	40%	- SAIL 6	5%
- SAIL 3	25%	- SAIL 7	5%
- SAIL 4	15%	- Not known	55%

Currently compliance can be demonstrated up to SAIL level:

- SAIL 1	15%	- SAIL 5	10%
- SAIL 2	35%	- SAIL 6	5%
- SAIL 3	20%	- SAIL 7	5%
- SAIL 4	20%	- Not known	45%

EUROPEAN UAS OPERATIONS
&
OPERATION RISK ASSESSMENT METHODS

Funded By The European Union

In The Context Of The Horizon 2020 Programme