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HEARING ON LIGHT UNMANNED AIRCRAFT SYSTEMS (UAS)
08 October 2009 – Brussels

REPORT

1 Unmanned Aircraft : A new field for civil aerospace development

Aviation has been mainly developed along the concept of aircraft operated with a pilot operating on board. The idea to use unmanned or remote piloted aircraft for specific applications emerged at the earliest ages of aviation, but the necessary technology was lacking to rend it viable. The evolution over last years in the aerospace sector is now providing all the necessary technical tools to make the insertion of unmanned aircraft in the airspace a reality. Therefore, unmanned aircraft is becoming new paradigm for aviation, creating new potential usage, but requiring an adapted approach compared to the one applied to manned aircraft.

1.1. First approach to Unmanned Aircraft (UA)

From a definition point, an unmanned aircraft (UA) is a pilotless aircraft, in the sense of Article 8 of the Convention on International Civil Aviation, which is flown without a pilot-in-command on-board and is either remotely and fully controlled from another place (ground, another aircraft, space) or programmed and fully autonomous.

Whether the aircraft is manned or unmanned does not affect its status as an aircraft, each category of aircraft having the potential for future unmanned versions. Unmanned aircraft must be differentiated from aircraft used for recreational purposes and designated as model aircraft, unmanned aircraft being used only for commercial or aerial work purposes. Non-power driven aircraft are excluded from the unmanned aircraft family.

The following terms are also encountered for the designation of unmanned aircraft (systems): drone, RPV (remotely piloted vehicle), UAV (unmanned aerial vehicle, unmanned air vehicle), UAV system. The term unmanned aircraft system (UAS) is now preferred by the sector, covering the flying vehicle itself and all the components necessary to accomplish the mission objectives.

In Europe unmanned aircraft are divided in two major groups, which are each regulated by different authorities:

- UA with a maximum take-off mass of more than 150 kg. These systems are regulated by the European Aviation Safety Agency (EASA);

- UA with a maximum take-off mass of less than 150 kg, commonly designated as Light UAS. These systems are regulated by the national civil aviation authority.

1.2. The emergence of civil applications for Unmanned Aircraft

The Unmanned Aircraft Systems (UAS) are currently principally used by the military, but there is a growing interest for non-military usage in the civil environment for a number of governmental functions, like border control, fire fighting, ground traffic surveillance, and pollution control. Unmanned systems reduce human life exposure in long, dull, dirty or dangerous air missions. They provide potential economic savings and environmental benefits with less fuel consumption, less CO2 emission, and less noise than for manned aircraft.

Current military UAS types are now migrating into civilian roles and applications, while newer designs are being tailored specifically for the civil market. The development of unmanned aircraft also contributes to the improvement of manned systems, in particular in support of single pilot operations and for the development of anti-collision systems, and shall be a valuable enabler for testing and implementing new technologies and procedures for the aviation as a whole.

In the short-term, the majority of systems used will be small or mini-UAV systems that are easier to use within the present air safety regulatory framework. Procurement of light unmanned aircraft systems is facilitated by the low required financial outlay, the less sophisticated payload requirements (when compared to military) and the lower training burden. By the middle of the next decade, European government use of UAS is expected to grow consistently for non-military applications[1]. – The explanation of [1] is missing.

2 Insertion of Unmanned Aircraft in European airspace: The challenge ahead

2.1 The absence of European legal framework for UA integration

The full and seamless integration of unmanned aircraft in European airspace is a huge challenge for the whole aviation community. The emergence of the unmanned aircraft market is currently quite limited due to the impossibility to routinely fly unmanned aircraft within national airspaces and across national borders. The absence/lack of a European regulatory framework encompassing civil and military unmanned aircraft, prevents the development of legally authorized unmanned aircraft operations.

This situation does not allow the industry to build pertinent business plans and to develop new products adapted to their clients.

2.2 UAS integration within the Single European Sky context

a) The difficulty to achieve a single internal market

The European industry needs sufficient economies of scale to be confident of a return on their investments in the unmanned aircraft segment. The future military market for unmanned aircraft alone is insufficient to effectively amortise the high costs of development and certification, unit production costs being uncompetitive or even unaffordable. In the future, internationally competitive unmanned aircraft therefore need to transcend the civil, security and defence sectors.

b) The difficulty to operate in European airspace

The Single European Sky (SES) aims to establish a European air traffic management environment capable to accommodate the future growth of aviation in Europe, while maintaining a high level of safety and a good quality of service.

It provides a set of measures enabling safer, greener and more cost-efficient flights, putting the needs of airspace users at the core of the system. SESAR[1] is the technological pillar of the SES, and brings together all aviation stakeholders to develop, validate and deploy a new generation of air traffic management system throughout Europe over the next thirty years.

The Single European Sky, complemented by the SESAR Programme, provides the overarching context for enabling the safe access to the airspace for all legitimate airspace users without any discrimination. Specific constituents like unmanned aircraft clearly have to be considered in that context.

c) First attempt to inventory the obstacles

Under its 6th Framework Programme, the European Commission supported the INOUI[2] project, which aimed through a holistic approach to identify the necessary requirements to insert unmanned aircraft in the future Air traffic Management (ATM) environment (SESAR). INOUI federated most of the current efforts made by the sector through civil-military cooperation and a multidisciplinary approach, bringing together industry, authorities, international organizations and agencies, air navigation service providers, and others.

INOUI assessed future operational concepts for unmanned aircraft and identifies procedures and requirements, evaluating the necessary actions to be taken to insert unmanned aircraft at the earliest possible point in time. Certification requirements and related processes were also looked at, as well as the potential benefits from System Wide Information Management (SWIM). It also addressed safety issues for UAS and aimed to develop high level safety objectives and requirements.

INOUI has produced several deliverables publicly available and covering concepts for civil UAS operations, and the definition of the future unmanned aircraft environment, UAS certification, safety criteria and the scope of related risks. The INOUI project results were presented to the unmanned aircraft stakeholder community in a final dissemination forum in December 2009.

2.3 Methodology followed by the European Commission

The European Commission is assessing what could be its potential role to support the emergence of the unmanned aircraft sector. Before launching concrete actions, it is necessary to fully understand the potential European industry baseline, the potentialities and benefits offered by UAS to the European citizens, and the existing obstacles to the market emergence.

In order to achieve this, the EC shall meet the various stakeholders of the UAS segments through dedicated hearings and a high level Conference, which will take place in April 2010.

The insertion of unmanned aircraft has been integrated in the Single European Sky work plan and was presented to the Single Sky Committee (SSC) and to the Industry Consultation Body (ICB) in July 2009.

[1] Single European Sky ATM research
[2] http://www.inoui.isdefe.es/INOUI/

2.4 Objectives of the Light UAS hearing conducted on 8 October 2009

The first hearing dedicated to unmanned aircraft took place on Thursday 8th October 2009. It was dedicated to the Light UAS segment, which is composed of unmanned aircraft with a maximum take-off mass of less than 150 kilograms**.** The main objectives of this event were:

- To understand the current European Light UAS industrial base and the current Light UAS applications in Europe.
- To identify potential obstacles, enablers and best practices in Europe;
- To exchange directly with the European Light UAS community views and assess the future potential role of EC for the insertion of Light UAS;

3 Conduct of the hearing

A wide representation of the European Light UAS sector

The event was attended by 49 European representatives of the civil Light UAS community. The hearing gathered governmental authorities, manufacturers, flight service (aerial work) providers, national police forces, fire brigades, national and international associations and working groups, research organizations, EUROCAE, and the European Defence Agency (EDA).

Support for the hearing

A survey has been conducted by UVS International[3] specifically for the hearing. Conducted during the summer 2009, it provided a very useful overview of the current Light UAS sector involved in systems for non-military applications.

- The hearing was also supported by 12 presentations given by European users of Light UAS, representing governmental entities already using Light UAS for specific missions, companies and associations:
    - Estacion Biologica de Donana – Conseja Superior de Investigaciones Cientificas (CSIC), Spain ;
    - National Police, Anti-Drugs Force, The Netherlands;
    - Ministry of Interior, Directorate General of Federal Police, Germany;
    - Northern Research Institute, Norway;
    - Swedish Forestry Agency, Sweden;
    - West Midlands Fire Service, UK.
    - Aeroart, France ;
    - Aerofilmphoto & Vision du Ciel, France;
    - Gatewing, Belgium;
    - HighEye, The Netherlands;
    - VITO - Flemish Institute for Technological Research
    - UVS International, The Netherlands;

[3] UVS International (Unmanned Vehicle Systems International) is a non-profit international association composed of 260 corporate and institutional members in 37 countries. Dedicated to the promotion of unmanned systems (air, ground & naval), it supports and represents the interests of its international members on a world-wide basis. Members represent all areas of industry, government (civil & military) and academia with an interest in unmanned systems (air, ground & naval).

Main areas of discussion

Four main domains of interest were covered by the discussions:

- Nature and specificities of the European Light UAS industry base;
- Current public and private applications taking place in Europe;
- Potential advantages and benefits of Light UAS to European citizens and users;
- Obstacles and difficulties relative to Light UAS operations and their development in Europe.

4 Content of the discussions

4.1 The European industrial and developmental base for Light UAS

The size of the European Light UAS industry is significant, with an industrial and developmental base of 105 small and medium enterprises (SMEs) and 10 industrial entities[4] involved in this business. The SMEs are a significant dynamic force, especially in the field of systems dedicated to non-military applications. Numerous SMEs are also indirectly involved in the market through the development of payloads, specific parts of the UAS (battery, software, engines, etc.) or by the provision of services based on or using UAS.

Most of the SMEs investing in the Light UAS segment sector are not part of the traditional aviation community and their interests are therefore not represented by specific aviation-related associations.

The large companies are hardly involved in the development and production of Light UAS, principally because their overheads are too high to permit the supply of a final product for non-military applications at an acceptable market price. They are nevertheless often teamed with SMEs involved in the development and the production of Light UAS.

The European Industry is well developed in the field of Light UAS. However, the absence of harmonised rules and regulations to operate in European airspace, and the lack of the necessary political support (due to insufficient awareness) might jeopardize all the efforts made so far to keep this new emerging branch of the aerospace sector at the frontline.

4.2 Current applications based on the effective usage of Light UAS

The hearing showed that Light UAS are already used in Europe for a large spectrum of governmental and non-governmental applications.

The market for Light UAS already exists and presents many potentialities, which are in many cases not yet identified by many of the potential users. The potential interest relative to the use of Light UAS is being transformed, step by step, into factual use by governmental authorities (See Annex 2), despite a limited – and sometimes experimental - usage. Most of the current applications presented are of high value for the citizens, and could create motivation with new customers to evaluate the potential offered by unmanned

[4] Industry is classified as having more than 250 employees and an annual turnover of over 50 Million€. An SME is classified as having less than 250 employees and an annual turnover of less than 50 Million €;

aircraft systems, thereby significantly increasing the short/medium term market potentialities.

The use of Light UAS is significant for civil security operations, in particular for supporting the fight against building fires, post fire investigations, motorway road traffic collision monitoring, chemical cloud release monitoring, searching frozen lakes for missing persons (thermal). UAS greatly improve the pre-intervention situational awareness of the authorities, which can be of prime importance in case of dangerous environments like collapsed buildings (earth quakes), chemical clouds, floods, etc.

Light UAS are also widely used for the monitoring of wildlife and nature observation, and reveal excellent capabilities in support of the meteorological domain (better capabilities/manoeuvrability than balloons). The following applications were also highlighted at the hearing: atmospheric and climate research, land monitoring (vegetation, fauna, hydrology, salt water infiltration) and ocean monitoring (sea-state, algae, sea-ice, and icebergs).

Light UAS are also capable to efficiently complement satellites, offering an excellent reactivity and a more permanent availability to the relevant authorities. UAS bridge the gap between what can be measured by satellites and what is measured at static ground-based research stations.

Most of the governmental non-military applications take place on an exemption basis without any existing legal framework, a potential risky situation for the whole UAS community, if any accident occurs. Very few national operational rules relative to aerial works are established, creating a legal barrier to the development of the market for manufacturers and aerial work suppliers.

4.3 Potential advantages and benefits of Light UAS for citizens

Light UAS provide authorities with new possibilities that did not exist before with manned aircraft. They limit physical risks for civil servants in dull, dirty and dangerous environments, due to the absence of crew on board and the non necessity to be physically involved on site.

Light UAS are easy to transport, relatively simple to deploy, easy to launch and recover, and show real advantages in terms of durability, modularity, silence, substantial autonomy and high degree of controllability.

The absence of pilots onboard the air vehicle brings new potentialities in terms of protection of the environment, noise abatement, reduced fuel consumption and CO2 emission. Light UAS present a high level of mobility and reactivity, supplying authorities with a rapid response capability in support of outdoor and indoor operations. Simpler than any manned aircraft systems developed for similar activities in terms of deployment and use, Light UAS have low cost operations and are less demanding in terms of resources allocated.

Light UAS allow long time surveillance, modularity through fusion of data coming from multiple onboard sensors (electro-optic, infrared, radar, etc…), and operations under extreme conditions.

