CONTRIBUTING STAKEHOLDERS

European Defence Agency (EDA)

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The European Defence Agency's activities in the field of UAVs in 2007 covered a broad range and many organisations and relevant industrial parties embraced the Agency as a new, relevant and potentially influential player. Having started from a Capability and Research and Technology perspective, the focus of EDA activities has gradually shifted towards cooperation, airworthiness and strengthening European industry — without neglecting and constantly validating the other areas.

UAVs may have begun as military systems – and that of course remains the primary interest of the European Defence Agency in this area – but they are now emerging from this environment and becoming increasingly important for global safety and security. In UAVs in particular, we see an urgent need to tackle tomorrow's challenges to ensure the timely and proper use of these systems in their global role. Specific military requirements will remain but, by and large, all UAV systems will be dual use and will thus face the challenges of civil regulations and the «Single European Sky» initiative launched by the European Commission.

Airworthiness is not something that comes as a final consideration while developing and building systems. The notion of airworthiness and continued airworthiness should leave its mark on all phases from the conceptual to the production phase. Therefore, before outlining the actual activities on airworthiness, it is useful to consider UAV-related activities that are relevant for airworthiness in the broader sense, from the conceptual view of sharing a common doctrine and common TTPs (Tactics, Techniques and Procedures) to standardisation of components, information exchange requirements, formats and so on. Commonalities simplify certification, common acquisition and acceptance of a common set of airworthiness requirements and procedures. They also contribute to a clear common understanding how to operate and maintain a UAV system, which leads to less confusion and errors, and thus to a higher reliability of the services provided.

The EDA monitored the acquisition activities of Member States, for it remains crucial for the EU's European Security and Defence Policy to have LE UAVs available from 2010. Where possible, the Agency encourages cooperation in order to maximise benefit for all. Whether it is in training, maintenance or education, if cooperation is efficient and cheaper, Member States are encouraged to pursue it.

Currently acquisitions are planned in Italy, the United Kingdom and Germany. At the same time, we see huge problems to find the money and to meet the intended initial operating capability status by 2010.

From the airworthiness perspective, using a common system of training, maintenance and education will contribute to a common understanding of how UAS work, will create less confusion in their operation and maintenance and thus less chance of failures.

Once acquired, further cooperation is possible in maintenance, deployment, operations and training of these assets. Also in this phase, involvement of NAMSA or OCCAR, for example, could be discussed as possible central interfaces towards industry or service providers.

Most Member States have, through adoption of the NATO NEC (Network Enabled Capabilities) concept, already agreed that whatever systems they buy should be able to operate in a wider C4ISR architecture. This means for instance complying with relevant data formats such as NATO STANAGs. It also means by the way that governments will have to agree on a European scale on how to tackle the issue of frequency and bandwidth availability. It is still very difficult to start a coherent discussion as long as Member States try to balance European needs and their national responsibilities and sovereignty.

A single European voice on this and similar issues is necessary, not specifically because of military operations but for enabling security related missions as derived from the Common Foreign and Security Policy (CFSP) and the European Security and Defence Policy (ESDP). It is therefore not a military problem but a problem for Europe as a whole if it wants to «project power» in a coherent and viable way.

As the situation is now, it will not be easy to achieve interoperability in the next few years as the fragmented approach from industry is not likely to end without some external pressure for common standards and formats, which can realistically only come from a cooperative UAV programme. As interoperability costs money, the simple mathematics of acquisition are likely to prevent fully Network Enabled UAVs within the next few years until new systems are procured to replace the current legacy systems.

In terms of harmonisation, Member States can take further steps and discuss harmonisation of essential UAV parts such as engines, payloads, and other components to enable common procurements, maintenance contracts and optimal use of very expensive sensors. We have seen the beginning of that process through initiatives like the NEURON (IT, CH, GR, FR, SP and SWE). A clear commitment to cooperate and harmonise is however still lacking.

In the area of Maritime Surveillance, an EDA working group has drafted a Common Staff Target for a Maritime Tactical Unmanned Aerial System (MTUAS). This document can be used as the first step to start a future cooperative program once Member States sign up to it and commit funds to acquire such a system.

Single European Sky

The pressure on the military is increased by the Single European Skies (SES)[1] concept, adopted in March 2004, which aims at enhancing current safety standards and overall efficiency for general air traffic in Europe, to optimise capacity meeting the requirements of all airspace users and to minimise delays. For this purpose a harmonised regulatory framework was established for the creation of the single European sky.

The objectives of Single European Skies ATM Research program (SESAR[2]) are to eliminate the fragmented approach to ATM, transform the European ATM system, synchronise the plans and actions of the different partners and federate

[1] http://www.eurocontrol.int/ses/public/standard_pagesk_ses.html
[2] http://www.eurocontrol.int/sesar/public/subsite_homepage/homepage.html

resources.

