Open Call announcement

Announcement of the 1ˢᵗ RAWFIE Open Call for recipients of financial support

Project acronym: RAWFIE
Project grant agreement number: 645220
Project full name: Road-, Air-, Water-based Future Internet Experimentation

Project RAWFIE (www.rawfie.eu), co-funded from the European Union's Horizon 2020 research and innovation programme under grant agreement No 645220, foresees as an eligible activity the provision of financial support to third parties, as a means to achieve its own objectives.

The types of activities that qualify for receiving financial support are the following:
- Testbed additions;
- UxV additions and customization;
- Software enhancements.

Deadline: 14 March 2016 (Monday), at 17:00 CET (Brussels local time)
Expected duration of participation: 30 months (starting from July, 2016 to December, 2018)
Maximum amount of financial support for each proposal: € 150 000
Call identifier: RAWFIE-INFRASTRUCTURE-2016 call
Language in which proposal should be submitted: English
Web link for further information (full call text/proposal guidelines/call results):
http://www.rawfie.eu/rawfie-infrastructure-2016-call
Email address for further information: rawfie-contact@cnl.di.uoa.gr [Please use the call identifier "RAWFIE-INFRASTRUCTURE-2016 " in the subject of your email]

The proposer:
- Proposals will only be accepted from a single party or a consortium of up to two parties eligible for participation in the EC H2020-projects.
- Evaluation and ranking will be carried out by an external jury of individual experts.
- Multiple proposals may be submitted by the same party. However, only the best ranked proposal may be selected among them (following the evaluation process).

Other conditions:
- Proposals must follow the provided **template**.
- Proposals must be submitted through the **EasyChair** system.
- Once a proposal is positively evaluated for funding, the respective proposer(s) will be contracted by the project coordinator (UoA) as Third Parties.

Call Objectives

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 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 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 be 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 have 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.

- **Activity / Direction of enhancement 1: Testbed additions.**

RAWFIE integrates numerous testbeds for experimenting in vehicular (road), aerial and maritime environments. The actual RAWFIE platform considers three kinds of areas within which the considered unmanned vehicles could operate in order to accomplish a task or execute a drill.

Specifically, the project searches for facilities belonging to (at least) one of the following categories:

   A. *Indoor and/or Outdoor Vehicular Testbeds (VT) that will deal with Unmanned Ground Vehicles (UGVs);*
   B. *Indoor and/or Outdoor Aerial Testbeds (AT) that will deal with Unmanned Aerial Vehicles (UAVs);*
   C. *Indoor and/or Outdoor Maritime Testbeds (MT) that will deal with Unmanned Surface Vehicles (USVs).*

*In the context of the 1st RAWFIE Open Call, the project invites **Testbed operators (i.e., owners and managers of testbed facilities)** to participate and expand the existing RAWFIE infrastructure. The proposers should provide either indoor or outdoor facilities capable of hosting at least one of the three considered kinds of vehicles (UGVs, USVs, UAVs).*

Such facilities should be closely monitored and controlled environments. In the general case, facilities should be able to receive, inspect, assemble/fix and store UxVs, provide emergency services (i.e., crash, fire or rescue) and have the appropriate equipment, both ground-based and mobile, to monitor and control the vehicles including but not limited to:

   - Radar facilities or other kinds of equipment (e.g., cameras) for tracking and surveillance;
   - Telemetry facilities such as antennas, receivers, display instrumentation systems;
   - Command uplink and optical tracking facilities;
   - Premier digital photographic and video services including operation of still cameras, high speed and video systems for Range Safety support, surveillance, and post-launch analysis (e.g., failure analysis).

