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# Road-, Air- and Water-based Future Internet Experimentation

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**Abstract:**
This deliverable is the final report of the 1st Open Call of RAWFIE. It presents the launch of the projects corresponding to the open call successful proposals, the project management process and the current status. It also presents the workshop that took place for the 1st open call projects.

**Keywords:** open call, contract, workshop, testbed, UxV, software

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# Part III: Executive Summary

This deliverable describes the several stages of the 1st RAWFIE Open Call projects after the completion of the call and the selection of the successful proposals that had been completed. Initially, a general introduction of the call is presented. Then, the reader is provided with several details about the project management and the processes followed over the twelve-month period after the completion of the selection process and the announcement of the official results regarding the successful bidders.
As a next step, the deliverables submission process is described as well as the procedure followed for the evaluation, acceptance and payment of the submitted deliverables. A summary of the Open Call deliverables that have been completed is also presented in this document.
The annexes provide relevant information concerning the contract, the deliverables acceptance committee and the letter of deliverable acceptance.

# Part IV: Main Section

## 1 Introduction

RAWFIE (Road-, Air- and Water- based Future Internet Experimentation) is a project funded by the European Commission (Horizon H2020 programme) under the FIRE initiative aiming to provide research and experimentation facilities through the growing domain of unmanned networked devices. The **FIRE** initiative (**F**uture **I**nternet **R**esearch and **E**xperimentation) creates an **open research environment,** which facilitates strategic research and development of new Future Internet concepts, giving researchers the tools they need **to conduct large-scale experiments** on new paradigms.

The purpose of the RAWFIE project is to create a federation of different testbeds that will work together to make their resources available under a common framework. Specifically, it aims at delivering a unique, mixed experimentation environment across the space and technology dimensions. RAWFIE integrates numerous testbeds for experimenting in vehicular (road), aerial and maritime environments. Vehicular Testbeds (VT) will deal with Unmanned Ground Vehicles (UGVs) while Aerial Testbeds (AT) and Maritime Testbeds (MT) will deal with Unmanned Aerial Vehicles (UAVs) and Unmanned Surface Vehicles (USVs), respectively. The RAWFIE Consortium includes all the possible actors of this highly challenging experimentation domain, from technology creators to integrators and facility owners. The basic idea behind the RAWFIE effort is the automated, remote operation of a large number of robotic devices (UGVs, UAVs, USVs) for the purpose of assessing the performance of different technologies in the networking, sensing and mobile/autonomic application domains. RAWFIE features a significant number of UxV nodes for exposing the experimenter to an extensive test infrastructure. All these items are managed by a central controlling entity, which will be programmed per case and fully overview/drive the operation of the respective mechanisms (e.g., auto-pilots, remote controlled ground vehicles). Internet connectivity will be extended to the mobile units to enable the remote programming (over-the-air), control and data collection. Support software for experiment management, data collection and post-analysis will be virtualized to enable experimentation from anywhere in the world. The vision of Experimentation-as-a-Service (EaaS) is promoted through RAWFIE. The Internet of Things (IoT) paradigm is fully adopted and further refined for supporting highly dynamic node architectures.

The main objective of the *1st RAWFIE Open Call* is to enhance certain parts and characteristics of the federated infrastructure. Specifically, the project searches for improvements in terms of hardware, software and new facilities (testbeds) that could host experiments. Each proposal should target **exactly one** of the three types of activities (termed *directions of enhancement*), as stated in the next paragraphs. In case a proposer intends to cover more than one directions of enhancement, this should have been addressed through the submission of separate proposals. All the proposals should fully comply with the public deliverables D3.1, D4.1, D4.2 (can be found in http://rawfie.eu/deliverables) that had been produced so far by the RAWFIE Consortium and

provide system requirements as well as technical description and implementation details for the RAWFIE architecture and specific components.

# 2 Management process of 1st Open Call projects

The 1st RAWFIE Open Call resulted with the selection of ten proposals for the provision of financial support to third parties. The following table summarizes the proposals that have been accepted to be funded as projects in the context of RAWFIE.

**Table 1: 1st RAWFIE Open Call Projects**

| # | Project Name | Project title | Organization | Abstract | Activity |
|---|---|---|---|---|---|
| 1 | RT-ART | RT-ART: Robotic Testbed in an ARt and Technology center | Universidad de Zaragoza | The overall goal of RT-ART is to provide a realistic environment for ground robot experimentation. It aligns to the Activity/Direction of enhancement 1, Testbed additions of the Call, in particular with the indoor and outdoor Vehicular Testbeds as an extension of RAWFIE infrastructures. Our proposal includes the necessary steps for sharing a unique Art and Technology center, ETOPIA, which is available for ground robotic platforms experimentation. This will be achieved by our contributed means integrated within the RAWFIE project sharing infrastructure. | 1 – Testbed additions |