Light UAS also complement data obtained from manned aircraft and satellites to better fit user's requirements, while creating possibilities of synergies of systems by combined operations. Unmanned aircraft systems enable persistent observation on demand, with a crew replacement that does not affect operations.

The user base for Light UAS is very large, enabling the use of these systems for all types of missions and by a large customer base. They also offer possibilities for operations run by public and private entities, thereby creating new business opportunities for the sector. Most current non-military Light UAS applications take place within visual line-of-site and at altitudes inferior to 150 meters, and are therefore outside airspaces used by manned aircraft. Consequently, a significant number of applications could rapidly be fulfilled with the existing Light UAS technology.

4.4 Current obstacles to Light UAS development

Lack of legal European environment

In Europe, no harmonised rules and standards exist for the insertion of unmanned aircraft. The certification and operational requirements for Light UAS with a minimum take off mass below 150 kg are the responsibility of the European National Aviation Authorities (NAA). The European Aviation Safety Agency (EASA) is responsible[5] for unmanned aircraft above the 150 kg limit. Due to the complexity of the task, very few States have developed *ad hoc* legislation and certification processes, and currently no harmonisation has taken place between national regulations. However, several States are attempting to address this topic within the JARUS initiative[6].

The absence of legal framework hampers the development of the European Light UAS market and adversely impacts the possibilities to conduct cross-border operations and the exchange of systems and personnel between national authorities. This situation also obliges the manufacturers to adapt the specifications of the systems for each Country where they are to be deployed or sold, generating an unbearable complexity and important additional costs. Because of this situation unmanned aircraft operations are principally restricted to segregated areas, which is a strong limitation to the full exploitation of the potential capabilities and qualities of Light UAS.

The International Civil Aviation Organization (ICAO) has engaged activities related to the insertion of unmanned aircraft, but the development of ICAO rules is not foreseen before a long time. Additionally, ICAO does not seems to consider itself competent in the field of Light UAS.

Lack of training and licensing requirements

There is no harmonisation of European standards relative to the recruitment, training and licensing of personal involved in Light UAS operations, procedures and proficiency levels. This situation prevents operators and pilots to have a common base of knowledge and skills, and prevents the implementation of similar procedures and mutual recognition of Licences. This is also a brake to the mobility in Europe of the qualified staff.

A dual civil/military approach to the training and licensing issue could provide military pilots with the possibility to operate Light UAS in a mixed environment and provide them with a better perspective in terms of recycling from military jobs into non-military ones, when retirement time comes around.

[5] According to Article 4.4 of EC Regulation 216/2008

[6] JARUS (a regulatory working group consisting of the national civil aviation authorities of 15 countries: Australia, Austria, Belgium, Canada, Czech Rep., France, Germany, Italy, Malta, Netherlands, South Africa, Spain, Switzerland, UK)].

Lack of airspace access

Very few Countries have defined specific rules for the Light UAS access to the airspace, and currently no harmonisation exists between the approaches taken. The criteria to operate in proximity of populated areas or in urban areas are not harmonised, creating differences in the way to operate.

For Light UAS operations below 150 meters, where no interference can occur with manned aviation, rules and equipment applied are still derived from manned aircraft standards, and are therefore not adapted to their specific needs.

Most of the time, the delivering of flight authorisations for aerial work is subject to long procedures, which are identical to manned aircraft activities. Made on a case-by-case basis, at a local level, the time to get a permit may range from a few days to several weeks. In many cases, local authorities are not familiar with those new systems and the lack of regulation and harmonisation of legislation causes long procedures due to the difficulty to address the authorisation of unmanned aircraft flights. Aerial work suppliers and their customers are therefore obliged to plan the flights far in advance and to submit the necessary applications well ahead of time. This situation adversely affects the potential use of Light UAS for emergency missions or governmental use, and diminishes the added value of flexibility and mobility required for such applications.

Common certification processes and standards: A must for the industry

In Europe, no harmonised technical airworthiness code has been developed for Light UAS, and no type approval/certification process is in place. The UAS sector below 150 kg is composed of aerial vehicles of very different types, capabilities, size and weight. Therefore, adaptation shall be required to accommodate them on the basis of their intrinsic relevant risk levels.

The Light UAS community needs a single certification process applicable in all EU States that should provide national authorities with:

- A single set of safety rules applied uniformly in all States;
- A clear affordable process with clear steps and specific outcomes;
- A short process to enable fast track certification for Light UAS deployed in emergency and time critical deployments;
- A set of rules allowing minimum segregation for operations.

In many States, the grant of an aerial work license to a UAS operator is almost impossible, as no appropriate framework for certification of the unmanned aircraft systems exist. This affects the development of professional activities based on Light UAS utilisation for governmental and commercial use.

The absence of definition of safety levels

The perception of the safety levels and requirements is not harmonised among Countries and is subject to frequent changes. The safety criteria are currently based essentially on risk assessments, and no systematic and pan-European approach exists for their definition. The requirements applied too Light UAS are most of the time identical to those applied to manned aircraft and therefore do not necessarily meet the specifities of unmanned aircraft systems.

In the field of safety, there is a great fragmentation of the developments related to the system components contributing to enhance the level of reliability and safety, such as: shock absorbing and frangible airframe structures, electric propulsion units, fail safe systems, automatic take-off and landing/recovery systems.

The absence of a federated research and development effort is therefore limiting the possibility to obtain results and appropriate answers for the industry. The European approach should permit to get short term solutions and benefits and to ensure convergence of choices.

The absence of common requirements

Unmanned systems are characterized by a separation between the pilot in command and the aerial vehicle. Compared to manned aircraft, this requires additional communication sub-systems to ensure a permanent and reliable dialogue between the various constituents of the system, and in particular between the pilot and the aircraft.

Dedicated solutions for UAS are mainly derived from existing technologies and procedures. However, specific developments are probably necessary in order to better match Light UAS requirements, due to the importance of getting miniaturised systems, low power consumption systems, which may also vary depending on the type of UAS used, the type of missions, the flight environment and the distance between the pilot the vehicle.

Light UAS need to rely heavily on communication, navigation and surveillance (CNS) technologies that are essential for ensuring their safe, efficient, secure, and reliable integration into the airspace. This is also essential to ensuring that flight operations are transparent to other airspace users and air traffic controllers, and that they do not have a negative impact on current safety levels.

UAS missions need a data link to control and command the unmanned aircraft, and another data link to down-link onboard payload. The safe and secure command and control of unmanned aircraft can only be guaranteed with a high level of safety, if the necessary connectivity exists, and the required frequency and bandwidth to control the unmanned aircraft are available, in particular when the unmanned aircraft is beyond the line-of-sight of the control station or outside radio coverage. The knowledge of all flying parameters (down-linked to the control station by telemetry) is essential to ensure the appropriate handling of the aircraft, and when automatic phases of flight are conducted, the pilot must, in the case of unexpected or emergency situations, be able to take over direct control of the unmanned aircraft.

The lack of dedicated radio frequencies seriously hampers unmanned aircraft that must have access to appropriate spectrum frequencies to operate. Operators are currently not able to rely on dedicated and interruption-free data links using dedicated and secure frequencies.

Satellite systems can play an essential role in this command and control capability, since they offer the possibility to control the unmanned aircraft any place where satellite coverage exists. The use of satellites also enables the necessary transfer of appropriate data with an acceptable level of permanence and reliability, which is essential for the safe operation of UAS in segregated and non-segregated airspace. Appropriate high speed data links should be available to ensure that maximum benefits shall be provided to UAS operations.

Weather conditions: a natural adversity of Light UAS operations

Light UAS are sensitive to the changes impacting their environment, like wind speed, turbulence, rain, hail, snow, icing, low temperatures, which effect both the operators and the equipment. Therefore, it is necessary to ensure that common operational standards, mandatory on-board equipment and crew skills are defined to ensure maximum reliability of the system in all situations. .

Miscellaneous elements to be further addressed

The responsibility and the liability of the different actors involved in the operations of Light UAS are not precisely defined, as the role and the main obligations of the stakeholders concerned being different from one State to another.

The insurance regime applied to Light UAS operations must be clearly defined, divergent policies being applied by companies. The cost of the insurance can be prohibitively expensive and beyond the funding capabilities of unmanned aircraft operators, as in some cases the insurance companies compensate the absence of legal framework by an overcharging. It is not sure at this stage, that a single insurance policy is sufficient to cover a UAS operator.

Export restrictions might be applied for Light UAS, as some Countries classify them as military equipment, or dual purpose systems. A restriction to the export of certain UAS sub-assemblies and/or components also impacts the exportability of the UAS.

5 Conclusions and recommendations

This first hearing has been a real success and a fruitful exercise. The Light UAS community has provided the Commission with a great number of elements of appreciation the current situation relative to Light UAS, allowing a better understanding of their requirements, and permitting to define the line of action required for the introduction of Light UAS into European airspace.

The hearing demonstrated that light UAS are already used by a significant number of governmental authorities, in particular for police, customs, border control, fire fighting, natural disasters, and search and rescue missions.

Unmanned system-related technologies are of strategic importance for Europe, with many potential spin-off applications, possibly even including for manned aviation. Like it was the case with space, unmanned aircraft may catalyse developments for complex technologies, including low fuel consumption, fuel cells, small large capacity batteries, computers and systems, green engines, sensors.

Light unmanned aircraft can be viable and competitive products, if they are low cost entry-level solutions for customers. Once a legal framework exists, a totally new aerial work service supply industry should sprout rapidly.

A *minima* European regulation could speed up the emergence of the market, the routine deployment of Light UAS being hampered by the current regulatory situation in Europe. The fast-track creation of dedicated standards and rules and regulations would be beneficial for the European Light UAS industrial community and provide civil society with a very wide range of benefits.

In addition, it would make it possible for a totally new aerial work supply community to form, thereby not only creating new jobs, but also a new market for Light UAS.

Non-military Light UAS operations are currently mainly conducted at altitudes inferior to 150 meters above ground level and within visual line-of-sight. In that condition, the operational environment does not conflict with flights of manned aircraft. This calls for the development of specific rules for Light UAS, simpler than those existing for manned aircraft, or that will be required for unmanned aircraft with a mass of more than 150 kg..

The European legislation should be very simple, covering essential elements like certification of UA system, training and licensing of the pilots and flight crew, responsibilities and obligations of all stakeholders, liability security and insurance issues, licence to operate, reliability of the components, maintenance matters, and security aspects. The legislation should take into account the specificities of Light UAS, but should ensure the maximum safety and security level, maintaining the current overall safety level. Rules and standards should be in equation with the aviation standards currently applicable for manned aircraft (equivalent level of safety), but should put the lowest possible constraints on manufacturers and users.

The full and seamless integration of Light UAS into the airspace shall require an important amount of common efforts from the aviation sector. A lot of work has already been done in these domains and could be used for the development of harmonised rules and standards at European level. The European Commission should support such harmonization efforts by federating the activities and developing European standards and rules applicable uniformly throughout Europe.

Detect & Avoid is a critical factor relative to the operation of Light UAS beyond visual line of sight, and it can be considered as the necessary enabling technology required to integrate Light UAS into non-segregated airspace. The possibility of launching a call for a funded study and technology demonstration relative to detect & avoid specifically for Light UAS should be investigated.

Without prejudice to the right of States to certify UAS below 150 kg, and taking into account the advantages of European harmonization, it is considered necessary to develop national legislation, based on consensually agreed criteria, in all European Union countries. The development of such harmonized rules and regulations would permit to ensure the recognition of the various certificates and licences between the countries of the European Union, as well as to provide all Light UAS manufacturers with similar standards.

The establishment of common European standards should allow trans-border cooperation between authorities, multi-lateral operations, and the transfer of systems and crews from one country to another (i.e. for security, atmospheric sensing, meteorological, environmental and research applications, and to address natural disaster crisis such as earth quakes, floods, forest fires, oil spills, etc). A single set of rules for Europe would favour the creation of an open and fair European market.

It is necessary to harmonise the requirements and limitations for Light UAS certification and operations within Europe, but also to harmonise the requirements with a number of non-European Union regulators such as the FAA, Transport Canada and Civil Aviation Safety Authority Australia. Europe should produce a single set of draft airworthiness, operational and airspace requirements to be applied on a voluntary basis by aviation authorities. The process should be based on the examination of existing standards and best practices.

As most manufacturers and aerial work service providers will have the intention to sell their products or their services outside the limited remit of their national boundaries, a single set of rules for Europe would favour the creation of an open and fair European market. This shall be the case not only for the 27 European Union States, but also in all the countries having bilateral or multilateral agreements with Europe for aviation (currently 38 States in the Single European Sky implementation region).

A significant number of European and non-European national aviation authorities are jointly endeavouring to develop specific rules for Light UAS, which may be applied at European level. It is required to implement methodology in Europe to ensure full cooperation between existing working groups like JARUS[7] and EUROCAE WG73 and other EU and non-EU initiatives that address UAS-related topics of interest. All the work done may constitute an excellent baseline material to be used to further, at European level, the aspired to harmonised rules and regulations. The hearing demonstrated that the European Commission can play an important role in the support of this process.