The use of the new testbeds can be three-fold:

a) *Testing of technologies* that directly pertain to the IoT paradigm (its mobile and variety of environment facets in particular) under controlled and replicable conditions. This is the horizontal nature of the testbed, i.e., the assessment of technologies that relate to smart sensors and 4/5G networking. This particular aspect of RAWFIE is used to show the feasibility of a certain technical solution and its performance under different conditions (fully dynamic nature of the testbed).

b) *Testing of applications* that rely heavily on the above technologies and associated characteristics (e.g., advanced/smart sensing, machine-to-machine communications, context and situation awareness). This is the vertical nature of the testbed. This aspect of the RAWFIE ecosystem shows the applicability of the above mentioned technologies/systems in real life applications (e.g., environmental control, safety).

c) *Testing of integrated solutions*, i.e., testing of new mobile devices that carry advanced equipment implementing the IoT paradigm and, in addition, facilitate advanced applications in all possible domains.

The proposals should present clearly the features and characteristics of the proposed testbed facilities that may be considered as future extensions of the project infrastructure. These features include, but are not limited to, the following aspects of the facilities:

- On-site personnel for the physical management of the devices (e.g., technical support, battery charging, maintenance and upgrades);
- RAWFIE-dedicated computational resources (e.g., committed PCs and/or VMs) able to host the RAWFIE software required to establish communication with the back-end RAWFIE platform infrastructure using standard based communication means;
- Time availability of the respective indoor/outdoor area that is proposed to host experiments (on a monthly basis). For the convenience of the proposers, a time shift can be determined by themselves, i.e., the exact days within a month that the facility will be available to the experimenters;
- Space availability, e.g., the size of the respective indoor/outdoor area that is proposed to host experiments (in terms of km^2);
- Available communication means within the experimentation area;
- Existing means to monitor vehicles (e.g., location, current conditions and status);
- Existing equipment of the facility (e.g., sensors and weather stations that monitor weather conditions that could affect the seamless operation of the robotic devices);
- Support of privacy and security mechanisms;
- Compliance with local legal (mostly safely-related) restrictions.

- **Activity / Direction of enhancement 2: UxV additions and customization.**

The basic idea behind the RAWFIE effort is the automated, remote operation of a large number of robotic devices for the purpose of assessing the performance of different technologies in the networking, sensing and mobile/autonomic application domains. RAWFIE considers three kinds of vehicles; UGVs, USVs and UAVs. The project aims to feature a significant number of UxV nodes in order to establish an extended test infrastructure for RAWFIE related experimentation purposes. All these

items will be 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 remote programming (over-the-air), control and data collection.

*In the context of the 1ˢᵗ RAWFIE Open Call, the project invites **manufacturers and providers of robotic devices** to participate and expand the existing RAWFIE equipment. The project expects proposals that will provide a considerable number of devices (between 5 and 10) that belong to exactly one of the considered types of vehicles (UGVs, USVs and UAVs). The exact number of devices considered by each proposal should comply with the requested funding and will be part of the evaluation process. Proposals considering higher number of devices will be considered favorably.*

The proposers should present clearly within the proposal text a number of features and characteristics of the unmanned vehicles that will be possibly considered as future additions to the project. These features include, but are not limited to, the following aspects of the vehicles:

- Processing capabilities (type of processors, number of cores, speed);
- Size and dimensions;
- Weight;
- Payload;
- Battery;
- Number and type or sensors;
- Number and type of integrated network components and supported communication interfaces;
- Minimum and maximum autonomy of the device;
- Auto-return capability (return to the base station automatically);
- Ability of the vehicle to operate as an access point;
- (Remote) Control interface;
- Over-the-air programming capabilities;
- Provision of collision avoidance mechanism;
- Compatibility with Apache Kafka architecture;
- Data storage of the vehicle;
- Support of "safe mode" operation;
- Localization capabilities (e.g., GNSS);
- Ability to operate in indoor/outdoor/mixed environments;
- Compliance with standards;
- Operational conditions (e.g., day/night) and temperature limitations.

Upon the completion of the project, the designed UxV equipment will become property of the RAWFIE Consortium.