| | | | | | |
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| | | | | Five different scenarios will be available within the ETOPIA: the large museum entrance, an exhibition hall, a large gallery and connected corridors, a residential area and an outdoor terrace, in which four UGV will be available. We will provide monitoring tools, prior maps and assistance with the experimentation. The team supporting the proposal has valuable expertise on experimentation in real scenarios using real platforms for a broad variety of challenging robotic topics and projects. | |
| 2 | CESA-DRONES | CESA-DRONES | CESA-DRONES | The overall objective of CESA is to be compliant with RAWFIE platform, to extend security and quality of the facilities, to complete services with high performance tool, enhance the existing services, to improve the site management by the possibility to have people 100% dedicate to the testbed operations and to consider the contribution of CESA | 1 – Testbed additions |

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| | | | | to RAWFIE development by providing REX and support for the business model definition.CESA experiences will benefit to the RAWFIE project, by bringing strong knowledge of the UAV French industry and recognition from professionals and aeronautic institutions. CESA will review the RAWFIE inputs in order to specify and define the approach to have current CESA organisation fully compliant with RAWFIE architecture. CESA is an existing Outdoor Aerial Testbeds that deals with UAVs and offers to its experimenters the required services. CESA provides 4 testing sites including infrastructure, facilities, instruments and air spaces to practice flight tests in optimal security conditions. The management of CESA is already operational and its organisation is based on the best practices of flight-testing in certified aeronautics. | |

| | | | | | |
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| 3 | MarEH4EU | MarEH4EU - Maritime Exploration Hall for Europe | Deutsches Forschungszentrum fur Künstliche Intelligenz DFKI GmbH | The German Research Center for Artificial Intelligence DFKI is one of the leading institutes worldwide in applied artificial intelligence. The DFKI Robotics Innovation Center (RIC) in Bremen, Germany, is specialized in the conceptualization and development of cognitive mobile robotic systems, among others for applications at sea and under water. Among the maritime technologies in the focus of DFKI RIC are remotely-controlled and autonomous surface- and under-water vehicles, which are developed and tested in Bremen. To be able to test and validate the systems developed at DFKI RIC, significant investments in the research infrastructure at DFKI in Bremen were made in the last years. One major investment was the DFKI RIC Maritime Exploration Hall (MarEH) (http://robotik.dfki-bremen.de/en/research/research-facilities/maritime- | 1 – Testbed additions |

| | | | | | |
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| | | | | exploration-hall.html). This large (23x19x8m) basin is filled with salt water and allows to test surface and underwater vehicles under controlled, but very realistic conditions. With its dimensions and current technical infrastructure (sensors, monitoring equipment, cranes, IT infrastructure), the Maritime Exploration Hall is already unique in Europe. However, caused by the high cost of physical on-site tests (costs for transport of equipment, travel, sustenance of experimenters) the facility is currently used mainly by regional institutes and companies. As part of the RAWFIE federation of robot testbeds, the MarEH will be made available to the robotics community (both academic and industrial) throughout Europe. The main objective of the MarEH4EU project is to open the unique DFKI Maritime Exploration Hall in Bremen, Germany, to all interested researchers and firms in | |

| | | | | | |
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| | | | | Europe and beyond. | |
| 4 | BCN4ROUTE | BCN Drone Center for RAWFIE On UAVs/UGVs & Testbed Enhancement | CATUAV | CATUAV / BCN DRONE CENTER proposal provides to RAWFIE consortium with testbed facilities consisting in a segregated air space of 25 square km, an airfield, a bioclimatic building and rural terrain of 14 Ha ready to install and deploy a wide diversity of components and infrastructures, with no restrictions or limitations, that can cover a wide diversity of experiments related to UAVs and UGVs. CATUAV /BCN DRONE CENTER proposal includes delivery of 2 UAVs for RAWFIE exclusive use as UAV nodes. | 1 – Testbed additions |
| 5 | PlaDyFleet | PlaDyFleet - A fleet of unmanned surface marine vehicles | University of Zagreb | PlaDyFleet project relates to the topic "Direction of enhancement 2: UxV additions and customization" or more specifically, USV additions and customization. The project proposes: · delivery of fleet of 10 USVs (PlaDyPos), capable to perform automated or remote | 2 – UxV additions and customization |

| | | | | | |
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| | | | | operation in order to extend RAWFIE testing infrastructure; · maintenance and support to the RAWFIE consortium to ensure smooth operation and further development of the USV fleet throughout the project lifetime. | |
| 6 | NIRIIS | AutoNomous Future Internet ExpeRimentatIon Surface VehIcleS (NIRIIS) | ALTUS | NIRIIS AutoNomous Future Internet ExpeRimentatIon Surface VehIcleS proposal aims to address one of the main objectives of the 1st RAWFIE Open Call and more specifically the Activity / Direction of enhancement 2: UxV additions and customization. Based on RAWFIE requirements the current proposal concerns the provision of 10 USV (Unmanned Surface Vehicles) integrated platforms in order to be used in RAWFIE testbeds and experiments. The proposed solution is in line and fully comply with all the specifications and requirements of the RAFIEW public deliverables D3.1, D4.1, D4.2 taking into | 2 – UxV additions and customization |