It has been understood that, due to the specific characteristics of Light UAS and the large number of SMEs involved with these systems, the Light UAS community should probably needs to be recognized as a separate stakeholder group.

Therefore, it was understood that the Light UAS community should be recognized as a separate stakeholder group and should benefit of *ad hoc* working arrangements clearly separated from the activities conducted for other segments like MALE[8] or HALE[9] systems. In particular, it is recommended that standardisation groups like EUROCAE evaluate the possibility of starting up dedicated activities aiming to develop specific solutions for Light UAS, with the view to speed up their insertion by producing dedicated standards.

This suggestion is motivated by the following:

1) A large number of SMEs are involved with the development of Light UAS;
2) SMEs are unable to participate in working groups on the same basis as Industry, mainly due to insufficient personnel, time & financial restrictions;
3) The standards for Light UAS have a specific and diverging nature in comparison to UAS with a maximum take-off mass superior to 150 kg;
4) The work methodology adopted, must be designed to specifically accommodate SMEs.

Furthermore, it is recommended that the European Light UAS community designate a representational entity to express their views and voice their interests. High political awareness of UAS matters, at national and European level, has to be improved, or created. To that end, the European Commission shall address the Light UAS dimension during the high-level UAS conference that it is organising in Brussels, Belgium on 21st April 2010.

[7] JARUS (a regulatory working group consisting of the national civil aviation authorities of 15 countries: Australia, Austria, Belgium, Canada, Czech Rep., France, Germany, Italy, Malta, Netherlands, South Africa, Spain, Switzerland, UK)].

[8] Medium Altitude Long Endurance

[9] High Altitude Long Endurance

ANNEX 1

Review of the European Light UAS Manufacturers & Developers

The review indicated that there were **20 European countries** with a total of **168 UAS manufacturers & developers** consisting of SMEs, industrial entities, national teamed efforts or consortia, European consortia and international consortia involved with UAS [Light UAS (MTOM < 150 kg) + UAS (MTOM > 150 kg)] (Note: MOTM = Maximum take-off mass):

Austria	Finland	Netherlands	Slovenia
Bulgaria	France	Norway	Spain
Belgium	Germany	Poland	Sweden
Croatia	Greece	Serbia	Switzerland
Czech Rep.	Italy	Slovakia	UK

The breakdown of these **168 manufacturers & developers** is as follows:

- SMEs **117**
  - Producing/developing LUAS 104
  - Producing/developing UAS 13
- Government research entities **5**
  - Producing/developing LUAS 4
  - Producing/developing UAS 1
- Industry **24**
  - Producing/developing LUAS 12
  - Producing/developing UAS 12
- National development/production consortium **10**
  - Producing/developing LUAS 4
  - Producing/developing UAS 6
- Inter-European development/production co-operations: **12**
  - Producing/developing LUAS 8
  - Producing/developing UAS 4
- International development/production co-operation: **8**
  - Producing/developing LUAS 0
  - Producing/developing UAS 8

Note: SME = nr of personnel < 250 & annual turnover < € 50 million

Industry = nr of personnel > 250 & annual turnover > € 50 million & SMEs owned by Industry

The breakdown of the **313 UAS** being produced and/or under development in Europe is as follows:

o Total number of **Light UAS** (aircraft MTOM < 150 kg):		**252**	**80, 5%**
- produced / developed by SMEs:	208		
- Government research entities	7		
- produced / developed by Industry:	21		
- produced / developed by national consortia:	8		
- produced / developed by European consortia:	8		
- produced/developed by international consortia:	0		
o Total number of **UAS** (aircraft MTOM > 150 kg):		**61**	**19, 5%**
- produced / being developed by SMEs:	17		
- Government research entities:	0		
- produced / developed by Industry:	23		

- produced / developed by national consortia: 8
- produced / developed by European consortium: 4
- produced / developed by international consortium: 9

The breakdown by MTOM of the referenced 252 Light UAS being produced / developed in Europe is as follows:

MTOM in kg	Quantity	
< 1, 5	41	16, 3%
1, 5 – 8	69	27, 4%
8 – 25	64	25, 4%
25 – 150	78	30, 1%

Annex 2

MAIN ELEMENTS OF THE SURVEY CONDUCTED BY UVS INTERNATIONAL IN SUPPORT OF THE HEARING ON LIGHT UAS

1. The 120 participants in this survey represented the following 17 stakeholder groups:

Flight Service Providers	23	Flight Service Customer	1
Governmental Entity	13	Governmental Researcher	5
Governmental UAS Operator	8	Industry < SME)	16
International Association	3	National Association	6
Multi-national UAS Working Group	2	Regulatory Authority (JARUS)[10]	1
National Working Group	1	Research Organization	18
Regulatory Service Provider	1	Standards Organization	1
Small or Medium-sized Enterprise	69	University	11
UAS Test & Evaluation	4		

Note:

- Operator means a legal entity deploying the UAS
- Flight Service Provider are non-governmental UAS operator conducting aerial work
- Industry has been considered with a number of personnel above 250 and an annual turnover above € 50 million;
- SME have been considered with a number of personnel below 250 and annual turnover above € 50 million;
- Some participants can fall into more than one stakeholder category

2. The 120 survey participating organizations came from the following 16 European and 11 non-European countries:

Australia	6	India	2	Spain	10
Austria	2	Israel	1	Sweden	3
Belgium	4	Italy	3	Switzerland	5
Brazil	2	Netherlands	3	Taiwan	1
Canada	6	Norway	6	Turkey	2
Cyprus	1	Pakistan	1	UK	11
Czech Rep.	3	Portugal	1	USA	18
France	13	Romania	1	International Associations	3
Germany	5	Russian Fed.	1	International Working Group	1
Greece	1	South Africa	2	Multi-National Working Group	2

3. The list of the organizations having participated in the survey and having supplied 137 Operation Definition forms relative to their current & desired non-military applications with Light UAS.

[10] JARUS represents 17 national civil aviation authorities

From the information provided by these organizations, it was apparent that a significant number of different types of unmanned aircraft (< 150 kg) were being used, namely:

- Fixed Wing	57
- Flexible Wing	7
- Motorized parafoil	3
- Lighter-than-Air	6
- Rotary Wing	49
- single rotor (not shrouded	13
- single rotor (shrouded)	5
- bi-rotor	6
- tri-rotor	1
- quadro-rotor	12
- hexa-rotor	1

4. The submitted Operation Definition forms highlighted the many currently ongoing non-military applications making use of Light UAS in Europe, as well as outside of Europe (**see Annex 5**), and brought to attention that the many of these operations were taking place at flight altitudes of less the 150 m (400 ft) above ground level and within visual line-of-site

5. The survey indicated that the following 19 European countries had 147 UAS manufacturers & developers [Light UAS (aircraft MTOM < 150 kg) + UAS (MTOM > 150 kg)]:

Austria	Finland	Italy	Serbia	Sweden
Belgium	France	Netherlands	Slovakia	Switzerland
Croatia	Germany	Norway	Slovenia	UK
Czech rep.	Greece	Poland	Spain	

6. Together these 147 UAS manufacturers & developers are producing and/or developing at total of 320 UAS [Light UAS (aircraft MTOM < 150 kg) + UAS (MTOM > 150 kg)] (**see Annex 7**). The breakdown of these 147 manufacturers & developers is as follows:

a) SMEs	105
b) Government entities	5
c) Industry	10
d) National development/production consortium	8
e) Inter-European development/production co-operations:	14
- concerning Light UAS (aircraft MTOM < 150 kg):	*9*
- concerning UAS (aircraft MTOM >150 kg): 5	*5*
f) International development/production co-operation:	**5**
- concerning Light UAS (aircraft MTOM < 150 kg):	*0*
- concerning UAS (aircraft MTOM >150 kg):	*5*

Note:

- Industry has been considered with a number of personnel above 250 and an annual turnover above € 50 million;
- SME have been considered with a number of personnel below 250 and annual turnover above € 50 million;
- MOTM = Maximum take-off mass

7. Total number of UAS developed (market ready) & under development in Europe came out at 320.

a) number of Light UAS (aircraft MTOM < 150 kg):	**259**
- produced / developed by SMEs:	210
- produced / developed by Industry:	21
- produced / developed by national consortia:	10
- produced / developed by European consortia:	8
- - produced/developed by international consortia:	0
b) number of UAS (aircraft MTOM > 150 kg):	**61**
- produced / being developed by SMEs:	13
- produced / developed by Industry:	30
- produced / developed by European consortium:	5
- produced / developed by international consortium: 5	5

8. The breakdown of the referenced 320 Light UAS being produced/developed in Europe by maximum take-off mass brings some very interesting points forward:

MTOM in kg	Quantity	
< 1,5	43	13,4%
1,5 – 8	68	21,3%
8 – 25	62	19,4%
25 – 150	147	45,9%

ANNEX 3

PARTICIPANTS IN EC HEARING ON LIGHT UAS
8 OCTOBER 2009

(PAGE 1/2)

Family Name	First Name	Company/Organization	Country	Speakers
Amato	Gilbert	EUROCAE	France	
Balda	Martin	AVBS (National Association)	Czech Rep.	
Baumann	Achim	DFS (on behalf of INOUI - Multi-National Working Group)	Germany	
Becerra Rubio	Pedro	Aertec Ingenieria y Desarrollos	Spain	
Björk	Lars	Swedish Forest Agency	Sweden	**1**
Blain	David	EADS Astrium	UK	
Boer	Jan-Floris	NLR - National Aerospace Lab (on behalf of Geocopter, Netherlands)	Netherlands	
Calvente Plaza	Juan José	Aertec Ingenieria y Desarrollos	Spain	
Caron	Jean	EADS Defence & Security	France	
Clot	Andre	EuroUSC & also representing UAVS (National Association)	UK	
Cobo	Daniel	Indra Sistemas	Spain	
Colorado	Julian	Technical University of Madrid	Spain	
Cosyn	Peter	Gatewing	Belgium	**1**
Decuypere	Roland	R-D Scientific Consulting	Belgium	
Diaz Perez	Eva	EADS Defence & Security	Belgium	
Didier	Marc	Aerofilmphoto & Vision du Ciel	France	**1**
Fartek	Gilles	European Commission, DG TREN	Belgium	**B**
Fasquel	Fabrice	Vision du Ciel	France	
Friedl	Achim	Ministry of Interior, Directorate General of Federal Police	Germany	**1**
Gay	Alan	Inst. of Biological, Environmental & Rural Sciences, Aberystwyth University	UK	
Guilhot-Gauddeffroy	Michel	Workfly	France	
Hagner	Olof Mathias	SmartPlanes	Sweden	
Henning Paulsen	Dag	ProxDynamics	Norway	
Homleid	Ole Vidar	Robot Aviation & UAS Norway (National Association)	Norway	
Koers	Ed	Geocopter	Netherlands	
Lewyckyj	Nicolas	VITO-Flemish Institute for Technological Research	Belgium	**1**
Lintener	Marita	DFS (on behalf of INOUI - Multi-National Working Group)	Germany	
Mortimer	Gary	Yellowplane	UK	
Mulero Pazmany	Margarita	Estacion Biologica de Donana, Consejo Superior de Invetigaciones Cientificas	Spain	**1**
Naderhirn	Michael	AeroSpy Sense & Avoid Technology	Austria	

PARTICIPANTS IN EC HEARING ON LIGHT UAS
8 OCTOBER 2009

(PAGE 2/2)

Family Name	First Name	Company/Organization	Country	Speakers
Pastor	Enrique	Technical University of Catalonia	Spain	
Perrin	Nathalie	Sirehna (subsidary of DCNS)	France	
Prats	Xavier	Technical University of Catalonia	Spain	
Restas	Agoston	UASystems Ltd & SwissCopter	Switzerland	
Roma	Alfredo	AS&T	Italy	
Sancho	Juan Manuel	Aerovision	Spain	
Steine	Tor Olav	Alfatroll	Norway	
Storvold	Rune	Northern Research Institute	Norway	**1**
Stoussavijewitsch	Martin	European Defence Agency	Belgium	
Tutty	Brian	Universal Target Systems	UK	
Tytgat	Luc	European Commission, DG TREN	Belgium	**B**
van Blyenburgh	Peter	Blyenburgh & Co + UVS International (International Association)	France	**1**
		Also representing West Midlands Fire Service	UK	**1**
van Damme	Jean-Philippe	JP Engineering	Belgium	
van de Leijgraaf	Ron	IVW (NL CAA) & also representing JARUS + Eurocae WG73-SG4 on LUAS	Netherlands	
Verhagen	Jan	HighEye	Netherlands	**1**
Versillé	Serge	Aeroart	France	**1**
von Bothmer	Bernhard	UAV DACH (Multi-National Working Group)	Germany	
Warmerdam	Johan	Gerechtelijk Politie (National Police)	Netherlands	**1**
Wenstedt	Joop	Albatros UAV & Communicatie Advies Wenstedt	Netherlands	