In response to strong demand from industry, EU Member States and other stakeholders to simplify and increase the effectiveness of the regulatory framework for aviation in Europe, a High Level Group for the Future European Aviation Regulatory Framework was appointed in November 2006 by European Transport Commissioner Jacques Barrot. He asked the Group to present a vision for the development of the aviation regulatory framework – with a particular focus on air traffic management — and to provide a roadmap with practical steps.

In their report[3] from July 2007, The High Level Group underlined the need for, and indeed urgency of, changes in the regulatory framework for aviation in Europe. That would be necessary to ensure alignment across the aviation systems towards achieving shared objectives.

The Group concluded that the challenge for Europe is not to embark on system changes but to focus on accelerating the effective delivery of existing initiatives and to strengthen the capabilities of the key players to deliver them. If 2020 is the target date for completion of the proposed changes then the start of the SESAR deployment phase needs to be set on 2013.

The military obviously plays an important role in delivering SES benefits to the civil community. There needs to be a mechanism in place to ensure that the military derives benefits from cooperation with the SES and that the SES meets military requirements. However, the strategic role that the military has in achieving the objectives of the SES is currently not properly enabled. The military has no mechanism for establishing a common European view to the extent that civil aviation does because of the various alignments of states.

To involve and engage the military closer in the SES objectives the High Level Group proposes to:
a. engage the defence Ministers in SES objectives, with particular focus on:
  - developing joint targets for the streamlined use of space;
  - identifying and overcoming bottlenecks to progress, e.g. the need to equip military aircraft with civil equipment for them to use civilian-controlled airspace;
  - addressing and accelerating military-military coordination and harmonisation of procedures;
b. monitor progress and provide feedback.

Harmonisation of Military Aviation Requriements

From January to April 2007, an industrial study was performed on behalf of the European Consortium for Advanced Training in Aerospace (ECATA) looking into the potential benefits of harmonising military aviation requirements. The purpose of the project was to investigate potential feasible approaches for the future «initial airworthiness» regulation of military air platforms and to postulate the most desirable outcome for an industry perspective.

The ECATA Consortium[4] itself is composed of leading Aerospace Teaching Institutes in association with the European Aerospace Industry. ECATA aims at identifying the high level training needs of the Aerospace Industry and jointly developing appropriate training programmes. Academic know-how, experience and knowledge of the profession are combined to organize a range of courses fitted to the needs. The study noticed that Civil Aviation Regulations have led to a high degree of coordination and commonality, unlike military or state regulations which can be very different from nation to nation. Large military programs like Airbus 400M, Tornado

3 http://ec.europa.eu/transport/air_portal/hlg/index_en.htm
4 http://www.ecata.org/presentation.htm

and NH-90 will require non-recurring overhead activities to agree on an acceptable approach for every new project.

Based on numerous interviews with relevant stakeholders, a number of proposals were developed ranging from common certification codes, independent «certification officials» to a combined civil/military EASA. A business case was developed to support the claim that harmonisation would actually save money and resources.

Most importantly, the study proposes three main engagement strategies:
a. Set up a joint team under direction of national airworthiness authorities to develop and implement a common set of EU codes and certification approaches.
b. The AeroSpace and Defence Industries Association of Europe (ASD) should take a lead in coordinating industry's input to the joint team (and in parallel raising it's profile for military issues)
c. High level influential stakeholders such as national military airworthiness authorities and governments need to be lobbied to increase their level of interest and support

Military Aviation Authorities

The EDA was already addressing the lack of cooperation between and the fragmentation of military aviation authorities. Where civil aviation organisations have a clear description and allocation of responsibilities and competencies, military organisations are still very much organised as a result of the historical development of military aviation. These organisations have already recognised the sometimes fragmented structures, even though joint operations and interoperability call for a coordinated approach.

The EDA is examining possible cooperation with the European Military Aviation Authorities Group (EMAAG) and intends to initiate an ad-hoc project group to determine a viable and agreed roadmap that leads to the creation of a forum for military airworthiness authorities as a first step towards the proposed military aviation authorities forum.

Airworthiness

The issue of opening up European skies for UAS forces us to take a very active role towards both military and civilian initiatives. The safety requirements to allow UAS outside restricted areas into the «Single European Sky» call for careful steps towards certification of all elements of the UAS. We need quality assurance for all elements, not only those concerned with flight. A chain is only as strong as its weakest link and poor maintenance or insufficiently trained operators can also cause safety problems for UAS, as for any aviation system. We also need to ensure that UAS will not be banned by other airspace users for fear that they cannot avoid dangerous situations that could arise in the incredibly busy European airspace. Predictability and reliability are also key issues here. A combined approach by all the relevant actors in Europe should result in a widely accepted approach to critical issues and mutually accepted procedures and requirements for technical solutions.