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| | | | | consideration all the technical and integration details and the RAWFIE testbeds architecture and needs. Since the main objective of RAWFIE project is to experiment with automation, remote operation and evaluation of different technologies in networking, sending and autonomous devices and applications, NIRIIS was designed and will be integrated so as to offer a flexible, open and reconfigurable solution that will incorporate current leading edge technologies and features. The system will be scalable and well aligned with typical ground control requirements yet able to provide enough capacity for further expansion if necessary so as to serve RAWFIE experimental requirements. NIRIIS will be developed and integrated within the project lifecycle and will consist of a fully integrated surface and ground control segment offering a scalable, secure and complaint | |

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| | | | | with all standards platform that will be able to accommodate all the RAWFIE experiments. | |
| 7 | VENAC | VENAC - Versatile Efficient Network Air Copters | WizzIT - ARGIRIOS TSAMAKOS & SIA EE | VENAC brings the value of 12 networked UAVs in 2 different configurations: 8 ultra-light Hyper Efficient UAVs that can hover for 90 mins and 4 Heavy Endurance UAVs that can lift up to 4kgs or hover for 120 mins. VENAC UAVs' innovative design comes with a full range of accessories and is coupled with state of the art electronics and network components. Key feature is the unique combination of WiFi mesh networking capabilities with Mobile Internet Connectivity for both flight control and data transfer in various contexts. VENAC uses a fully configurable auto-pilot controller running open-source software, utilizing all capabilities of the MAVlink protocol, enabling a plethora of possible experiments that will enhance the RAWFIE federation of | 2 – UxV additions and customization |

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| | | | | different testbeds and expand the envisioned Experimentation-as-a-Service infrastructure. | |
| 8 | FLEXUS | FLEXUS - Flexible Unmanned Surface Vehicles for the Internet of Moving Things | INESC Technology and Science | This proposal aims to extend RAWFIE experimental infrastructure by providing a set of innovative high maneuverable, small-sized, one-man-portable Unmanned Surface Vehicles (USVs), which will support coordinated networked operations and novel above water communications technologies. This USVs swarm will extend and enrich the type of test scenarios for water-based IoT platforms, where M2M (Machine-to-Machine) and Internet of Moving Things applications may use long-range single-hop communications and multi-hop radio networks. | 2 – UxV additions and customization |
| 9 | SAMANT | Semantic Aware Management of federated Testbeds | Université Pierre et Marie Curie<br>Institute of Communications and Computer Systems | In the SAMANT project we aim to adopt generic/common, thus universal solutions, for tackling issues related to semantic aware management of federated | 3 – Software enhancements |

| | | | | | |
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| | | | | infrastructures. To this end, SAMANT will equip RAWFIE with open-source tools that will allow experimenters to discover and select available RAWFIE testbeds and their resources in order to build experiments. The RAWFIE software stack will be enhanced with functionalities related to discovery, booking, provisioning/release of resources, while addressing authentication and authorization issues at the federated environment. Semantic web technologies will be used to describe the federated infrastructures and support the lifecycle of unmanned vehicles. The proposed software enhancements are (i) testbed-tier specific, using software for the aforementioned management operations, and (ii) cross-layer, spanning the RAWFIE middle, data and front end tiers, supporting such operations at the federation level. To pursue SAMANT | |

| | | | | | |
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| | | | | objectives complementary technological expertise from various fields and in depth knowledge of the proposed software implementations is required, not easily found within a single group or partner, which however is well covered among SAMANT partners. Both research groups (LIP6/UPMC and NETMODE/ICCS) have been actively involved in several activities related to FIRE initiative while have already closely collaborated in several previous related projects. | |
| 10 | AeroLoop | Flexible experimentation with virtual UAVs through a software-in-the-loop and hardware-in-the-loop simulation infrastructure | University of Thessaly | AeroLoop proposes a UAV simulation infrastructure based on a hardware-in-the-loop and software-in-the-loop approach, which will allow users to perform experiments in a flexible way, 24x7, without requiring any human on-site support. AeroLoop will implement virtual UAVs, based on a UAV software stack that will run on both real and emulated hardware, coupled with | 3 – Software enhancements |

| | | | | | |
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| | | | | a state-of-the-art flight dynamics model. Communication with the virtual UAVs will be supported via a simulated WiFi network. Virtual UAVs will also feature a virtual camera sensor, which will return aerial photos / images, based on their current position. AeroLoop will be integrated to the RAFWIE platform at the Testbed Tier, via the corresponding interfaces/protocols of the architecture. | |

The following paragraphs describe the action and process that has been followed for the management of the 1st Open Call (OC1) projects.

