



ADVANCED LOW FLYING AIRCRAFT DETECTION AND TRACKING

MESSAGE FROM THE TECHNICAL LEAD

The consortium has recently been working on various integration issues. Each partner tested, evaluated and made improvements to the communication backbone through which all modules were connected over the internet. Also, the functionality of all modules was evaluated, using both artificial and previously recorded sensor signals. This all gave the necessary confidence that an integrated system test could be successfully completed.

The first ALFA full system test has been conducted in Cacela Velha in the south of Portugal during the week 24-28 June. This test proved very successful and the system was able to detect and classify drones, helicopters and fixed wing aircraft. The threat analysis and behavioral analysis proved to operate, as well as the landing site prediction. Of course, no test is without a hurdle. The information flow from the camera to the core system was found to be less effective than anticipated. Moreover, the passive RF system suffered from an error that has not been seen before.

Many recordings were made from the full system test and are currently being analyzed. Based on these results, adaptations and improvements will be made. The observed shortcomings of the first test will have to be resolved. The team is preparing for the ultimate system test and demonstration to the European Union in the beginning of October

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Consortium

9 partners (6 countries)

Project number: **700002**

Project website: www.alfa-h2020.eu

Project Coordinator

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Project start: **1st January, 2017**

Duration: **3 years**

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EC contribution: **EUR 4,613.831,25**



ALFA DEMO ALGARVE, PORTUGAL

During the week of June 25th, ALFA project partners gathered in Cacela Velha, Portugal to test the performance of their demonstrator. During this week, participants teamed up to test not only hardware and software components but integration of these systems. With project partners located remotely across Europe, this was a valuable opportunity to bring everything and everyone together. As a team, they were able to pinpoint areas requiring further work and celebrate positive outcomes and successes. Using various aerial vehicles such as helicopters, small airplanes, drones and gyrocopters, the team tested the tracking, classification and landing prediction of the system.

Rob van Heijster, technical leader from TNO commented that the whole chain was working. He also mentioned that feedback received from GNR, ALFA end user, was very helpful. There are some improvements that could happen in the area of specifying landing sites in greater detail, but generally, the team has proven that the concept works.

Gilles Prémel-Cabic from THALES Nederland also said they have seen the system working and this is very valuable because teams have been working on ALFA for a long time and it's really important to see it, first-hand, coming together.

Both partners point out that the project's success thus far, comes from the unwavering support and feedback from the end users, Guardia Civil (GC) from Spain and the Guarda Nacional Republicana (GNR) from Portugal who were always on site and highly motivated.



SUBMITTED PUBLIC DELIVERABLES:

“ALFA SYSTEM DATA MODEL DATABASE”

From **2nd to 6th July 2018** the ALFA RF sensor could be tested within the framework of a testing & demo workshop organized by the AMBOS project.

It is a bi-national R&D project focusing on UAV detection and interception for police forces. The testing took place at a rescue training site (TCRH) in Mosbach, Germany. The goal of the test was to show the capabilities of the sensor for drone detection in a real-world scenario. A wide range of drones could be tested, including almost every available DJI model.

All drones were fitted with GPS tracking systems, providing ground truth information for the verification of the RF detection results. The system capabilities for RF detection could be proven and up to three drones and an active WI-FI connection could be differentiated in real time.

Further, the complete raw data from the measurements were gathered for further post processing at TUBS. The ALFA partner TUBS attended the workshop which was also a great dissemination possibility with a target group of German and Austrian police forces.

SUBMITTED CONFIDENTIAL DELIVERABLES:

SET-UP AND TESTING OF SENSOR CAPABILITIES

In parallel to the final phase of sensor development, the first testing activities were conducted during project-months 22 to 27. As a first step, the developed sensor components were tested primarily in the lab. Testing focused on key specifications that had been laid out in order to conduct a provisional assessment of sensor capabilities. As testing and final development and optimisation tasks were running in parallel, testing results could be incorporated in the optimisation of the sensor components. The tests were conducted with each type of sensor by the respective partners, individually.

As a second activity, the sensor development teams created test data to be used in the set-up and testing of the system integration. With these data, the data processing and information flow through the ALFA core components could be tested without having actual sensors providing such data.

Results of the initial laboratory-based testing were compiled in a report. It has several main topics:

- development of experimental (laboratory) testing concepts for the different sensors in order to verify the key sensor capabilities versus their design goals;
- laboratory-scale measurements to assess the sensor performance using the testing concepts defined above;
- generation of test data for integration testing of the sensors with the ALFA core (i.e. information fusion, threat assessment and landing site prediction capabilities of the ALFA system);
- integration tests of the sensor with the ALFA core.

As this was the first task of “System integration and testing”, the final content and format of the messages exchanged between sensors and ALFA core were defined and implemented. Examples are included in the document for future reference. This work was a direct follow-up on the results of the work in “System architecture”, where the content of the exchanged information was defined, but messaging formats had been out of scope.

Simulation tools to generate test data according to each sensor were designed and implemented, and these served as tools for definition and testing of the data interfaces at the same time. The integration of the sensors with the information fusion was demonstrated successfully.

SUBMITTED CONFIDENTIAL DELIVERABLES:

SET-UP AND TESTING OF THE THREAT ASSESSMENT AND LANDING PREDICTION CAPABILITY

This report describes the work, which aims to set-up and test the threat assessment function, the data fusion engine, the landing site prediction and the presentation layer of the ALFA system. The work in this task has been performed in two phases. In the first phase, the threat assessment function, the data fusion engine, the landing prediction and the presentation layer were integrated and tested in a local environment. In the second phase the integration and the testing were conducted by deploying the involved components in the production server.

Chapter 2 reports the work done in the first integration phase, the setup of the components, and the results of the tests. The aim of this integration phase was to evaluate if all the components were able to produce and to consume the right data, according to the JSON data structures defined in the ALFA data model.

Chapter 3 provides the description of the scenario for the second integration test, and the analysis of the data processed and shown by the system; during the second integration phase, all the components were deployed in the production server, and the integrated system was tested according to a well described scenario defined by the ALFA Consortium. The main objectives of this integration test were the analysis of the data processed by the system and shown in the presentation layer, and the evaluation of the outcomes according to the expectations.

PAST DISSEMINATION ACTIVITIES

SMI2G Event 2019

January 29th -30th 2019

@ Brussels, Belgium

The Security Mission Information & Innovation Group (SMI2G) organised a two-day event, regarding the upcoming 2019 Secure Societies calls of Horizon 2020. The SMI2G gave the delegates the opportunity to stimulate networking and consortia building.

The Sixth International Conference on Software Defined Systems (SDS-2019)

June 10th -13th 2019

@ Rome, Italy

Dissemination of ALFA and specific results on the synchronisation of software-defined radio devices.

FRONTEX workshop 2019

June 26th 2019

@ Warsaw, Poland

The aim of the workshop was to brief the border guard community on the projects' evolution and results and to discuss about future possibilities of exploring the projects' outcomes.

UPCOMING EVENTS

SPIE Defense & Security 2019

September 09th 2019

@ Strasbourg, France

EuRAD 2019

2nd - 4th October 2019

@ France

The project partners TNO and TNL will present a paper on the ALFA radar classifier at the conference.

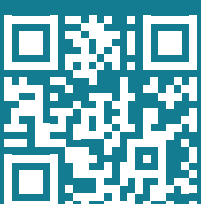
INTSYS 2019 - 3rd EAI International Conference on Intelligent Transport Systems

December 4th - 6th 2019

@ Braga Portugal

Dissemination of specific ALFA results on the EO detection, tracking and classification algorithms.

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