Though a number of nations and NATO are currently tackling the military aspects of airworthiness, it is very important that proposals are supported by the legislative bodies of the European Union. The EU will undoubtedly adopt legislation to enable civilian unmanned platforms to fly and be operated by law enforcement agencies, for example, and this is likely to affect defence organisations. As in manned aviation, we still see specific military aviation rules, but there will be increasing pressure to close the gap with civilian standards. EDA can play a pivotal role in bringing all parties together

and getting involved in this process from the beginning. Therefore EDA awarded a €500.000 project in January 2008 focussing on UAV traffic insertion[5]. The project intends to encourage European stakeholders such as airworthiness authorities, air traffic management bodies, procurement agencies, industry and research institutes to develop a joint agenda for common European UAS activities, leading to specific projects addressing security and commercial — as well as defence — uses of UAS.

Another area to investigate is on achieving common certification procedures and requirements for aircraft including UAVs (as also indicated by the ECATA report). OCCAR is already discussing possible common experimental flight test permissions and is now in the process of defining the airworthiness requirements for future UAS that can be used by industry to actually build a UAS. This should also be linked to the EUROCAE working group 73[6], which is defining the technical standards for UAS-related equipment.

Bridging The Gap

UAVs will not fly over Europe unrestricted for the next 5-10 years due to both regulatory and technical reasons. At the same time there is an upcoming need for more large aerial platforms to support security related missions (border control, pollution investigation, wild fire monitoring etc.).

Industry has identified this gap and is creating bridging solutions to overcome this gap. The preferred solution seems to be Optionally Piloted Vehicles. The charm of this solution is that a fully type certified airplane is used that can be flown at any time and in any place with a pilot in the current version, while at the same time industry has developed a capability to turn the aircraft into an unpiloted version and use it as a UAV where required or allowed. In that mode it can be used for the traditional dull, dirty and dangerous missions for which UAVs are primarily intended.

The concept itself is the ideal transition vehicle for the next 10 years where UAS traffic insertion is being developed but ISTAR platforms are required now. The aircraft can fly tomorrow as a piloted version anywhere over Europe and as a UAS over a war zone. When UAV traffic insertion is adequately solved (perhaps by 2013) it can then be transformed into a «real» UAS.

Research & Technology

After launching successfully a number of R&T studies in 2006, the EDA is assessing a follow-up. Member States and industry have welcomed the efforts of the EDA to create convergence in programmes and harmonisation of standards, formats, technologies and information exchange.

In the field of UAS, the EDA has already initiated several studies to assist Member States and industry in assessing some of the critical technology areas.

- A study on LOS/BLOS (line-of-sight/beyond line-of-sight) data links by a consortium led by PATRIA (FI) was finalised in February 2007. The study[7] was intended to consolidate and analyse the available information on the LE-UAS operational environment, integrate the outcome of known efforts undertaken in the area of data links, recommend a specific, realistic and feasible solution and propose a way ahead for future standardisation, technology and regulatory

efforts. Apart from the technical issues related to data links in a Network Enabled Environment, special attention was given to the organisational prerequisites to make such a Network Enabled Environment work in both a NATO and EU setting. Showstoppers for future integrated EU operations are the releasability of relevant data and communication standards (such as STANAGs) to all EU nations involved, the lack of security and authentication standards and fragmented frequency allocation policies.

- Also in February 2007, EDA launched a new study for a common UAS simulation test bed that could be used as a benchmarking and common experimentation tool for both large industrial parties and SMEs. A consortium consisting of BAE systems (UK), SAGEM (FR), TNO (NL) and ITTI (PL) was appointed to ensure proper industrial inputs. The goals of this study are:
  - To promote European collaboration in the UAS field in requirements definition, development, certification, training and possibly procurement of UAS systems, leading to a more efficient use of funds compared to a pure national approach.
  - To encourage development of innovative sub-components for UAS systems by small and medium-sized enterprises.

  In the course of 2008 the consortium will demonstrate a scalable, modular and geographically dispersed UAS simulation test bed using currently available systems and technology.

- In November 2007, a consortium consisting of SAGEM (FR), TNO (NL), ESPELSA (ES) and ONERA (FR) finalized a study[8] on possible short and medium term solutions for sense-and-avoid for UAS, where the technology is required for the integration of UAS with other air traffic. Once mature, sense-and-avoid technology will undoubtedly have its impact on manned aviation too.

Both governments and industry are looking at technology shortfalls. In a series of reports from the European Commission[9], the shortfalls were clearly identified. Several working groups are currently discussing if these shortfalls are still valid and how a UAV roadmap should lead to further develop recognized technologies that are not yet mature, but vital to improve current capabilities. The recognised shortfalls in R&D should lead to transparent, cost and burden sharing industrial technology centres, the European «skunk works»[10] that can take Europe to state-of-the-art development and production, competitive with other major economic powers such as the U.S. and ASEAN.

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5 http://www.eda.europa.eugenericitem.aspx?area=News&id=312
6 http://www.eurocae.org/php_workgroup.php?ver=va#WG-73
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