## 2.1 OC1 kick-off meeting

A kick-off meeting for the 1st Open Call projects was held in Athens on September 23th, 2016. The meeting had the form of a workshop which enabled the exchange of ideas and questions among the project partners in order to explore collaboration opportunities and challenges. Twenty-five participants from the ten projects attended the meeting. Each project was presented in detail to all participants so that all the parties of the 1st Open Call projects could have a clear understanding of all the projects. During the kick off meeting contact points on behalf of UOA defined to third parties. Regular skype calls between the contact points and the ROC1 beneficiaries were also established once-per-week for resolving questions and efficiently overview each project lifecycle.

## 2.2 OC1 coordination

Three teams from RAWFIE project members of the University of Athens were formed for the management of the OC1 projects, with each team being responsible for the projects of one activity of the open call. Each team has a close collaboration with the respective projects, monitoring the progress of the projects, facilitating the project work and the cooperation with other projects and addressing possible problems.

## 2.3 Communication

A separate mailing list was created for each project in order to facilitate communication and collaboration among the people involved in each project.
In addition to the use of the mailing lists, communication is made with each project partners on a regular basis, with conference calls that are scheduled within each project every week, as well as emails and ad-hoc conference calls whenever needed.

## 2.4 Contracts

A contract was prepared for each project between the RAWFIE project coordinator and the third party. Each contract was signed by the legal representatives of the contractor – third party and the University of Athens. Due to a delay in the resolution of certain legal issues related to the contract, the projects start was delayed by one month.

## 2.5 Reviewers contract and payment

The 1st Open Call proposals were evaluated by 34 reviewers from various countries, including France, Italy, Croatia, Spain, Greece, Serbia, Belgium, U.K., Austria. Each reviewer signed a contract for the reviews conducted and the remuneration was €150 per reviewed proposal. Each reviewer was assigned with 3 proposals at most, thus the maximum amount a reviewer received was €450.

## 2.6 Deliverables submission and evaluation process

The deliverables of the OC1 projects are submitted following the time plan which is part of every project's contract. A separate monitoring and acceptance committee was created for each project, consisting of faculty members of the University of Athens with expertise in the project fields. The deliverables submitted from each project are checked by the respective monitoring and acceptance committee with regards to the quality and completeness of their content. In case there are comments about requested changes in the submitted deliverables, they are communicated to the project. When a deliverable is approved by the monitoring and acceptance committee of the respective project, an acceptance letter is sent to the project manager, notifying that the University of Athens will proceed to the preparation of the provision of financial support based on the deliverable. Following the acceptance of a deliverable, an invoice is issued for the payment of the deliverable according to the contract.

# 3 1st Open Call projects progress and status

The following table summarizes the progress and current status of the 1st Open Call projects.

**Table 2: 1st RAWFIE Open Call Projects status**

| # | Project Name | Project title | Organization | Deliverables |
|---|---|---|---|---|
| 1 | RT-ART | RT-ART: Robotic Testbed in an ARt and Technology center | Universidad de Zaragoza | D1.1, D1.2, D2.1, D3.1, D4.1 |
| 2 | CESA-DRONES | CESA-DRONES | CESA-DRONES | |
| 3 | MarEH4EU | MarEH4EU - Maritime Exploration Hall for Europe | Deutsches Forschungszentrum fur Künstliche Intelligenz DFKI GmbH | D1.1.1.7, D2.1.1 |
| 4 | BCN4ROUTE | BCN Drone Center for RAWFIE On UAVs/UGVs & Testbed Enhancement | CATUAV | D1.1, D2.1, D2.2, D3.1, D4.1 |
| 5 | PlaDyFleet | PlaDyFleet - A fleet of unmanned surface marine vehicles | University of Zagreb | D1.1, D2.1, D2.2.1, D2.2.2 |
| 6 | NIRIIS | AutoNomous Future Internet ExpeRimentatIon Surface VehIcleS (NIRIIS) | ALTUS | D2.1, D2.2 |

| | | | | |
|---|---|---|---|---|
| 7 | VENAC | VENAC - Versatile Efficient Network Air Copters | WizzIT - ARGIRIOS TSAMAKOS & SIA EE | D1.1.1, D1.2.1, D1.3.1 |
| 8 | FLEXUS | FLEXUS - Flexible Unmanned Surface Vehicles for the Internet of Moving Things | INESC Technology and Science | D1.1, D2.1, D2.2, D2.3, D2.4, D3.1, D4.1 |
| 9 | SAMANT | Semantic Aware Management of federated Testbeds | Université Pierre et Marie Curie<br>Institute of Communications and Computer Systems - National Technical University of Athens | D4.1 |
| 10 | AeroLoop | Flexible experimentation with virtual UAVs through a software-in-the-loop and hardware-in-the-loop simulation infrastructure | University of Thessaly | D1.1 |

