ROSIN Funding Opportunities: Focused Technical Projects

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rosin-project.eu
Team Delft winning Amazon Robotics Challenge 2016

Cognitive Robotics Department
- Robot Dynamics
  - Motion planning and control
  - Prediction-error minimization
- Robot software
  - Model-based self-adaptation for autonomy through metacontrollers


© ROSIN – ROS-Industrial Quality-Assured Robot Software Components
Flexible pick&place with dynamic obstacle avoidance developed in the Factory-in-a-day EU project

https://surfdrive.surf.nl/files/index.php/s/QLaZHdH5Ja0doM
E
New Robotic Automation

> technology push <

- “robotics science” is mature
- hardware is cheaper than ever!
  examples:
  -> new collaborative robot arms, 10k EUR
  -> sensors for high-volume markets
  (smartphones, IoT, gaming devices, ...)

> market pull <

- mass customization: I4.0, low-volume high-mix production (“lots of size 1”)
- expansion of automation in logistics; new markets (e.g., service robotics)
  -> need for advanced & flexible automation

“smart skills” + modern hardware -> automation technology meeting demands

By Mirko Bordignon, Fraunhofer IPA
Another Example: Amazon Robotics Challenge

- 14/16 team members were software developers.
- Team Delft won in 2016 both Picking and Stowing tasks using

https://youtu.be/3KlZVWxomqs
ROS-INDUSTRIAL QUALITY-ASSURED
ROBOT SOFTWARE COMPONENTS

- ROSIN: 4 years, ~8 million EUR IA H2020-ICT-2016-1
  - Speed-up the industrial uptake of advanced robotics applications.
  - Builds upon the ROS-Industrial Europe community, to make it sustainable and leading worldwide.

- H2020 EU Digital Industrial Platform for Robotics

... and more
ROSIN vision

ROS-Industrial the EU Digital Industrial Platform for Robotics

- widely accessible and adopted
- quality software available
- European companies leading ROS-enabled robot capabilities
- Self-sustaining

on the market!
Current challenge

- Robot developer or integrator
  - “I need a software component for “X”
  - Can I use something already available?
Current challenge
Current challenge

- How does it work?
- Can I rely on this component?
- Has it been tested?
- …
ROS-INDUSTRIAL QUALITY-ASSURED ROBOT SOFTWARE COMPONENTS

ROSS Activities

- Quality Assurance tools
- Education in ROS-Industrial
- Grants for robot software development
QUALITY ASSURANCE TOOLS

Quality Assurance
Working with the community to have better tools:
• continuous integration
• model-in-the loop
• automated test generation
• code scanning

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EDUCATION IN ROS-INDUSTRIAL

Education
Professionals trained in ROS
- curriculum
- ROS-I Academy professional trainings
- ROS-I Schools for students
- 3rd party ROS education
  - Grants: call opening August 2018

Alexander Ferrein
ROSIN Education Activities
FH Aachen University Applied Sciences
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OPENING IN 2018 @ TU DELFT CAMPUS

- ROS-INDUSTRIAL TRAININGS
- 800 M² FOR ROBOTICS
- CONNECTS END-USERS <-> ROBOT DEVELOPERS
- TESTING FACILITIES
- WORKSHOPS
ROSIN Internships - [http://rosin-project.eu/jobs](http://rosin-project.eu/jobs)

- **Companies**: find interns with ROS experience in Europe
- **Young professionals**: find companies working on advanced robotics with ROS
MOOC: Hello (Real) World with ROS

- October 2018 - Enroll opening soon

Learn the fundamentals of ROS – Robot Operating System to create advanced real-world robotic systems

- Use ROS communication tools (topics, services, actions)
- Create a custom environment with a robot and visualize it.
- Build a map of the robot environment and navigate the map with a mobile robot.
- Implement a pick and place function with industrial robot arms.
- Design a complete robotic application with state machines.
ROSIN grants for robot software development

EU cascade funding
Grants for robot software development:
Focused Technical Projects

http://rosin-project.eu/ftps
Grants for robot software development: Focused Technical Projects

**What service?**
- Financing of a **ROS software open source development**. Grant covers 1/3 of development person-months
  - concrete industry robot software need: driver, algorithm, application template, license or code audits…
  - Max 100K ~ 1 year duration

**Who can benefit?**
- Robot software developers: companies, research centers…
  - H2020 eligible entities (typically 1-2)

**How to apply?**
- Apply **anytime** at: [http://rosin-project.eu/ftps](http://rosin-project.eu/ftps)
- Simple application template (~5 pages):
  - Project description
  - Project implementation plan
  - Commitment to fund the remaining 2/3 costs
What is an FTP?

