

Innovative Operational UAS Integration

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INOUI has been commissioned by the Directorate General for Energy and Transport of the European Commission and aims to establish general and harmonised rules and procedures for integrating UAS in the air traffic management (ATM) environment.

The INOUI objective, as part European R&D community, was to contribute to the insertion of UAS in the 2020 Air Traffic Management system currently developed through the Single European Sky (SES) ATM Research programme (SESAR). Although UAS are recognized by SESAR as legitimate airspace user, the topic of UAS was only briefly mentioned in SESAR Definition Phase and the related deliverables. Consequently, the results of the INOUI project feed into upcoming work within the SESAR Development Phase. On behalf of the SJU the work was appreciated by Peter Ahlers, head of SESAR WP B (Target Concept and Architecture): "SESAR needs the expertise gathered in INOUI concerning UAS operations and requirements. We will consider and integrate UAS operations in concepts and system architecture and the results of INOUI will be used to update the CONOPS". "Detailed conceptual descriptions and requirements concerning UAS operations will be developed in operational and technical thread work packages, the material developed by INOUI will be used and considered. SESAR can possibly learn from UAS technology which is already available".

INOUI has developed proposed innovative concepts for the integration of UAS into the new Air Traffic Management system and airport paradigm. INOUI represents a holistic approach to UAS integration. Goal of INOUI is to provide a stepwise approach to enable the earliest possible use of UAS applications. In particular INOUI research comprised the areas:

- Integration of UAS into the future ATM architecture of 2020+ as defined within SESAR;
- UAS applications, related operational concepts, procedures & requirements and their impact/consequences on the ATM system;
- Certification & licensing of UAS technology and human resources;
- Common Operation Picture and integrating UAS into the System-Wide Information Management (SWIM);
- Safety analysis of UAS integration in the ATM System;
- Aerodrome concepts and UAS operations - procedures and requirements up to 2020.

All 21 Deliverables of the INOUI project, an Executive Summary per work package, and the complete documentation of the Stakeholder Workshops and the Dissemination Forum are published on the INOUI webpage. A comprehensive glossary of UAS terms and terminology used in the project can also be found on the website.

The European project INOUI for the integration of Unmanned Aircraft Systems (UAS) into non-segregated airspace

INOUI: The project consortium consists of six organisations: a UAS Manufacturer, an Air Navigation Service Provider, various Research Centres and Consultancy Companies from France, Germany and Spain. More specifically these are DFS Deutsche Flugsicherung GmbH (DFS), Ingeniería de Sistemas para la Defensa de España, S.A. (Isdefe), Boeing Research & Technology Europe, S.L. (BRT&E), Fundación Instituto de Investigación INNAXIS, Rheinmetall Defence Electronics GmbH (RDE) and the French Aerospace Lab ONERA.

presented its research results at a forum in Cologne, Germany, on 1 - 2 December 2009. The forum was open to all interested UAS stakeholders. The 85 participants from Europe and USA represented all UAS stakeholder groups: private, governmental and military users, operators, CAA/regulators, research & development institutes, producers, ANSPs and other relevant organisations like EASA, European Defence Agency (EDA), EUROCAE resp. EUROCAE WG73 and JAPCC.

Furthermore a booklet was compiled to provide the UAS stakeholder community an overview of the content and the results of the INOUI project and points the interested reader to the detailed INOUI deliverables. The booklet itself is designed to present the wider public with a broad view on the current problems and the challenges for successful integration of UAS into non-segregated airspace. It is also available for download on the INOUI webpage.

Action Items Identified by the INOUI Project, Among Others

- Key issues are known but lacking consensus on solutions, as many institutions and organisations are involved.
- Proposed procedures and technologies need validation. Establishing an open architecture for each type of UAS.
- UAS specific operational concepts and procedures at aerodromes need to be validated.
- Developing specific safety case scenarios for the integration of UAS. Concentration on early implementations for gaining operational expertise to provide feedback in development and for safety case building.
- Communication with manned aviation technology developers shall be maintained.
- Clear definition of regulatory framework & responsibilities needed.
- Re-prioritise existing activities as many actions have not started yet, especially those foreseen to be the most difficult/time consuming ones.
- As target is to integrate UAS in 2020 actions have to start now.
- European guidance needed.

Proposed Way Forward: Create a New Vision for Europe

The INOUI project developed operational concepts and procedures as well as action lists for R&D and for evaluating technology. Many other institutions are working on UAS topics. But without the required legal framework, to be provided on European level, none of the organisations will be able to realise the target of earliest possible use of UAS applications in non-segregated airspace.

In order to achieve the above described economical and societal benefits of UAS implementation, the INOUI consortium is proposing a potential solution that could help the UAS interested parties to move forward and help the market development from a global perspective.

(1) A proposal for a European UAS Institute: Creation of a European UAS Institute with the mission "Promoting the implementation of UAS applications for the benefit of the society by facilitating the development and implementation of all the processes involved" and the following tasks and base lines:

- Single point of contact for manufacturers, users, SME's, Research institutes, vendors etc., providing the UAS stakeholders guidance how to go through the path of certification.
- Identify technology gaps & promote initiatives to address them;
- Coordinate supporting R&D through existing EC mechanisms and dedicated funding;
- Integration of academia and scientific institutes;
- Link to the military;
- Contribution from Industry and Research Institutes;
- Organisational structure based on the idea of Private Public Partnership.

(2) A proposal for a European UAS Validation Centre: Creation of a European UAS Validation Centre with the goal "Federating the activities of validation for UAS technology and operations as well as accelerating the process of gap filling for technology and legislation" and the following tasks and base lines:

- Implementation of common quality standards and common calibration standards.
- Serve as an initial test bed for operational data gathering that will serve to support the statistics required for reliability, safety and other operational assessments.
- Facilitate the rulemaking process by providing validation infrastructures.
- Promoting the transfer of R&D results into production, thus speeding up innovation.
- Providing the overview about validation capacities. The validation itself can be executed in different facilities resp. regional centres (e.g. specification by UAS type, mission type etc.). The centre could rely on given premises and facilities in different countries as well as creating new facilities if required. Partnership with regions is possible.
- Point of contact especially for R&D and SME's to validate products and procedures.
- Contribution from the industry, academia & research institutes.
- Organisational structure based on the idea of Private Public Partnership.

Timeframe

The current momentum has to be used to initiate the process on European Level. The UAS conference July, 1st, 2010, co-organised from EC DG MOVE and European Defence Agency (EDA) in cooperation with DG ENTR and DG RTD is the first

important step. The implementation of a High Level Group after the conference could catalyse the current activities and lead the initiative towards an integrated concept for UAS operation in Europe. The proposed new institutions of UAS Institute and UAS Validation Centre could be ready to start their work in 2011.

Conclusions

A new institutional set-up will be key to progress and to materialise the benefits of UAS operations as the UAS stakeholder community is very fragmented. The current and potential UAS users as well as the industry are expecting the EC to provide the legal and institutional basis to boost the UAS market. The current momentum shall make use of the Communities legal and financial possibilities and instruments to get ahead and to earn early tangible results.

INOUI's proposed solution must be seen as a proposal on the way forward to open the European skies for civil UAS applications. European guidance can align all parties; a mandated High Level Group may coordinate and accelerate the path to implementation and the way forward.

For additional information contact:

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