The following paragraphs provide a description of the progress and the current status of the OC1 projects

## 3.1 RT-ART

The role of the RT-ART project is to provide a testbed for ground vehicles. The testbed has five (5) different areas at the disposal of RAWFIE: the large museum entrance, an exhibition hall, a large gallery and connected corridors, a residential area and an outdoor terrace. These areas can be isolated or be freely accessible to the public visiting the premises on demand, thus providing an opportunity for extra complexity during the experimentation. At the regular biweekly TELCOs started mid-January 2017, several technical details were discussed and addressed (i.e. wireless network settings, UGV VPN credentials used for secured and encrypted communications, VM image with the testbed manager software developed be the Consortium, maps of the premises in ROS-compatible yaml format etc).

As the RT-ART project had also four (4) ground vehicles available for experimentation (TurtleBots manufactured and acquired by the RAWFIE partner Robotnik previously), at one of the regular calls, Robotnik developers were invited late-April in order to make arrangements for their mid-May 2017 visit at the testbed premises in order to speed-up the incorporation of the RT-ART testbed to the RAWFIE infrastructure.


Figure 1 - May 17-18th visit of Robotnik developer to the premises of University of Zaragosa/RT-ART

On May 2017 the 18th, the first successful experiment using the whole infrastructure (ranging from the EDL script, through the Kafka message bus and to the subsequent execution from the TestBed Manager) was performed. All RAWFIE-involved developers were monitoring the situation and minor details regarding the indoor positioning where addressed in the following day. At the second integration experiment, on 29th May 2017, all the tests ran smoothly.

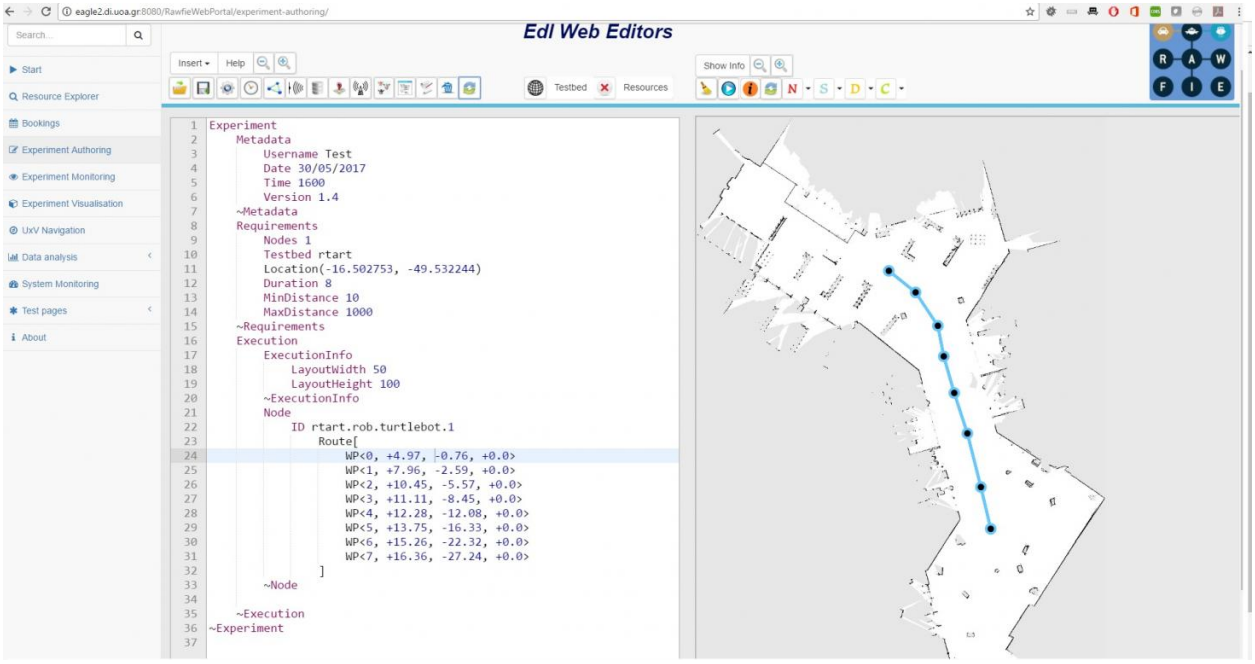


Figure 2 - First successful RAWFIE experiment showing the corresponding EDL script

## 3.2 CESA-DRONES

CESA drones provides four (4) (lately 5) different testing sites suitable for UAV flights including infrastructure, facilities, instruments and air spaces to practice flight tests under controlled conditions.