- **Activity / Direction of enhancement 3: Software enhancements.**

Apart from the testbed facilities and the robotic devices, RAWFIE also comprises software architectures and developments for experimentation management, data collection and post-analysis. Virtualization is used to enable remote experimentation from everywhere in the world. In this Open Call, the project

does not target to attract new experiments and applications that could be supported by the infrastructure. Such application will be subject of the 2nd Open Call for Proposals (that will follow later within the project lifetime). At the current stage, RAWFIE foresees the enhancement of the existing RAWFIE developments by bringing into the infrastructure software that could belong to the following categories:

A. *Horizontal applications. The project is looking for cross-layer applications and software that could provide added value to the infrastructure by bringing into RAWFIE novel features in different types of experimentation. Indicative examples of expected software include network administration software and resource management tools.*
B. *Supporting software at testbed-tier. This category refers to the addition and/or the extension of existing software architectures and products that could be included in the RAWFIE architecture and become part of the RAWFIE software stack in order to improve existing functionality.*

In both categories, the adoption of open technologies, specifications and standards (including open source software and Semantic Web technologies) that will enable the openness of the RAWFIE platform towards possible future expansion through the integration with other testbed infrastructures will be preferred.

Expected Timeplan

For all three types of activities, the expected duration of the proposals is 30 months, starting from July, 2016 and ending at the time the project completes (i.e., December, 2018). The following table provides an indicative timeplan for the three types of activity expected to be targeted by the proposals of the present open call.

Type of Activity	Expected Timeplan	Stage Description
Testbed Additions	**Preparation stage:** Months 1 - 3.	The facility will be prepared to adopt RAWFIE equipment and software.
	Running stage: Months 4 – 30.	The facility will be ready to host experiments according to the project needs.
UxV Additions and Customization	**Delivery and customization stage:** Months 1 - 8.	The beneficiaries will deliver to the RAWFIE Consortium the robotic devices customized and ready to be used.
	Supporting stage: Months 9 - 30.	The UxV resources will

		participate in experiments.
Software Enhancements	**First prototype stage:** Months 1 - 8.	A first prototype of the software will be provided to the RAWFIE Consortium and an initial integration with RAWFIE platform will be demonstrated.
	Final delivery stage: Months 9 - 12.	The finalized version of the software completely integrated with RAWFIE infrastructure is delivered.
	Supporting stage: Months 13 - 30.	Minor modifications are expected according to the feedback received by the experimenters and the end-users.

The proposals are expected to propose their own plan of documentation and deliverables that will be provided to the RAWFIE Consortium. The implementation plan will be subject to the evaluation criterion C3 ("Ability to implement"). The successful beneficiaries will be invited to refine and implement the final plan with the project coordinator and the other collaborators.

Practical Information

Total budget: € 1,500,000 - € 2,000,000
Expected number of proposals to be funded: up to 15
Maximum Commission funding per proposal: € 150,000

Budget foreseen for testbed enhancements: € 800,000

Budget foreseen for UxVs enhancements: € 800,000

Budget foreseen for software enhancements: € 200,000

Number of partners per proposal: Projects should normally have one participant per proposal. In exceptional cases only, proposals with up to two participants may participate on the condition that the combined expertise of the participants justifies the expected outcome of the proposal. This should be also clearly stated and presented in the proposal.

Type of participants: Testbed operators and facility holders, UxVs' manufacturers, organizations with software engineering capabilities that will participate as contractual Third Parties. The profile of participants could be academics, industries or SMEs, and all kinds of private or public bodies active in the domains of IoT , Robotics, Autonomous Systems, Networking or Cloud Computing that need to provide hardware (UxVs), develop software or host experiments in their premises to further test, evaluate and optimize the project solutions. The rules of participation are the same as those applied to any H2020 project.

Duration of the contract: The duration of each proposal will be 30 Months.