ANNEX 4

AGENDA OF THE EC HEARING ON LIGHT UAS

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ENERGY
AND TRANSPORT

DIRECTORATE F - Air Transport

European Hearing on Light UAS

Brussels, Belgium, 8th October 2009

DG TREN, Rue De Mot, 24

Room 3/047

From 09:30 to 17:30

Chaired by Mr Luc Tytgat,

Head of the Unit Single European Sky and ATC Modernization

Part I – Hearing of Light UAS users – Presentations and exchanges of views

Including Q&A	AGENDA points	Country	Stakeholder Category	Name of Speaker
08.30-09.00	**Registration & Security Formalities**			
09.00-09.05	**European Commission, DG Tren**	**EC**		**Luc Tytgat**
	Welcome address & Opening of the hearing			
09.05-09.20	**European Commission, DG Tren**	**EC**		**Gilles Fartek**
	Background, the EC's objective with the hearing, order of the day			
09.20-09.35	**UVS International**	**Netherlands**	Internat. Ass.	**Peter van Blyenburgh**
	Conclusions of the survey on Light UAS			
09.35-09.50	**Aeroart**	**France**	SME & FSP	**Serge Versillé**
	The use of LUAS for geological & agricultural applications (Operational experience)			
09.50-10.05	**CSIC - Doñana Biological Station**	**Spain**	Gvt Operator	**Mara Mulero Pazmany**
	LUAS for wildlife & habitat monitoring (Aeromab Project)			
10.05-10.20	**Aerofilmphoto & Vision du Ciel**	**France**	SME & FSP	**Marc Didier**
	The use of LUAS for aerial photography (Operational experience)			
10.20-10.35	**Gatewing**	**Belgium**	SME & FSP	**Peter Cosyn**
	Low altitude aerial work (Operational experience)			
10.35-10.55	***Coffee Break***			
10.55-11.10	**Higheye**	**Netherlands**	SME & FSP	**Jan Verhagen**
	The use of LUAS for security & cinema applications (Operational experience)			

Including Q&A	AGENDA points	Country	Stakeholder Category	Name of Speaker
11.10-11.25	**Ministry of the Interior, Directorate-General Federal Police**	**Germany**	Gvt Operator	**Achim Friedl**
	The potential offered by LUAS for security applications			
11.25-11.40	**National Police, Anti-Drugs Force**	**Netherlands**	Gvt Operator	**To be announced**
	The potential offered by LUAS in the combat against drugs (Experimental operations experience)			
11.40-11.55	**NORUT - Northern Research Institute**	**Norway**	Gvt Operator	**Rune Storvold**
	LUAS for polar research (Operational experience)			
11.55-12.10	**Swedish Forest Agency**	**Sweden**	Gvt Operator	**Lars Björk**
	Light UAS for forestry applications (Operational experience)			
12.10-12.25	**VITO - Flemish Institute for Technological Research**	**Belgium**	Gvt Research	**Nicolas Lewycki**
	Light UAS for earth observation (Operational experience)			
12.25-12.40	**West Midlands Fire Service**	**UK**	Gvt Operator	**Peter van Blyenburgh on behalf of Pat Mika**
	Light UAS for fire brigade applications (Operational experience)			
12.25-14.00	***Lunch Break***			

Part II – Opened discussions

14.00-15.00	**Theme 1:** The current situation - How are flight operations conducted – Obstacles, users requirements	All participants
15.00-16.00	**Theme 2:** The upcoming market opportunities	All participants
16.00-17.00	**Theme 3:** Views, desires & preparation for the future	All participants
17.00-17.30	**Conclusions & Follow-Up & Close of Hearing** European Commission, DG TREN, Luc Tytgat	

ANNEX 5

CURRENT NON-MILITARY UAS APPLICATIONS WITH LIGHT UAS

Security-Related Applications	**Countries Where They Are Taking Place**
Border surveillance	(IL, US)
Crowd surveillance	(CH, CN, FR, ZA)
(Forest) Fire fighting support	(ES, HU, UK, US)
International summit surveillance	(CA, FR)
Maritime & Sea lane surveillance	(BE, ES)
Natural disaster site surveillance	(CN, IN, RU, US)
Police applications	(CA, DE, FR, NL, UK, ZA)
Regional surveillance	(Israel & Gaza & Occupied Territories)
Road traffic surveillance	(CH)
Experimentation (Police)	(AT, AU, BE, CA, CH, CN, CZ, DE, ES, FR, IT, MY, NL, NO, SG, PT, SE, SI, ZA, UK)
Scientific & Research Applications	
Aerial photogrammetry	(BE, CH, DE, NL)
Agricultural monitoring	(ES, UK, US)
Arctic research	(DE, NO, UK, US)
ATM Research	(DE, ES)
Climate monitoring	(NO)
Coastal mapping	(NL)
Coastal zone studies	(NL)
Crop monitoring	(US)
Forestry management/research	(SE)
Geophysical survey	(BR)
Glacier & ice cap monitoring	(DK, NO)
Iceberg monitoring	(NO)
Invasive species identification/analysis	(US)
Marine mammal monitoring	(US)
Meteorological research	(DE, NO, US)
Ocean & sea research support	(NO)
Plant growth vigour mapping	(US)
Salt water infiltration detection	(NL)
Vegetation identification	(US)
Volcano monitoring	(JP)
UAS sensor research	(CA, DE, ES, FR, NO, US)
Wildlife census	(ES, US)
Contractor Supplied Flight Services	
Advertising (light-than-air UAS)	(indoor & outdoor)
Aerial data collection	(AU, AT, BE, CH, ES, IT, NL, SE, UK)
Aerial photography & video	(many countries)
Agricultural fertilizer dispensing	(CN, JP, KR)
Agricultural insecticide spraying	(CN, JP, KR)
Cinema (aerial shots & special effects)	(many countries)
Critical infrastructure inspection	(FR, NL)
Forest fire operations support	(ES, US)
Historical monument inspection	(FR)
Illegal cannabis cultivation detection	(NL)
Magnetic field survey	(AU)
Oil & gas pipeline monitoring	(RU)

Terrain mapping (BE, DE, NL)

ANNEX 6

RESULTS OF THE SURVEY

	Submitted				Qnty: 27	Stakeholder	
	Mtx	Ltr	Anx	Name	Country	Category	Name of contact person
01	NA	1	1	ACUO - Australian Certified UAS Operators Association - **Qnty of members: 10**	Australia	Ass. National	Joe Urli
02	1	1	1	Helimetrex	Australia	SME & FSP	Brad Mason
03	1			Team COOEE Rescue	Australia	SME Research	Nick Peppas
04	NA	1	1	UATAR - UAV Operator Alliance Working Group 27 - **Qnty of members: 6**	Australia	WG National	Peter Hill
05		1	1	UAV Systems	Australia	SME & FSP	Joe Urli
06	1	1	1	V-TOL Aerospace	Australia	SME & FSP	Peter Hill
07	2	1	1	AeroSpy Sense & Avoid Technology	Austria	SME	Michael Naderhirn
08	1	1	1	AIT - Austrian Institute of Technology	Austria	Gvt Research	Manfred Gruber
09	1	1	1	Gatewing	Belgium	SME & FSP	Peter Cosyn
10	1	1	1	JP Engineering	Belgium	SME	Jean-Philippe Van Damme
11		1		R-D Scientific Consulting	Belgium	SME	Roland Decuypere
12	2	1	1	VITO - Flemish Institute for Technological Research	Belgium	Gvt Research	Jurgen Everaerts Nicolas Lewychyj
13	1			Alácticus Fabricação de Aeródinos (new start-up)	Brazil	SME	Pedro José Garcia Chavarro
14	1	1	1	Brasil Aircrafts	Brazil	SME	Andersson Beccari
15	1	1	1	Aeryon Labs	Canada	SME	Marni McVicar
16	1	1	1	Deep Vision	Canada	SME	Alan Parslow
17	1	1	1	Draganfly Innovations	Canada	SME	Kevin Lauscher
18	1	NA	NA	Ontario Provincial Police	Canada	Gvt Operator	Constable Marc Sharpe
19	1			Provincial Aerospace	Canada	Industry	Pip Rudkin
20	1			Sander Geophysics	Canada	Industry & FSP	Matthew Wells
21	1	1	1	Cyprus Institute (The)	Cyprus	Research	Dr. Amit Teller
22	NA	1	1	AVBS - National Unmanned Systems Manufacturers Association - **Qnty of members: 10**	Czech Rep.	Ass. National	Martin Balda
23	NA	1		ESC - Evolving Systems Consultancy	Czech Rep.	SME	Richard Sysala
24	1			TL Elektronic	Czech Rep.	Industry	Tomas Marczi
25	1	1	1	Aeroart	France	SME & FSP	Serge Versille
26	NA	1	1	Blyenburgh & Co	France	SME	Peter van Blyenburgh
27	1			EADS Defence & Security	France	Industry	Jean Caron Eva Diaz-Perez
28	NA	1	1	EUROCAE	France	Stan. Org.	Gilbert Amato
29	2			Infotron	France	SME & FSP	Francis Duruflé
30	1	1		Lehmann Aviation	France	SME & FSP	Benjamin Lehmann
31	2			Novadem	France	SME & FSP	Pascal Zunino
32	1	1		PY Design	France	SME	Pierre-Yves Duchesne
33	1			Sirehna (subsidary of DCNS, France)	France	SME	Nathalie Perrin Jean-Pierre Le Goff
34	NA	1		UAS Services & Consulting	France	SME	Christophe Gyr

	Mtx	Ltr	Anx	Name	Country	Category	Name of contact person
35	NA	1		UVS France - **Qnty of members: 10**	France	Ass. National	Christophe Gyr
36	1	1		Vision du Ciel / Sky View	France	SME & FSP	Fabrice Fasquel
37	1	1	1	WorkFly	France	SME	Michel Ghilhot-Gaudeffroy
38	1	1	1	INOUI (EC-funded) - Qnty of members: 5 (DFS, Germany; ISDEFE, Spain; Boeing R&T, Spain; ONERA, France; Rheinmetall DS, Germany)	Germany	WG Multi-Nat.	Marita Lintener Achim Bauman
39	1			FernUniversität in Hagen	Germany	Uni. Research	Dr. Ulrich Borgolte
40	1	1	1	Institute of Systems Optimization, University of Karlsruhe (TH)	Germany	Uni. Research	Prof. Dr.-Ing. G. F. Trommer
41	1			International Quadrocopter Association e.V. - **Qnty of members: 15**	Germany	Ass. Internat.	Thomas Bögel
42	2	1	1	Mavionics	Germany	SME	Marco Buschmann
43	2	NA	NA	Ministry of the Interior, Directorate-General Federal Police	Germany	Gvt Operator	Achim Friedl
44	1	1		UAV Services & Systems	Germany	SME & FSP	Stephan Sabath
45	NA	1	1	UAV-DACH - **Qnty of members: 16**	Germany	WG Multi-Nat.	Bernhard von Bothmer
46	1	1	1	Arpedon	Greece	SME	Dimitris Sagiots
47	1	1		Basant Aerospace	India	SME	Air Vice Marshal Arvinda Agrawal
48	1	1	1	ideaForge Technology	India	SME	Rahul Singh
49	1			Elbit Systems	Israel	Industry	Yuval Galili Itai Toren
50	1	1	1	MavTech	Italy	SME	Giorgio Guglieri
51	4	1	1	Nimbus	Italy	SME	Mercalli Andrea
52	2	1	1	U.T.R.I.	Italy	SME	Michele Mazza
53	1	1	1	Albatros UAS	Netherlands	SME & FSP	Joop Wenstedt
54	1			Geocopter	Netherlands	SME & FSP	Ed Koers
55	9	1	1	Higheye	Netherlands	SME & FSP Gvt Operator	Jan Verhagen Johan Warmerdam
56	NA	1	NA	JARUS (representing the national civil aviation authorities of Australia, Austria, Belgium, Canada, Czech Rep., France, Germany, Italy, **Malta**, Netherlands, South Africa, Spain, Switzerland, UK, USA + **EASA** & **EUROCONTROL**)	Netherlands	National & European Regulatory Authorities	Ron van de Leijgraaf
57	NA	1	1	UVS International - **Qnty of members: 263 in 33 countries**	Netherlands	Ass. Internat.	Peter van Blyenburgh
58	NA	1	1	Alfatroll	Norway	SME	Tor Olav Steine
59	1			NORUT - Northern Research Institute	Norway	Gvt Operator	Dr Rune Storvold
60	1	1	1	Prox Dynamics	Norway	SME	Petter Muren Dah Henning Paulsen
61	1	1	1	Robot Aviation	Norway	SME & FSP	Per Osen
62	2	1		Scandicraft	Norway	SME	Nils Kvilvang
63	NA	1	1	UAS Norway - **Qnty of members: 10**	Norway	Ass. National	Ole Vidar Homleid
64	1	1	1	Fusions Group	Pakistan	SME	Khawaja Sajjad Hussain