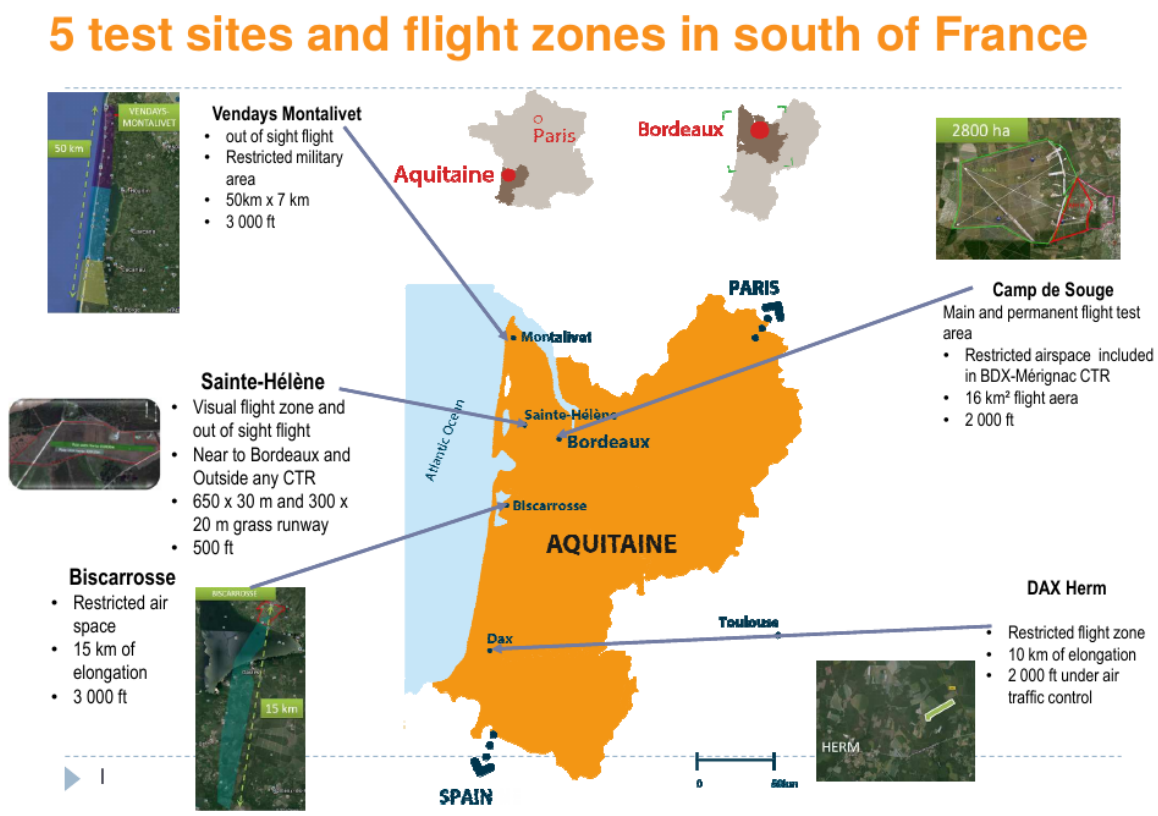


Figure 3- Five test sites of CESA marked on a map of France

Starting mid-November 2016, regular TELCOs were performed in order to alleviate the consequences of an unforeseen on-site personnel cost in accordance with French UAV-related regulations (drone pilot able to take over the devices at a moment's notice). A consensus for the use of the testbed was reached with the following remarks:

-experimentations will take place from September 2017 to December 2018 , about 14 months;

- needs will depends of experimentations and could be different every month. So, an average of 10 days per month will be desirable which represents something like 140 days of operation ;

- some experiments don't need all a day to be achieved. So, to maximize the experiments coverage, CESA-Drones must be able to reduce the operations unit from day to half a day or less if it possible (few hours) ;

- the external UAV services company in charge of flights must be responsive and enough available to not introduce too long delays between our demands and the achievement of flights

Some of the projected deliverables and budget were restructured accordingly and an amendment to the initial contract was drafted and agreed upon. As with all the other testbed-related projects, various technical details were communicated (i.e coordinate polygon of the actual flight areas) while the delivery of UAV devices is expected under the second round of Open Calls.

## 3.3 MarEH4EU

DFKI provides a large (23x19x8m) basin filled with salt water and allows testing of USVs for the RAWFIE project.

Figure 4 - Panoramic view of the large basin. (Photo: DFKI GmbH)

As with all the other testbed-related projects, various technical details were communicated and agreed upon through regular TELCOs (i.e indoor positioning of devices in a place without GNSS availability, installation of cameras and VM images etc.)

The delivery of the first set of USVs (PladyFleet - from the University of Zagreb) at DFKI's premises during the last week of May 2017. During the same days (22-23/05/2017), the integration of the devices with the infrastructure of RAWFIE and the hands-on training sessions took place. Personnel from the testbed of HMOD - also receiving devices from the same provider - was also present in order to avoid double effort. The delivery of some NIRIIS devices to the DFKI's testbed is expected by September 2017.