Language of the proposal: English

Proposal page limits and layout: According to the provided template, each proposal should consist of two distinct sections; Part A and Part B. Part A provides administrative information for the proposing party (or parties in case of two-party consortia), while Part B provides information about costs, proposed plan and methodology, implementation and impact. **Part B of each submitted proposal should not exceed 30 pages length in total** (including cover page, abstract, table of contents, and sections B0, B1, B2, B3 of the provided template). There is no automatic check in the system. Experts will be instructed to disregard any excess pages in each section in which the maximum number of pages is indicated. The minimum font size allowed is 11 points. The page size is A4, and all margins (top, bottom, left, right) should be at least 15 mm (not including any footers or headers). Ensure that the font type chosen is clearly readable (e.g., Arial or Times New Roman).There is no page limitation for Part A since it consists of administrative forms. **A single document containing both parts A and B should be submitted.**

Call deadline: Monday, March 14, 2016 at 17:00h CET (Brussels time)

Contact for information on this call: Prof. Stathes Hadjiefthymiades (UoA)

email: rawfie-contact@cnl.di.uoa.gr

Eligibility

Proposals may only be submitted by:

- Parties eligible for participation in the EC Horizon 2020 Framework Programme. Rules for eligibility can be found at: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-a-countries-rules_en.pdf
- Single parties or consortia of up to two (2) parties in exceptional cases.

A party may participate and submit multiple proposals. However, only the best ranked proposal may be selected among them (following the evaluation process).

Evaluation Criteria

Evaluation and ranking will be carried out by an external jury of individual experts. Proposals for third party funding will be evaluated against the following criteria:

C1. Relevance to the project architecture and technological excellence

All the contributions of third parties are intended to enhance the current RAWFIE architecture. Therefore, the proposals should adhere to the requirements of the platform, and build on top of the existing framework. This criterion assesses the compliance of each proposal with RAWFIE technologies and adopted approaches. The technological excellence of the proposed solution and the level of integration with RAWFIE tools and platform are also evaluated. The quality of the proposed solutions will also be evaluated (e.g., number of robotic devices, size and time availability of testbed facilities).

C2. Impact

The funded proposals' impact (both on the project and in general) is evaluated. The open call seeks proposals which provide high added value. Proposals should enable possible future follow-up experiments and support the sustainability of the federated architecture. Market potential of the proposals as well as their ability to provide significant value to the end-users will be taken into consideration. The funded third parties will also have to integrate their proposals outcome into the current RAWFIE infrastructure and maintain a connection to the RAWFIE Consortium until the end of the project. Further integration into a future RAWFIE federation is a major target for the project. In this context, this call also searches for participants that will stay active beyond the project lifetime. Hence, proposals with high levels of engagement with RAWFIE and the FIRE community will be promoted. The same stands with proposals that foresee and enable possible synergies with other H2020 projects and/or nationally funded activities.

C3. Ability to implement

The proposers will be evaluated on their ability to implement the tasks. The experience and the technical capacity of the applicant(s) are of high importance. The proposed implementation plan should be clear and methodically sound, with a clear task statement, a solid design, a good methodology and of high quality. Participants are expected to propose a concrete plan that enables them to achieve the project goals during the given time-frame. The successful beneficiaries will be invited to refine and implement the final plan with the project coordinator and the other collaborators.

Each of the criteria is evaluated in a scale of 0-5. The threshold for each of the criteria is 3. The threshold for the total evaluation is 10.

In case of possible ties in ranking, the above criteria will be considered as listed in order of importance, i.e., criterion 1 is ranked higher than criterion 2, etc.

The funding of the proposals will be split among the 3 activities, and for the first 2 activities between the individual sub-activities. For example, in the testbed enhancement activity, if the best ranked proposals offers an outdoor ground vehicle testbed, another outdoor ground vehicle testbed will only be selected if the other types of testbed enhancements are successfully covered or there is available budget and no other proposal of a different type with an evaluation above the threshold.

Redress

A third party (or consortium of 2 parties) may submit a redress request to the project coordinator within 7 days of the announcement of the evaluation and funding results. The redress request may involve only the procedural aspects of the evaluation. The request will be evaluated by the project Quality Control Board, a committee of 5 representatives of different project partners, and responded to within 10 days of its reception.