	Mtx	Ltr	Anx	Name	Country	Category	Name of contact person
65	1	1	1	University of Porto, School of Engineering	Portugal	Uni. Research	Ricardo Bencatel
66	2	1	1	Mechanical Enginering Faculty Braila	Romania	Uni. Research	Florin Nedelcut
67	2		1	Irkut Corporation	Russian Fed.	Industry	Alexander Koldaev
68	1	1	1	ATE (Advanced Technologies & Engineering)	South Africa	Industry	Jan Vermeulen
69	2	1	1	CSIR - Council for Scientific & Industrial Research	South Africa	Gvt Research	John Monk
70	3	1	1	Aerovision Vehiculos Aereos	Spain	SME	Juan Manuel Sancho
71	2	1	1	Aertec Ingenieria y Desarrollos	Spain	SME	Juan José Calvente Plaza
72	4	1	1	CATUAV	Spain	SME & FSP	Jordi Santacana
73	1	1	1	CSIC - Doñana Biological Station	Spain	Gvt Operator	Mara Mulero
74	2	1	1	FADA-CATEC	Spain	Gvmt Research	Francisco Javier Pérez Grau
75	1	1	1	Grupo Tekplus	Spain	SME	Eduardo Alonso
76	4	1	1	Indra Sistemas	Spain	Industry	Daniel Cobo-Vuilleumier
77	1	1	1	UPC - Technical University of Catalonia	Spain	Uni. Research	Enric Pastor
78	3	1	1	UPM - Technical University of Madrid	Spain	Uni. Research	Antonio Barrientos Julian Colorado
79	NA	1	1	UPM - Technical University of Madrid - CVG	Spain	Uni. Research	Pascual Campoy
80	1	1	1	CybAero	Sweden	SME	Robert Veenhuizen
81	NA	1		SmartPlanes	Sweden	SME	Olle Hagner
82	1	1	1	Swedish Forest Agency	Sweden	Gvt Operator	Lars Bjork
83	1	1	1	Avigate	Switzerland	SME	Dr. Peter M. Lenhart
84	1	1		SenseFly	Switzerland	SME	Jean-Christophe Zufferey
85	1	1	1	SkyBotix	Switzerland	SME	Samir Bouabdallah
86	1	1	1	SwissCopter	Switzerland	SME	Hans-Christian Stuber Agoston Restas
87	1			Swiss UAV	Switzerland	SME	Lars Zander
88	1	1	1	Yoshine Helicopters	Taiwan	Industry	Charles Lin
89	2	1	1	Kuzgun High Technology Design	Turkey	SME	Yucel Demir
90	1	1	1	STM Defence Technologies Engineering	Turkey	Industry	Hakan Isci & Gokhan Tursun Gokhan Tursun
91	1	1	1	Aberystwyth University, Institute of Biological, Environmental & Rural Sciences	UK	Uni. Research	Alan Gay
92	NA	1	NA	ACPO - Association of Chief Police Officers, UAS Steering Group	UK	Gvt Operator	Vaughan Clarke
93	NA	1	1	Burbidge Associates	UK	SME	Colin Burbidge
94	NA	1		EADS Astrium	UK	Industry	David Blain
95	NA	1		EuroUSC	UK	SME & RSP	Andre Clot
96	1	1	1	Horizon Imaging	UK	SME & FSP	David Hogg
97	1			Mortimer	UK	SME & FSP	Gary Mortimer
98	3	1	1	Universal Target Systems	UK	SME	Paul Blake Brian Tutty
99	1	1	1	VTOL Technologies	UK	SME	Ashley Bryant
100	NA	1	1	UAVS Association - **Qnty of members: 37**	UK	Ass. National	John Moreland
101	1	1	1	West Midlands Fire Service	UK	Gvt Operator	Pat Mika
102	1	1	1	AAI Corporation / Textron Systems	USA	Industry	Rose Karolenko

	Mtx	Ltr	Anx	Name	Country	Category	Name of contact person
103	3	1	1	AeroVironment	USA	Industry	Ted Wierzbanowski
104	1	1	1	Arcturus UAV	USA	SME	Eric Folkestad
105	1			Callahan	USA	SME & FSP	Russell Callahan
106	1			ConocoPhillips	USA	Industry & FSC	Dennis Parrish Christer Broman
107	1			Dragonfly Pictures	USA	SME	Gregory Piasecki
108	2			Emmen Aerospace	USA	SME	Andrea Facchinetti
109	1			Flightlutions	USA	SME & FSP	AJ Acevedo
110	1	1		Insitu (Boeing subsidary)	USA	Industry & FSP	Paul McDuffee
111	1	NA	NA	NASA GSFC WFF Instrumentation Sciences Branch	USA	Gvt Operator	Geoff Bland
112	1			NMSU UAS Flight Test Center	USA	UAS T&E	Steve Hottman
113	1			NMSU, PSL, Technical Analysis & Applications Center	USA	Uni. Research	Steve Hottman
114	NA	1	1	Padina Group	USA	SME	Dale Tietz
115	2			Raytheon	USA	Industry	Doug Davis Rocky Gmeiner
116	NA	1		RCAPA - Radio Control Aerial Photography Association - **Qnty of members: 1700**	USA	Ass. Internat.	Patrick Egan
117	1			Remote Systems NW	USA	SME & FSP	Mike Myers
118	1	1	1	Sky-Borg	USA	SME & FSP	Patrick Egan
119	1			University of North Dakota	USA	Uni. Research	Doug Marshall
120	1	NA	NA	US Department of Agriculture-Agricultural Research Service-Jornada Experimental Range	USA	Gvmt Research	Albert Rango Andrea Laliberte

137	89	72	**Total of documents received**	27	**Nr of countries contributing**

Operator: Legal entity deploying the UAS	**Participants**		
	Per Category	**Abbreviation**	**Stakeholder Categories**
Non-Government UAS Operator - Supplier of Aerial Work	23	FSP	Flight Service Provider
	1	FSC	Flight Service Customer
	11	Gvt	Governmental Entity
	8	Gvt Research	Governmental Research
	7	Gvt Operator	Governmental Operator
Personnel >250 & Turnover >50 million Euro	16	Industry	Company larger than SMEs
	3	Ass. Internat.	International Association
	6	Ass. Nat.	National Association
	18	RA	Regulatory Authority
	1	RSP	Regulatory Service Provider
	15	Research	Research Organization
Personnel <250 & Turnover <50 million Euro	64	SME	Small or Medium-Sized Enterprise
	1	Stan. Org.	Standards Organizations

20		UAS Operator - Non-Goverment

Operator: Legal entity deploying the UAS	Participants		
	Per Category	**Abbreviation**	**Stakeholder Categories**
	1	UAS T&E	UAS Test & Evaluation
	10	Uni	University
	2	WG Multi-Nat.	Working Group with participants from different countries
	1	WG National	National Working Group
	Participants can fall into more than one category		

		Qnty of Participants	**28 Contributing Countries + 3 Internat. Ass. & 1 Multi-Nat. WG**
Including 1 national association & 1 national WG	01	6	Australia
	02	2	Austria
	03	4	Belgium
	04	2	Brazil
	05	6	Canada
	06	1	Cyprus
Including 1 national association	07	3	Czech Rep.
Including 1 national association	08	13	France
	09	5	Germany
	10	1	Greece
International Quadrocopter Ass, RCAPA, UVS International	11	3	International Association
15 National CAAs + FAA + EASA & Eurocontrol	12	1	International Regulatory Authority Working Group (JARUS)
	13	2	India
	14	1	Israel
	15	3	Italy
	16	3	Netherlands
Including 1 national association	17	6	Norway
	18	1	Pakistan
	19	1	Portugal
	20	1	Romania
	21	1	Russian Federation
	22	2	South Africa
	23	10	Spain
	24	3	Sweden
	25	5	Switzerland
	26	1	Taiwan
	27	2	Turkey
Including 2 national associations	28	11	United Kingdom
	29	18	USA
INOUI & UAV-DACH	30	2	Working Group - Multi-National

Total	**120**	Including 11 Non-European Countries

ANNEX 7

EUROPEAN UNMANNED AIRCRAFT SYSTEM MANUFACTURERS & DEVELOPERS

	Country		Company/Organization (*Universities not included*)	SME /Ind		UAS Designation	Aircraft Type	MTOM in kg	Status
	SMALL & MEDIUM-SIZED ENTERPRISES					**Aircraft with MTOM < 150 kg**			
1	Austria	1	AeroSpy	SME	01	Sensorplatform	FW	1,5	under development
	Austria	2	KameraDrone	SME	02	HD35	RW	40	under development
	Austria	3	Schiebel Elektronische Geraete	SME	03	Camcopter 5.1	RW	68	in service
2	Belgium	4	Gatewing	SME	04	K120	FW	1,5	in service
	Belgium	5	JP Engineering	SME	05	JP-1	RW	10	under development
3	Bulgaria	6	Aviotechnica	SME	06	Yastreb	FW	66	in service
	Bulgaria	7	Kintex	SME	07	Niti	FW	60	under development
4	Croatia	8	Defence Research Est.	Gvt	08	BL-50	FW	53	in service
5	Czech Rep.	9	Airship Club	SME	09	9m Airship	L-t-A	25	in service
	Czech Rep.	10	VTUL à Pvo	Gvt	10	Sojka III	FW	145	in service
6	Europe	11	EMT (& Swiss UAV, Switzerland-AC)	SME SME	11	Museco	RW	75	under development
	Europe	12	Indra (& CybAero, Sweden-AC)	Ind SME	12	unnamed	RW	150	under development
	Europe	13	MAVDEM Consortium (Alcore Techn., FR; Celin Avio, IT; ONERA, FR *; Oto Melara, IT *; Sener, ES *; Tellmie, NO)	Ind * & SME	13	MAVDEM	RW-4R	< 1	technical demonstr. under development (financed by EDA)
	Europe	14	Saab (& Swiss UAV, Switzerland-AC)	Ind SME	14	KOAX X-240	RW	100	under development
	Europe		Saab (& Swiss UAV, Switzerland-AC)	Ind SME	15	Neo S300	RW	50	under development
	Europe	15	Selex Sensors&Airborne Syst., UK (& Alpi Aviation, Italy - A/C)	Ind SME	16	Strix	FW	20	market ready
	Europe		Selex Sensors&Airborne Syst., UK (& UTRI, Italy-AC)	Ind SME	17	Asio	S-RW	4	market ready
	Europe		Selex Sensors&Airborne Syst., UK (& UTRI, Italy-AC)	Ind SME	18	Otus	FW	2,3	market ready
7	Finland	16	Patria	Ind	19	Mini-UAV	FW	3	in service
8	France	17	ABS AeroLight	SME	20	Maxy	M-Prfl	25	status unknown
	France	18	Aerodrones	SME	21	Aerodrone	RW	< 150	under development
	France	19	Alcore Industries	SME	22	Azimut 2001	FW	9	proto/techn. demo.
	France		Alcore Industries	SME	23	Biodrone	FW	12	proto/techn. demo.
	France		Alcore Industries	SME	24	Chacal 2	FW	85	proto/techn. demo.
	France		Alcore Industries	SME	25	EasyCopter	RW	1,6	proto/techn. demo.
	France		Alcore Industries	SME	26	Epsilon	FW	0,45	proto/techn. demo.
	France		Alcore Industries	SME	27	Futura	FW	70	proto/techn. demo.
	France		Alcore Industries	SME	28	Maya	S-RW	2,5	proto/techn. demo.
	France	20	Bertin Technologies	SME	29	Flying Ball	DF	1,5	proto/techn. demo.
	France		Bertin Technologies	SME	30	HoverEye	DF	3,5	proto/techn. demo.
	France	21	Dassault Aviation	Ind	31	AVE-C (test bed)	FW	60	proto/techn. demo.
	France		Dassault Aviation	Ind	32	AVE-D (test bed)	FW	60	proto/techn. demo.
	France	22	EADS Defence & Security (& SurveyCopter, France-AC)	Ind SME	33	Scorpio 30	RW	38	in service
	France		EADS Defence & Security (& SurveyCopter, France-AC)	Ind SME	34	Scorpio 6	RW	13	in service
	France		EADS Defence & Security (& SurveyCopter, France-AC)	Ind SME	35	Tracker (DRAC)	FW	8,5	in service
	France	23	Euro MC	SME	36	Aero-Drone 120	S-RW	6	under development
	France		Euro MC	SME	37	Aero-Drone 50	S-RW	1,5	under development
	France		Euro MC	SME	38	Aero-Drone 70	S-RW	1,85	under development
	France	24	Flying Robots	SME	39	FR A2	FW	15	under development
	France		Flying Robots	SME	40	FR E1	FW	< 150	under development
	France	25	Fly-n-Sense	SME	41	CB 750	RW	**1,8**	under development
	France		Fly-n-Sense	SME	42	FNS 900 Seeker	FW	2,2	market ready
	France		Fly-n-Sense	SME	43	CB 300	RW-3x2CR	**0,4**	under development
	France	26	Gates Technology	SME	44	DPR G2008 Type 1	FW	4	market ready
	France	27	Infotron	SME	45	IT180-5 EL	RW	17	in service
	France		Infotron	SME	46	IT180-5 TH	RW	19	in service
	France	28	Lehmann Aviation	SME	47	LP960	FW	0,9	in service
	France	29	Novadem	SME	48	NX110	RW-4R	1,7	in service
	France		Novadem	SME	49	NX130	RW-4R	2,7	in service
	France	30	Philae Concept	SME	50	Pixy 1	M-Prfl	5,6	in service
	France		Philae Concept	SME	51	Pixy 2	M-Prfl	12	in service

