

# ASD - Air4All Consortium

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As a result of the study 'UAS Insertion into GAT' dated June 2008, the European Defence Agency (EDA) commissioned Air4All to conduct a follow on study to supplement the findings of the original study, strengthen the support of participating Member States of EDA (pMS<sup>1</sup>) for the Roadmap concept and direct the future work of the Consortium. The study duration was limited to 3 months and included 3 workshops with the pMS.

In looking to improve the interaction with pMS a series of face-to-face expert level discussions was conducted. Consortium companies were assigned to both their parent nations and to those nations not represented in the Consortium, in order to gather comment on the original report. The interaction with pMS was always constructive and the comments were welcomed in the pursuit of a way forward. They reflected the opinion of the way the Roadmap was constructed/developed, its scope and application to military needs and how the work of Air4All related to other activity being conducted across Europe.

The second element of the study was the refinement of the original Roadmap, to focus it more closely to the needs of ESDP operations. A 2-Step approach was taken to analysing the responses; a national-level collection of requirements followed by a synthesis at the European level. Whilst there was a common view that the original Roadmap was not fully aligned to the needs of the pMS, they felt it could be adapted to focus more directly on military needs and development priorities. There was a clear consensus that nations required UAS to transit through Classes A, B and C airspaces, including crossing national borders and access to Class G airspace.

The third element of the study considered human factors and crew licensing. Critical to the importance of the human role in UAS operation must be addressed with the same rigour as for manned aviation and although many requirements were different, the core issues of situation awareness, robust intuitive controls and adequate warning/cautions remained essential; furthermore the design of a Control Station must support transparent integration within the ATM environment. Maintaining situational awareness including sensory perception (vibration, noise etc) was identified as a challenge, as was the extent to which automation could play a part. The issues of scalability and interoperability were seen to be important as they not only provide opportunities for reduced costs but are an important aspect of achieving a common certification standard. A number of clear benefits to military operations were identified in support of a common European position on military crew licensing and training including the ability to increase interoperability across nations through universally recognised competencies enabling multi-national crew operation and the identification of a common baseline for training at the European level.

The final element of the study looked at the challenges associated with operating in non-segregated, uncontrolled airspace and in airspace with only limited ATC support to separation. The technologies required to enable achievement of Steps 5a to 6a centre around the ability of the UAS to both separate and avoid collisions in an environment where there is a mix of traffic (both

co-operative and non-co-operative) operating under VFR and/or IFR. The responsibility of separation varies between ATC and the UAS and for both separation and collision avoidance, certain levels of autonomy may be required for which the development of a certification approach would be necessary. Additional requirements included the avoidance of terrain/obstacles and maintaining an appropriate distance from cloud under VFR operations.

The Air4All study team made a series of recommendations, which for the operational and regulatory activities would deliver short term outcomes and for the technical work, short term conclusions, but realisation of products in the slightly longer term. These are summarised below.

### Operational

- Conduct a study to create rules for combined military aircraft and UAS operations in segregated airspace for operational evaluation.
- Adapt these rules to operations in non-segregated airspace to enable military UAS operation in controlled airspace as OAT (Classes A, B and C).
- Implementation of a development programme leading to achievement of Step 5, cross-border operations in Class A, B and C.

### Regulatory

- Conduct a project that harmonises, across Europe, a set of guidelines for designing UAS control stations taking into account the critical human factor requirements.
- Incorporate in any future demonstration programme, elements that exploit the UAS mission management functionality in the light of scalability and interoperability concepts.
- Set up a UAS Training & Licensing Group that creates a library of information to enable the identification of common national requirements in support of cross-border coordination.
- Commission a study to define common minimum standards for the licensing and training of military aircrew.
- Propose a basis for common medical selection criteria, required capabilities/competencies and training themes at the European level.

### Technical

- Conduct a series of technical surveys covering the following capabilities:
  - Obstacle avoidance;
  - Weather avoidance;
  - Automatic take-off and landing;
  - Autonomy (in particular the certification thereof).



<sup>1</sup> All EU member states with the exception of Denmark