## 3.4 BCN4ROUTE

CATUAV / BCN DRONE CENTER proposal provides to the RAWFIE consortium testbed facilities consisting of segregated air space of 25 square km, an airfield, a bioclimatic building and rural terrain of 14 Ha ready to install and deploy a wide diversity of components and infrastructures, with no restrictions or limitations, that can cover a wide diversity of experiments related to UAVs and UGVs.

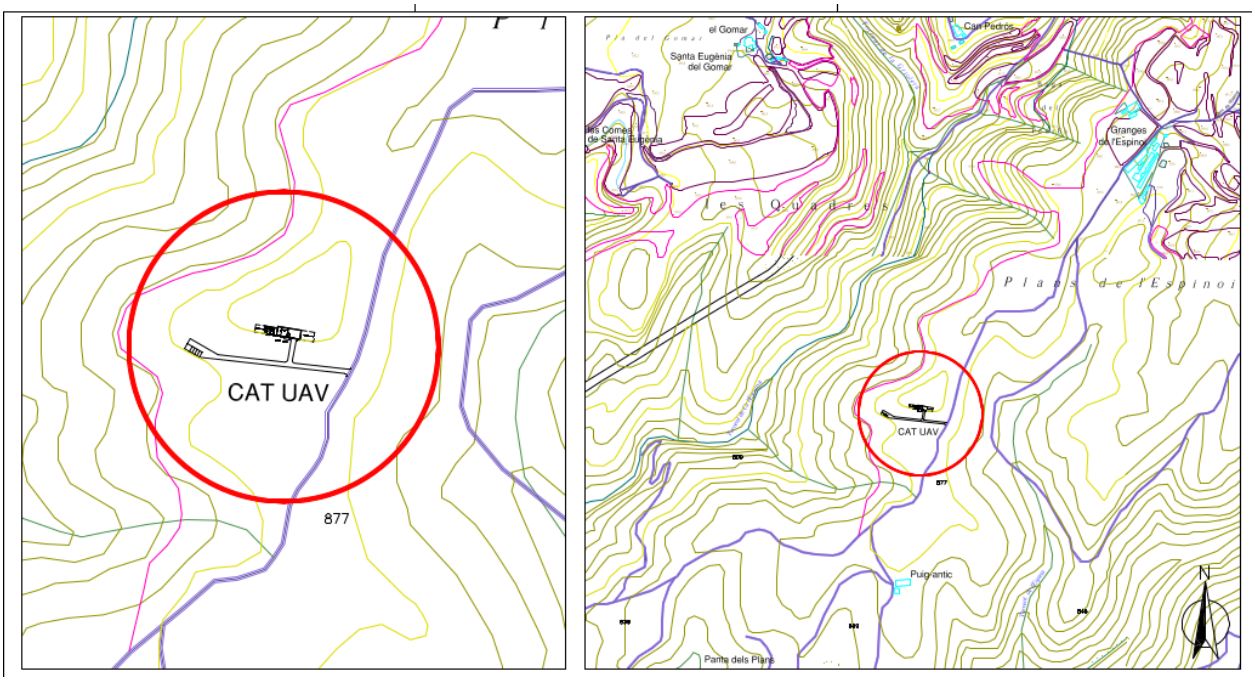


Figure 5- Topographic diagram of the segregated area of BCN drone center

Two (2) fixed-wing aircrafts, a platform 4m by 3.4m used for the approach and landing of said vehicles through optical detection and image recognition and processing of the signs on top of it and a meteorological station. Also, WI-Fi coverage of the area was increased per the needs of RAWFIE. At the company van available on-site for emergency control takeover of UAV devices, a long range command & control module with a new gimbal and directional antennas was installed as documented in the proposal.

As with all the other testbed-related projects, various technical details were communicated and agreed upon (i.e coordinate polygon of the actual flight areas, protocols used for the fixed-wing aircrafts and their subsequent incorporation in the infrastructure) while the delivery of more UAV devices (quadrocopters) is expected under the first round of Open Calls around Q4 2017.

## 3.5 PlaDyFleet

The project aims to enhance the infrastructure of RAWFIE with 10 USVs. The project has completed the replication and the assembly of the devices. Also, the software implementation and the integration phases have successfully been finished. The testing phase has suffered from small deviations from the original timeplan since hardware replication was taking place in parallel. The submission of expected deliverables was on schedule. Partial delivery of the devices (7 items) took place in Bremen (i.e., DFKI facilities). The rest three (3) vehicles are expected to be delivered to the testbed of Skaramagkas by the end of July.