MTOM = Maximum Take-Off Mass
(& ..... - AC) = airframe manufacturer
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not a subsidary of Ind (see below)
Ind = Industry:
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> Euro 50.000.000 annual turnover
Converted aircraft = certified aircraft converted into UAS (not optionally piloted)

† = Has ceased trading
AC = Aircraft
DF = Ducted Fan
Fan W = Fan Wing
Flap W = Flapping Wing
Flying W = Flying Wing
FW = Fixed Wing
FW-SW = Fixed Wing Stub Wing
FW-TE = Fixed Wing Twin Engine
Inflat. W = Inflatable Wing
L-t-A = Lighter-than-Air (Airship)

M-Prfl = Motorized Parafoil
OPA = Optionally Piloted Aircraft
RW = Rotary Wing
RW-3x2CR = Rotary Wing with 3 sets of 2 counter-rotating rotors
RW-3R = Rotary Wing with 3 rotors
RW-4R = Rotary Wing with 4 rotors
RW-8R = Rotary Wing with 8 rotors
S-RW = Shrouded Rotary Wing
T-Body = Tilt Body
T-Rotor = Tilt Rotor

EUROPEAN UNMANNED AIRCRAFT SYSTEM MANUFACTURERS & DEVELOPERS

	Country		Company/Organization (*Universities not included*)	SME /Ind		UAS Designation	Aircraft Type	MTOM in kg	Status
	International	20	U-TacS	Ind	24	Watchkeeper	FW	450	on order
			(owned by Thales, UK-49% &	Ind					
			Elbit Systems, Israel-51%)	Ind					
7	Italy	21	Alenia Aeronautica	Ind	25	Molynx	FW-TE	3000	under development
	Italy		Alenia Aeronautica	Ind	26	Sky-X (test bed)	FW	1200	under development
	Italy		Alenia Aeronautica	Ind	27	Sky-Y (test bed)	FW	1200	under development
	Italy	22	CIRA	Ind	28	Castore (Stratospheric)	FW	> 150	proto/techn. demo.
	Italy	23	Selex Galileo	Ind	29	Falco	FW	350	in service
	Italy		Selex Galileo	Ind	30	Falco EV	FW	750	under development
8	Spain	24	EADS CASA	Ind	31	Atalante	FW	> 150	under development
	Spain	25	INTA	Ind	32	SIVA	FW	300	in service
	Spain	26	Platino Consortium:	Ind	33	HADA	RW	380	under development
			[31 Spanish companies incl.:						
			- Aries Complex	SME					
			- ARESA	SME					
			- ACTA	SME					
			- ISDEFE	Ind					
			and lead by:						
			- CATEC (Aeronautical Research Council of Andalusia) &	Gvt					
			- INTA]	Ind					
9	Sweden	27	Saab	Ind	34	Skeldar V150	RW	160	under development
	Sweden		Saab	Ind	35	Skeldar V200	RW	200	under development
	Sweden		Saab	Ind	36	Skeldar V200M	RW	200	under development
	Sweden		Saab	Ind	37	Skeldar V600	RW	600	under development
10	UK	28	BAE Systems	Ind	38	Hertl 1B (converted AC)	FW	750	proto/techn. demo.
	UK		BAE Systems	Ind	39	Hertl 1D (converted AC)	FW (jet)	350	proto/techn. demo.
	UK		BAE Systems	Ind	40	Mantis	FW-TE	?	under development
	UK		BAE Systems	Ind	41	Taranis	FW	8000	under development
	UK		BAE Systems	Ind	42	GH22	L-t-A	> 150	market ready
			(& Lindstrand Techno., UK-AC)	SME					
	UK		BAE Systems	Ind	43	Hertl 1A (converted AC)	FW	500	in service
			(& Slingsby Aviation, UK-AC)	SME					
11	UK	29	LM Consortium:		44	Fire Shadow (Lethal) (loitering ammunition)	FW	200	under development
			- Blue Bear Systems Research, UK	Ind *					
			- Cranfield Aerospace, UK	&					
			- Cranfield University, UK	SME					
			- Lockhead Martin Insys *, UK	Ind					
			- MBDA *, UK	Ind					
			- Meggitt Defence *, UK	Ind					
			- QinetiQ *, UK	Ind					
			- Roxel, UK	Ind					
			- Selex Sensors & Airborne Systems *, UK	Ind					
			- Thales *, UK	Ind					
			- Ultra Electronics *, UK	Ind					
			- Selex Systems Integration, UK (formerly Vega, UK)	Ind					
	NO LONGER IN DEVELOPMENT OR PRODUCTION					**Aircraft with Take-Off Mass > 150 kg**			
01	Europe	01	EADS Defence & Security, France	Ind	01	Carapas	FW-SW	330	no longer in dvpmt
			(& Selex Galileo-AC)	Ind					
02	Germany	02	EADS Deutschland	Ind	02	CL-289	FW-SW	240	in service
			[originally (CL-89) in cooperation with Bombardier, Canada]						
	Germany		EADS Deutschland	Ind	03	Shark (test bed)	RW	190	no longer in dvpmt
03	International	03	EADS Defence & Security, France	Ind	04	SIDM / Eagle 1 / Harfung	FW	1200	in service
			(& IAI-Malat, Israel-AC)	Ind					
04	Italy	04	Selex Galileo	Ind	05	Mirach 150	FW-SW	330	no longer in prod.
	Italy		Selex Galileo	Ind	06	Mirach 26	FW	230	no longer in prod.
05	Spain	05	INTA	Ind	07	SIVA	FW	300	in service
06	Switzerland	06	RUAG Aerospace	Ind	08	Super Ranger	FW	500	no longer in dvpmt
07	UK	07	BAE Systems	Ind	09	Phoenix	FW	180	no longer in prod.

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EUROPEAN UNMANNED AIRCRAFT SYSTEM MANUFACTURERS & DEVELOPERS

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	France	31	PolyAvionics	SME	52	Vulcas	FW	20	proto/techn. demo.
	France	32	PY Design	SME	53	O.V.O.	L-t-A	25	under development
	France	33	RFTronic	SME	54	Coleo 224	S-RW	0,6	under development
	France		RFTronic	SME	55	Coleo 380	S-RW	5	under development
	France		RFTronic	SME	56	Coleo 700	S-RW	25	under development
	France	34	Sirehna (owned by DCNS, France)	Ind	57	Elsa V1,1	FW	1,45	in service
	France		Sirehna (owned by DCNS, France)	Ind	58	Elsa V2	FW	1,6	market ready
	France	35	SMP Technologies	SME	59	Idrone V3	RW-4R	1,5	market ready
			(Microdrones distributor?)	SME					
	France		SMP Technologies	SME	60	Idrone V5	RW-4R	2,2	market ready
			(Microdrones distributor?)	SME					
	France	36	SurveyCopter	SME	61	Blimp 37M	L-t-A	< 150	market ready
	France		SurveyCopter	SME	62	Copter 1B	RW	15	in service
	France		SurveyCopter	SME	63	Copter 4	RW	10	in service
	France		SurveyCopter	SME	64	CopterCity (electric)	RW	12	market ready
	France		SurveyCopter	SME	65	DVF 2000	FW	10	in service
	France	37	Technisolar	SME	66	Bourdon	FW	7	in service
	France		Technisolar	SME	67	Coccinelle	FW	< 5	market ready
	France	38	Thales	Ind	68	Spy'Arrow HC	FW	1,2	in service
	France		Thales	Ind	69	Spy'Arrow LW	FW	0,5	status unknown
	France	39	Workfly	SME	70	Eyesfly	S-RW	7	under development
9	Germany	40	AirRobot	SME	71	AR100	RW-4R	1,3	in service
	Germany		AirRobot	SME	72	AR150	RW-3x2CR	2	market ready
	Germany		AirRobot	SME	73	AR70	RW-3R	1	in service
	Germany	41	Ascending Technologies	SME	74	Falcon 8	RW-8R	1,8	in service
	Germany		Ascending Technologies	SME	75	Hornet	RW-6R	0,3	in service
	Germany		Ascending Technologies	SME	76	Hummingbird Auto	RW-4R	0,55	in service
	Germany		Ascending Technologies	SME	77	Hummingbird Research	RW-4R	0,5	in service
	Germany		Ascending Technologies	SME	78	Pelican	RW-4R	0,75	in service
	Germany	42	Borjet	SME	79	CoRex	FW	5	under development
	Germany		Borjet	SME	80	FlyEye	FW	3	under development
	Germany	43	Diehl BGT Defence	Ind	81	SensoCopter	RW	0,9	market ready
			(& Microdrones-AC)	SME					
	Germany	44	EMT	SME	82	Aladin	FW	3,5	in service
	Germany		EMT	SME	83	Fancopter	RW	1,3	in service
	Germany		EMT	SME	84	Luna	FW	40	in service
	Germany		EMT	SME	85	X-13	FW	130	proto/techn. demo.
	Germany	45	Go!Cart Consortium: Rheinmetall *,	Ind *					
			CeBeNetwork, DFS, Haindl, Offis,	&	86	Guard	S-RW-4R	5	market ready
			DFKI, Uni. of Bremen	SME					
	Germany		Go!Cart Consortium: Rheinmetall *,	Ind *					
			CeBeNetwork, DFS, Haindl, Offis,	&	87	Mariner	FW	25	market ready
			DFKI, Uni. of Bremen	SME					
	Germany		Go!Cart Consortium: Rheinmetall *,	Ind *					
			CeBeNetwork, DFS, Haindl, Offis,	&	88	Profiler	FW	15	market ready
			DFKI, Uni. of Bremen	SME					
	Germany		Go!Cart Consortium: Rheinmetall *,	Ind *					
			CeBeNetwork, DFS, Haindl, Offis,	&	89	Scout	FW	50	under development
			DFKI, Uni. of Bremen	SME					
	Germany	46	Institute for Thermografie	SME	90	Flying Roboter	RW-3x2CR	< 5	in service
	Germany		Institute for Thermografie	SME	91	Veriocopter	RW	< 5	in service
	Germany	47	Mavionics	SME	92	Carolo P330	FW	5	market ready
	Germany		Mavionics	SME	93	Carolo T200	FW	5,6	in service
	Germany	48	MicroDrones	SME	94	MD4-1000	RW-4R	5,5	in service
			(& Karlsruhe Inst. of Technology)						
	Germany		MicroDrones	SME	95	MD4-200	RW-4R	1	in service
			(& Karlsruhe Inst. of Technology)						
	Germany	49	Mikado	SME	96	Logo 600	RW	5	status unknown
	Germany	50	RotRob	SME	97	RotRob	RW	< 150	under development
	Germany	51	ScaleCopter	SME	98	CamClone	RW	41,6	under development
	Germany	52	Sim Security (MicroDrones distrib?)	SME	99	SkyEye	RW	0,9	in service
10	Greece	53	Arpedon	SME	100	IR 001	FW	3,5	under development
	Greece	54	BSK Defence	SME	101	Ideon	FW	< 150	status unknown
	Greece		BSK Defence	SME	102	Phaeton	FW	< 150	status unknown
11	Italy	55	A2Tech	SME	103	RV-02	FW	2	under development
	Italy		A2Tech	SME	104	RV-160TD	FW	16	under development

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	Italy	56	Aermatica	SME	105	Anteos	RW-4R	< 150	market ready
	Italy	57	Aero Sekur	SME	106	unnamed	Inflat.W	3	under development
	Italy	58	Alpi Aviation	SME	107	Strix-A	FW	6	in service
	Italy		Alpi Aviation	SME	108	Strix-B	FW	6	in service
	Italy	59	International Aviation Supply	SME	109	Corvo	FW	25	under development
	Italy		International Aviation Supply	SME	110	Gabbiano	FW	4,5	in service
	Italy		International Aviation Supply	SME	111	Pico	FW	5	market ready
	Italy		International Aviation Supply	SME	112	Pitagora	FW + DF	25	market ready
	Italy	60	MavTech	SME	113	MH2000	FW	11	under development
	Italy		MavTech	SME	114	MH600 AP	FW	1	under development
	Italy	61	Nautilus	SME	115	NRC Class D	L-t-A	9	under development
	Italy		Nautilus	SME	116	NRC Class E	L-t-A	7	under development
	Italy	62	Nimbus	SME	117	Beta	Inflat.W	60	under development
	Italy		Nimbus	SME	118	C-Fly	Inflat.W	145	under development
	Italy		Nimbus	SME	119	EosXi	Inflat.W	54	under development
	Italy	63	Siralab	SME	120	SR-H3	FW	< 150	under development
	Italy	64	U.T.R.I.	SME	121	Asio	RW	6	market ready
	Italy		U.T.R.I.	SME	122	Crex-B	FW	3,2	market ready
	Italy		U.T.R.I.	SME	123	MHeli	RW	4,8	status unknown
	Italy		U.T.R.I.	SME	124	Otus	FW	2,3	market ready
	Italy		U.T.R.I.	SME	125	Profalk	T-Rotor	18	status unknown
	Italy		U.T.R.I.	SME	126	SpyBall	S-RW	1	status unknown
	Italy		U.T.R.I.	SME	127	Strix	FW	20	market ready
	Italy		U.T.R.I.	SME	128	TSO-401 Hummingbird	DF	4,2	market ready
12	Netherlands	65	Albatros UAS	SME	129	Albatros 3	FW	25	in service
	Netherlands		Albatros UAS	SME	130	Albatros 4	FW	30	in service
	Netherlands	66	ASTI & TNO	SME	131	Delfy I	FW	< 0,1	proto/techn. demo.
	Netherlands		ASTI & TNO	SME	132	Delfy II	Flap-W	< 0,1	proto/techn. demo.
	Netherlands	67	Delft Dynamics	SME	133	Robot Helicopter	RW	15	in service
	Netherlands	68	GeoCopter	SME	134	GC-201	RW	100	under development
	Netherlands	69	HighEye	SME	135	HE 26 Backpack	RW	14	in service
	Netherlands		HighEye	SME	136	HE 26 CA	RW	14	in service
	Netherlands		HighEye	SME	137	HE 60 A	RW	23	in service
	Netherlands		HighEye	SME	138	HE 60 CA	RW	23	in service
	Netherlands		HighEye	SME	139	HE 80 A	RW	35	in service
	Netherlands		HighEye	SME	140	HE Electric	RW	11,5	in service
	Netherlands		HighEye	SME	141	X2F 3,6 T	RW	22	in service
	Netherlands		HighEye	SME	142	X2F 60 A	RW	22	in service
	Netherlands		HighEye	SME	143	X2F 80 A	RW	30	in service
13	Norway	70	ET-Air	SME	144	Cruiser	FW	20	status unknown
	Norway	71	NORUT-Northern Research Inst.	Gvt	145	Cryowing	FW	30	in service
	Norway	72	Odin Aero	SME	146	Cruiser	FW	25	in service
	Norway		Odin Aero	SME	147	Prion 3-001	FW	30	in service
	Norway		Odin Aero	SME	148	Prion 3-004	FW	?	in service
	Norway		Odin Aero	SME	149	Recce D6	FW	2,8	status unknown
	Norway	73	ProxDynamics	SME	150	PD-100C	RW	0,2	under development
	Norway	74	ProxFlyer	SME	151	Bladerunner	RW	0,15	sold as toy
	Norway		ProxFlyer	SME	152	MicroFlyer	RW	0,07	sold as toy
	Norway		ProxFlyer	SME	153	Mosquito	RW	0,11	sold as toy
	Norway		ProxFlyer	SME	154	Nanoflyer	RW	0,02	proto/techn. demo.
	Norway	75	Robot Aviation	SME	155	Aerobot	FW	149	under development
	Norway		Robot Aviation	SME	156	Taildragger	FW	30	under development
	Norway	76	Simicon	SME	157	SCR	FW	150	research ongoing
14	Poland	77	Air Force Inst. of Technology	Gvt	158	HOB-Bit	FW-TE	3,5	status unknown
	Poland		Air Force Inst. of Technology	Gvt	159	unnamed	FW	10	status unknown
	Poland	78	Research & Development Centre	Gvt	160	Bee	FW	0,07	status unknown
	Poland		Research & Development Centre	Gvt	161	CamBat	FW	1,7	status unknown
	Poland	79	WB Electronics	SME	162	Sofar	FW	4,9	market ready
15	Serbia	80	EMA-UAV	SME	163	Nikola Tesla 150	FW	40	status unknown
	Serbia	81	Utva Aircraft Industry	SME	164	Gavran I	FW	16	status unknown
	Serbia		Utva Aircraft Industry	SME	165	Gavran II	FW	30	status unknown
	Serbia		Utva Aircraft Industry	SME	166	IBL-2004	FW	< 150	status unknown
16	Slovakia	82	Advanced Unmanned Systems	SME	167	AirSniper	T-Rotor	12	status unknown
17	Slovenia	83	AvioTech	SME	168	RVM04	FW	36	status unknown
	Slovenia	84	C-Astral	SME	169	Bramor	FW	4	market ready
	Slovenia		C-Astral	SME	170	Spectral System	FW	9,2	status unknown

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18	Spain	85	Aerovision	SME	171	Fulmar Land 2.0	FW	19	market ready
	Spain		Aerovision	SME	172	Fulmar Sea	FW	19	under development
	Spain	86	Airview	SME	173	AV-01	FW	6	market ready
	Spain		Airview	SME	174	AV-02	FW	8	market ready
	Spain		Airview	SME	175	AV-03	FW	28	market ready
	Spain	87	Alfa Unmanned Systems	SME	176	Atlantic	FW	31	market ready
	Spain		Alfa Unmanned Systems	SME	177	Atlas	FW	6,9	market ready
	Spain		Alfa Unmanned Systems	SME	178	Commando	RW	8	market ready
	Spain		Alfa Unmanned Systems	SME	179	Sniper	RW	14	market ready
	Spain	88	CATUAV	SME	180	Argos	FW	12	in service
	Spain		CATUAV	SME	181	Atmos-4	FW	1,75	in service
	Spain	89	Elimco (FADAC-CATEC)	SME	182	Viewer	FW	8	in service
	Spain		Elimco (FADAC-CATEC)	SME	183	Xvision	FW	50	in service
	Spain	90	Grupo Tekplus	SME	184	Tekplus 1	RW	100	status unknown
	Spain	91	Indra Sistemas	Ind	185	Albhatros	FW	40	status unknown
	Spain	92	Oberon Space	Ind	186	SAVL (test bed)	FW	< 25	under development
	Spain	93	Proytec	SME	187	Atmos-2	FW	0,96	under development
	Spain	94	Robotnik Automation	SME	188	X4	RW	< 150	under development
	Spain	95	Sistemas de Control Remoto	SME	189	Alba	FW	18	market ready
	Spain		Sistemas de Control Remoto	SME	190	X-Vision	FW	40	market ready
	Spain	96	UAV Navigation	SME	191	Commando	RW	8	status unknown
	Spain		UAV Navigation	SME	192	KUAV	FW	30	status unknown
19	Sweden	97	CybAero	SME	193	APID 60	RW	150	in service
	Sweden	98	Saab	Ind	194	Filur (test bed)	FW	55	proto/techn. demo.
	Sweden		Saab	Ind	195	Sharc (test bed)	FW	60	proto/techn. demo.
	Sweden	99	SmartPlanes	SME	196	PAMS - SmartOne	FW	1,1	in service
20	Switzerland	100	Aeromedia	SME	197	Aerocopter 1	RW	2	under development
	Switzerland		Aeromedia	SME	198	Aerocopter 2	RW	12	under development
	Switzerland		Aeromedia	SME	199	Aerostar 1	FW	1	under development
	Switzerland		Aeromedia	SME	200	Aerostar 2	FW	2	under development
	Switzerland	101	Aeroscout	SME	201	B2-120	RW	< 150	in service
	Switzerland	102	MiniZepp	SME	202	Z10000 Pro	L-t-A	< 150	status unknown
	Switzerland		MiniZepp	SME	203	Z13000	L-t-A	< 150	status unknown
	Switzerland	103	SenseFly	SME	204	Swinglet	FW	0,5	market ready
	Switzerland	104	Skive Aviation	SME	205	Skive	L-t-A	< 150	in service
	Switzerland	105	SkyBotix	SME	206	CoaX 1	RW	0,4	market ready
	Switzerland		SkyBotix	SME	207	CoaX 2	RW	0,8	market ready
	Switzerland	106	Swiss UAV	SME	208	KOAX- X-240	RW	45	under development
	Switzerland		Swiss UAV	SME	209	Neo-S300	RW	100	market ready
	Switzerland	107	SwissCopter	SME	210	NT150	FW	55	under development
	Switzerland	108	weControl (SurveyCopter, France)	SME	211	Card CH	FW	10	market ready
21	UK	109	Aesir UAS	SME	212	Embler	S-RW	< 15	proto/techn. demo.
	UK	110	Aesir UAS	SME	213	Odin	DF	20	market ready
	UK	111	Aesir UAS	SME	214	Vidar	DF	0,5	market ready
	UK	112	Autonomous Vehicles	SME	212	Seeker	T-Rotor	16	under development
	UK	113	BAE Systems	Ind	213	Corax (test bed)	FW	< 150	proto/techn. demo.
	UK		BAE Systems	Ind	214	Fury (test bed)	FW	< 150	proto/techn. demo.
	UK		BAE Systems	Ind	215	Kestrel (test bed)	FW	< 140	proto/techn. demo.
	UK		BAE Systems	Ind	216	Raven (test bed)	FW	< 150	proto/techn. demo.
	UK	114	CyberFlight	SME	217	Bushmaster	FW	2	status unknown
	UK		CyberFlight	SME	218	CyberEye	FW	10	market ready
	UK		CyberFlight	SME	219	CyberOne	FW	12,2	status unknown
	UK		CyberFlight	SME	220	FatBoy	FW	70	status unknown
	UK		CyberFlight	SME	221	SOD I	FW	3	status unknown
	UK		CyberFlight	SME	222	SOD III	FW	5,4	status unknown
	UK		CyberFlight	SME	223	SOD IV	FW	0,5	status unknown
	UK		CyberFlight	SME	224	Super Swift Eye	FW	< 150	market ready
	UK		CyberFlight	SME	225	SwiftEye	FW	6,4	in production
	UK	115	Dragonfly Air Systems	SME	226	Highland Darter	RW	< 150	under development
	UK		Dragonfly Air Systems	SME	227	Skimmer	T-Rotor	20	under development
	UK	116	FanWing	SME	228	STOL UAS	Fan W.	12	proto/techn. demo.
	UK	117	Flying Wings	SME	229	Observer	FW	7	under development
	UK	118	GFS Projects	SME	230	Flying Saucer	S-RW	< 150	under development
	UK		GFS Projects	SME	231	GFS-7	S-RW	5,45	under development
	UK	119	MagSurvey	SME	232	Prion	FW	30	in service
	UK	120	NitroHawk	SME	233	NitroHawk	RW	15	in service