## 3.6 NIRIIS

The project aims to add 10 USVs to RAWFIE. The project has completed the replication and the assembly of the devices. The software implementation and the integration phases have successfully been finished. A small delay has been faced with respect to a faulty FLIR camera that had to be replaced. The submission of expected deliverables was on schedule. Partial delivery of the devices (7 items) took place in Skaramagkas (i.e., HMOD facilities). The rest three (3) vehicles are expected to be delivered to the testbed of DFKI by the end of July.

## 3.7 VENAC

The project targets to provide 12 UAVs to RAWFIE. The project has already completed the replication and the assembly of all the devices. The software implementation and the integration phases have successfully been finished. Average delays were faced due to problems with the suppliers but the overall plan and the submission of the deliverables were kept on schedule. The devices are expected to be delivered to the testbeds of HMOD, CESA and HAI by the end of July.

## 3.8 FLEXUS

The project aims to enhance the infrastructure of RAWFIE with 10 USVs. The project has completed the replication and the assembly of the devices. Also, the software implementation and the integration phases have successfully been finished. The assembly phase has suffered from significant delays due to problems caused by suppliers and, in particular, the provision of floaters. The submission of expected deliverables was on schedule. All the ten (10) vehicles are expected to be delivered to the testbed of Skaramagkas by the end of July.

## 3.9 SAMANT

The SAMANT project aims to enhance the RAWFIE architecture software tiers with appropriate tools and software enhancements in order to support functionalities related to resource discovery, booking and reservation, provisioning and release by experimenters while addressing at the same time the corresponding authentication and authorization issues at the RAWFIE federation. Due to the large interoperability of SAMANT with RAWFIE infrastructure in terms of software telco (skype calls) and meetings scheduled in a weekly time plan in order to be able to follow and manage the design concepts of the SAMANT architecture and how these should be best fit to RAWFIE platform. The progress of SAMANT project is very satisfying and all scheduled

deliverables have been delivered on time. At the moment the SAMANT design and principals have been finalized while several components and APIs have already been implemented.

### 3.10 AeroLoop

This project aims to provide a simulator that supports the simulated flight of virtual unmanned aerial vehicles (vUAVs). The initial release of the software implements a software-in-the-loop configuration that can be used to perform virtual experiments. It also supports the simulated wireless communication among vUAVs as well as the communication between vUAVs and the local RAWFIE testbed entity that runs the corresponding Resource Controller. The vUAVs run the same autopilot stack and the same RAWFIE adapter software as the quadcopters that VENAC project (another ROC-1 project) will deliver to RAWFIE. The initial release of Aeroloop simulator has been presented at the University of Athens premises in the 16th of June 2017. In terms of functionality people of Aeroloop project presented the following:

1. Flight simulation of vUAVs. This is done using the Arducopter Software-In-The-Loop (SITL) flight simulator configuration.
2. Simulated wireless communication between vUAVs. This is done via a virtual WiFi network infrastructure, which is implemented using the NS3 network simulator.
3. Execution of application software on vUAVs. This is done using the standard process management of the Linux environment that runs on vUAV.
4. Interaction between vUAVs and the RAWFIE infrastructure. This is done by running on the vUAVs the same software (RAWFIE adapter) which communicates with a local instance of the RAWFIE Resource Controller as will be done in the real testbeds that are part of the RAWFIE infrastructure.

# 4 References

# 5 Annex – Tables

# A1. RAWFIE Deliverable Acceptance Letter

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
DEPARTMENT OF INFORMATICS AND TELECOMMUNICATIONS
Panepistimiopolis, 15784, Athens, Greece


**Road-, Air- and Water-based Future Internet Experimentation**

| Project Acronym: | RAWFIE | | |
|---|---|---|---|
| H2020 call: | FIRE+ initiative | Total EC funding: | 6.995.733 € |
| Grant agreement | 645220 | | |
| Final date: | Jan 1st 2015 | Ending date: | Dec 31st, 2018 |

Athens,
<Project manager name>
<Proposer address>

**Subject: Result of evaluation of deliverable <deliverable number>**
**<Project Name>**
Contract duration: 30 months
Budget: <proposal budget>

Dear <Proposer>,

We are pleased to inform you that the aforementioned deliverable of project <project name>, financially supported by the National and Kapodistrian University of Athens as a third party under the RAWFIE INFRASTRUCTURE 2016 Open Call, has been positively evaluated and has been accepted by the Monitoring and Acceptance Committee. Consequently, we will proceed to the preparation of the provision of financial support based on your deliverable.

You will find the Evaluation Summary Report (ESR) for your deliverable together with this letter. The ESR reflects the comments of the Monitoring and Acceptance Committee.

The Monitoring and Acceptance Committee

| | | |
|---|---|---|
| <Member of the Monitoring and Acceptance Committee> <Signature> | <Member of the Monitoring and Acceptance Committee> <Signature> | <Member of the Monitoring and Acceptance Committee> <Signature> |