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	UK	121	QinetiQ	Ind	234	Mercator	FW	27	proto/techn. demo.
	UK		QinetiQ	Ind	235	Tiger	T-Body	3	status unknown
	UK		QinetiQ	Ind	236	Zephyr	FW	30	proto/techn. demo.
	UK	122	Roke Manor Research (Siemens)	Ind	237	unnamed	M-Prfl	< 150	status unknown
	UK	123	Selex Sensors & Airborne Systems	Ind	238	Damsfly	FW	9	proto/techn. demo.
	UK	124	Swam Systems	SME	239	Owl	RW	1	status unknown
	UK	125	Tasuma	SME	240	CSV-20	FW	20	proto/techn. demo.
	UK		Tasuma	SME	241	CSV-25	FW	85	market ready
	UK		Tasuma	SME	242	CSV-30	FW	22	proto/techn. demo.
	UK		Tasuma	SME	243	CSV-40	FW	28	market ready
	UK		Tasuma	SME	244	CSV-50	FW	65	market ready
	UK		Tasuma	SME	245	Hawkeye	FW	3,8	proto/techn. demo.
	UK		Tasuma	SME	246	MSV-10	FW	4,2	proto/techn. demo.
	UK	126	Universal Target Systems	SME	247	Spotter	FW	< 150	market ready
	UK		Universal Target Systems	SME	248	Vigilant	FW	15	market ready
	UK	127	VTOL Technologies	SME	249	VTOL UAV	Flying W	3,5	under development
	UK	128	Warrior (Aero-Marine)	SME	250	Gull 24	FW	18	under development
	UK		Warrior (Aero-Marine)	SME	251	Gull 36	FW	70	under development
	UK		Warrior (Aero-Marine)	SME	252	Gull 44	FW	93	under development
	NO LONGER IN DEVELOPMENT OR PRODUCTION					**Aircraft with Take-Off Mass < 150 kg**			
1	Austria	01	Schiebel Elektronische Geraete	SME	01	Camcopter 5.1	RW	68	in service
2	France	02	Aeroart (✞ Nov '09)	SME	02	A100	FW	44	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	03	Aelius-0	FW	75	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	04	Aelius-1	FW	20	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	05	Aves	FW	25	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	06	Featherlite	FW	1,5	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	07	H250	FW	125	no longer in dvpmt
	France		Aeroart (✞ Nov '09)	SME	08	Seagos	FW	< 150	no longer in dvpmt
	France	03	Sagem DS, France (& Meggitt Defence, UK-AC)	Ind	09	Crecerelle	FW	145	no longer in prod.
	France	04	Gates Technologies	SME	10	GT Aircraft	L-t-A	< 150	no longer in dvpmt
3	Germany	05	EADS Deutschland	Ind	11	DO-MAV	FW	0,5	no longer in dvpmt
	Germany		EADS Deutschland	Ind	12	Midas	FW	0,2	no longer in dvpmt
	Germany	06	UAV Services & Systems (✞ '09)	SME	13	SS-1	FW	8	no longer in prod.
	Germany		UAV Services & Systems (✞ '09)	SME	14	SS-2	FW	13	no longer in prod.
4	Netherlands	07	Dutch Space	Ind	15	MATE	FW	6	no longer in dvpmt
	Netherlands	08	E-Producties (now GeoCopter)	SME	16	EKH-001	RW	80	no longer in prod.
5	Spain	09	Aitem	SME	17	Dedalo	FW	< 150	no longer in prod.
	Spain		Aitem	SME	18	Horus	RW	< 150	no longer in prod.
6	UK	10	Meggitt Defence	Ind	19	Phantom	FW	40	no longer in prod.
	UK		Meggitt Defence	Ind	20	Spectre	FW	145	no longer in prod.
	UK	11	QinetiQ	Ind	21	Observer	FW	30	no longer in dvpmt
	UK		QinetiQ (& Tasuma-AC)	Ind SME	22	MinO	FW	10	no longer in dvpmt
	UK	12	SkyShips	SME	23	C1000	L-t-A	30	no longer in dvpmt
	UK		SkyShips	SME	24	Cirrus 840	L-t-A	< 150	no longer in dvpmt
	SMALL & MEDIUM-SIZED ENTERPRISES					**Aircraft with Take-Off Mass > 150 kg**			
1	Austria	01	Diamond	SME	01	DA42 (OPA)	FW-TE	1785	market ready
	Austria	02	Schiebel Elektronische Geraete	SME	02	Camcopter S-100	RW	200	in service
2	Czech Rep.	03	TL Elektronik	SME	03	Ampad	M-Prfl	250	in service
3	Europe	04	European Consortium	SME	04	Heliplat	FW	7200	under development
4	France	05	ECT Industries	SME	05	Hetel	RW	550	proto/techn. demo.
	France	06	Flying Robots	SME	06	FR 101	M-Prfl	600	in service
5	Germany	07	IMAR Navigation	SME	07	IFF-4.5	RW	220	under development
6	International	08	Naval Research Lab, USA (& CybAero, Sweden-AC)	Gvt SME	08	Vantage	RW	160	proto/techn. demo.
7	Italy	09	International Aviation Supply	SME	09	Raffaello	FW	180	market ready
	Italy	10	International Aviation Supply (& Iniziative Industriale Italiane-AC)	SME SME	10	Archimede (converted Sky Arrow light plane)	FW	650	market ready
	Italy	11	Nimbus	SME	11	D-Fly	Inflat.W	260	under development
8	Netherlands	12	Aerwin Technologies & Aeromedia	SME	12	unnamed	L-t-A	?	under development
9	UK	13	Aesir UAS	SME	13	Hoder	2 DF	2500	under development

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	UK	14	Kestrel Aerospace	SME	14	Kestrel	T-Rotor	295	under development
	UK		Kestrel Aerospace	SME	15	Lancer	T-Rotor	> 295	under development
	UK	15	Lindstrand Technologies	SME	16	G20	L-t-A	> 150	in service
	UK	16	Warrior (Aero-Marine)	SME	17	Gull 68	FW	250	under development
	INDUSTRY					**Aircraft with Take-Off Mass > 150 kg**			
1	Croatia	01	Soko	Ind	01	B3 & B4	FW	220	under development
2	Europe	02	Advanced UAV Project:		02	Talarion	FW-TE	7000	under development
			- EADS CASA, Spain	Ind					
			- EADS Defence & Security, France	Ind					
			- EADS Deutschland, Germany	Ind					
			- EADS Astrium, France	Ind					
			- Safran, France	Ind					
			- Thales, France	Ind					
			- Zodiac, France	Ind					
			- numerous SMEs	SME					
	Europe	03	Neuron Consortium:		03	Neuron	FW	2270	under development
			- Dassault, France	Ind					
			- Alenia Aeronautica, Italy	Ind					
			- EADS CASA, Spain	Ind					
			- Hellenic Aerospace Ind., Greece	Ind					
			- Thales, France	Ind					
			- RUAG Aerospace, Switzerland	Ind					
			- Saab Aerosystems, Sweden	Ind					
	Europe	04	Rheinmetall Defence, Germany	Ind	04	Opale (OPA)	FW-TE	1785	market ready
			(& Diamond, Austria-AC)	SME					
	Europe	05	Sagem Defence & Security, France	Ind	05	Patroller (converted AC)	FW	1050	market ready
			(& Stemme, Germany-AC)	SME					
3	France	06	EADS Defence & Security	Ind	06	Orka	RW	680	under development
			[& Vertivision (Eurocopter & Gimbal-AC)]	Ind					
	France		EADS Defence & Security	Ind	07	Surveyor 2500 (OPA)	FW	750	market ready
			(& Robin, France-AC)	SME					
	France	07	Sagem Defence & Security	Ind	08	Sperwer	FW	350	in service
	France		Sagem Defence & Security	Ind	09	Sperwer B / MK 2	FW	> 350	under development
4	Germany	08	EADS Deutschland	Ind	10	Barrakuda (test bed)	FW	3250	proto/techn. demo.
	Germany		EADS Deutschland	Ind	11	CL-289	FW-SW	240	in service
			[originally (CL-89) in cooperation with Bombardier, Canada]						
	Germany		EADS Deutschland	Ind	12	Shark (test bed)	RW	190	proto/techn. demo.
	Germany	09	OHB System	Ind	13	Unnamed (OPA)	FW	860	under development
			(& Stemme, Germany-AC)	SME					
	Germany	10	Rheinmetall Defence	Ind	14	KZO	FW	161	in service
	Germany		Rheinmetall Defence	Ind	15	Tares (Lethal)	FW	160	under development
5	Greece	11	EADS 3 Sigma	Ind	16	Nearchos	FW	190	in service
6	International	12	EADS Defence & Security, France	Ind	17	SIDM / Eagle 1 / Harfung	FW	1200	in service
			(& IAI-Malat, Israel-AC)	Ind					
	International	13	EuroHawk	Ind	18	EuroHawk	FW	14630	on order
			(EADS Deutschland &	Ind					
			Northrop Grumman, USA-AC)	Ind					
	International	14	RUAG Aerospace	Ind	19	ADS Ranger	FW	280	in service
			(& IAI-Malat, Israel)	Ind					
	International	15	Irkut, Russian Federation	Ind	20	Irkut 850 (OPA)	FW	860	in service
			(& Stemme, Germany-AC)	SME					
	International	16	SDM Project:			Système de drones MALE	FW	4650	development project
			- Dassault Aviation, France	Ind		(Heron TP)			
			- Thales, France	Ind					
			- IAI-Malat, Israel (AC)	Ind					
	International	17	Selex Galileo, Italy	Ind	21	Technology cooperation	FW	350	UAS development
			(& King Abdullah Design & Development Bureau, Jordan)	Ind					
	International	18	Selex Galileo, Italy	Ind	22	Technology coop. MoU	FW	350	UAS development
			(& Mubadala Developmt Co., U.A.E)	Ind					
	International	19	Selex Galileo, Italy	Ind	23	Technology coop. MoU	FW	350	UAS development
			(& CTRM, Malaysia)	Ind					

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	International	20	U-TacS	Ind	24	Watchkeeper	FW	450	on order
			(owned by Thales, UK-49% &	Ind					
			Elbit Systems, Israel-51%)	Ind					
7	Italy	21	Alenia Aeronautica	Ind	25	Molynx	FW-TE	3000	under development
	Italy		Alenia Aeronautica	Ind	26	Sky-X (test bed)	FW	1200	under development
	Italy		Alenia Aeronautica	Ind	27	Sky-Y (test bed)	FW	1200	under development
	Italy	22	CIRA	Ind	28	Castore (Stratospheric)	FW	> 150	proto/techn. demo.
	Italy	23	Selex Galileo	Ind	29	Falco	FW	350	in service
	Italy		Selex Galileo	Ind	30	Falco EV	FW	750	under development
8	Spain	24	EADS CASA	Ind	31	Atalante	FW	> 150	under development
	Spain	25	INTA	Ind	32	SIVA	FW	300	in service
	Spain	26	Platino Consortium:	Ind	33	HADA	RW	380	under development
			[31 Spanish companies incl.:						
			- Aries Complex	SME					
			- ARESA	SME					
			- ACTA	SME					
			- ISDEFE	Ind					
			and lead by:						
			- CATEC (Aeronautical Research Council of Andalusia) &	Gvt					
			- INTA]	Ind					
9	Sweden	27	Saab	Ind	34	Skeldar V150	RW	160	under development
	Sweden		Saab	Ind	35	Skeldar V200	RW	200	under development
	Sweden		Saab	Ind	36	Skeldar V200M	RW	200	under development
	Sweden		Saab	Ind	37	Skeldar V600	RW	600	under development
10	UK	28	BAE Systems	Ind	38	Herti 1B (converted AC)	FW	750	proto/techn. demo.
	UK		BAE Systems	Ind	39	Herti 1D (converted AC)	FW (jet)	350	proto/techn. demo.
	UK		BAE Systems	Ind	40	Mantis	FW-TE	?	under development
	UK		BAE Systems	Ind	41	Taranis	FW	8000	under development
	UK		BAE Systems	Ind	42	GH22	L-t-A	> 150	market ready
			(& Lindstrand Techno., UK-AC)	SME					
	UK		BAE Systems	Ind	43	Herti 1A (converted AC)	FW	500	in service
			(& Slingsby Aviation, UK-AC)	SME					
11	UK	29	LM Consortium:		44	Fire Shadow (Lethal)	FW	200	under development
			- Blue Bear Systems Research, UK	Ind *		(loitering ammunition)			
			- Cranfield Aerospace, UK	&					
			- Cranfield University, UK	SME					
			- Lockhead Martin Insys *, UK	Ind					
			- MBDA *, UK	Ind					
			- Meggitt Defence *, UK	Ind					
			- QinetiQ *, UK	Ind					
			- Roxel, UK	Ind					
			- Selex Sensors & Airborne Systems *, UK	Ind					
			- Thales *, UK	Ind					
			- Ultra Electronics *, UK	Ind					
			- Selex Systems Integration, UK (formerly Vega, UK)	Ind					
	NO LONGER IN DEVELOPMENT OR PRODUCTION					**Aircraft with Take-Off Mass > 150 kg**			
01	Europe	01	EADS Defence & Security, France	Ind	01	Carapas	FW-SW	330	no longer in dvpmt
			(& Selex Galileo-AC)	Ind					
02	Germany	02	EADS Deutschland	Ind	02	CL-289	FW-SW	240	in service
			[originally (CL-89) in cooperation with Bombardier, Canada]						
	Germany		EADS Deutschland	Ind	03	Shark (test bed)	RW	190	no longer in dvpmt
03	International	03	EADS Defence & Security, France	Ind	04	SIDM / Eagle 1 / Harfung	FW	1200	in service
			(& IAI-Malat, Israel-AC)	Ind					
04	Italy	04	Selex Galileo	Ind	05	Mirach 150	FW-SW	330	no longer in prod.
	Italy		Selex Galileo	Ind	06	Mirach 26	FW	230	no longer in prod.
05	Spain	05	INTA	Ind	07	SIVA	FW	300	in service
06	Switzerland	06	RUAG Aerospace	Ind	08	Super Ranger	FW	500	no longer in dvpmt
07	UK	07	BAE Systems	Ind	09	Phoenix	FW	180	no longer in prod.

MTOM = Maximum Take-Off Mass
(& ….. - AC) = airframe manufacturer
SME = Small/Medium-sized Enterprise:
< 250 employees
< Euro 50.000.000 annual turnover
not a subsidary of Ind (see below)
Ind = Industry:
> 250 employees
> Euro 50.000.000 annual turnover
Converted aircraft = certified aircraft converted into UAS (not optionally piloted)

⇳ = Has ceased trading
AC = Aircraft
DF = Ducted Fan
Fan W = Fan Wing
Flap W = Flapping Wing
Flying W = Flying Wing
FW = Fixed Wing
FW-SW = Fixed Wing Stub Wing
FW-TE = Fixed Wing Twin Engine
Inflat. W = Inflatable Wing
L-t-A = Lighter-than-Air (Airship)

M-Prfl = Motorized Parafoil
OPA = Optionally Piloted Aircraft
RW = Rotary Wing
RW-3x2CR = Rotary Wing with 3 sets of 2 counter-rotating rotors
RW-3R = Rotary Wing with 3 rotors
RW-4R = Rotary Wing with 4 rotors
RW-8R = Rotary Wing with 8 rotors
S-RW = Shrouded Rotary Wing
T-Body = Tilt Body
T-Rotor = Tilt Rotor