**THE ROSIN OPEN CALL:**

3+ MILLION EUR AVAILABLE TO THIRD PARTIES FOR ROS-INDUSTRIAL DEVELOPMENT

**Improve availability of quality, open source ROS-I software**

- target a **concrete business need**, i.e.: software development, definition of technical standards, security and license audits, etc.
- typically **one/two applicants**: a **user** and a **developer** (can be more)
- an expected duration of ~**12 months**, 3 milestones
- budget of **around € 50K-100K**
Scope of FTPs

- **HW-related components**, e.g. drivers, configuration tools;
- **ROS Enhancement Proposals (REPs)**: REPs are akin to, e.g. IEEE standards with a reference implementation of a working system;
- **algorithms**: e.g., a SLAM algorithm which currently exists only as a MATLAB implementation;
- **“application templates” driven by concrete use cases**, e.g. a configurable software component for a palletizing work cell;
- **improvement of existing components**, e.g., Rviz, the ROS navigation stack;
- **process-related work**, e.g. code security audits.
- **improvement of documentation**: technical manuals, deployment guides, etc.
- **integration with other software frameworks**
- … (this is a non-exhaustive list)
Scope of FTPs

- ALL industrial application areas:
  - Manufacturing, but also
  - Intralogistics
  - Agriculture
  - Drones
  - …

- ROS(1) and ROS2
## Scope of FTPs

### Examples: projects already granted

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ensenso-ROSIf</strong>&lt;br&gt;by Ensenso</td>
<td>15k</td>
<td>ROS interface node for Ensenso stereo cameras supported by the manufacturer.</td>
</tr>
<tr>
<td><strong>Robot Language</strong>&lt;br&gt;by Robot Care Systems</td>
<td>54k</td>
<td>Modular and user-extendable domain-specific robotics language for ROS.</td>
</tr>
<tr>
<td><strong>Zivid-ROS</strong>&lt;br&gt;by Zivid Labs</td>
<td>100k</td>
<td>Linux and ROS support for the Zivid 3D color camera.</td>
</tr>
<tr>
<td><strong>Visard4ROS</strong>&lt;br&gt;by Roboception GmbH</td>
<td>25k</td>
<td>ROS interface to the rc_visard sensor providing ego-motion, depth data and point clouds.</td>
</tr>
<tr>
<td><strong>Coverage path plan. and control</strong>&lt;br&gt;by Nobleo</td>
<td>44k</td>
<td>Package providing coverage path planning and trajectory tracking functionalities</td>
</tr>
<tr>
<td><strong>ROSdyn</strong>&lt;br&gt;by CNR-ITIA</td>
<td>27k</td>
<td>Fully automated procedure able to calibrate the robot dynamics model.</td>
</tr>
</tbody>
</table>
How to Apply

FTP submission

Who
FTP applicants: H2020 eligible robot sw developers and users

When
Anytime! we are open to new applications (NO deadline)

Where
http://rosin-project.eu/fts

How
Simple template (~5 pages)
Focused, well-defined goal
Clear work plan: Milestones
Compromise to fund M2, M3

Evaluation and selection

When
Every ~ 3 months

Who
Experts from ROSIN and ROS-I community

Contract agreement

Who
ROSIN FTP applicants

When
immediately upon selection

What
Contract agreement
ROSIN funds 33% (M1)
Applicants fund 67% (M2,3)

ROSIN pays
40% of M1
FTP budget and ROSIN grant

- ROSIN grant funds up to **33% of person months of software development**
- Additional project costs are **not considered** when calculating the requested ROSIN contribution
  - hardware
  - travelling
  - demonstrators

Total project budget

- 33% of total PM
- Hardware costs
- Other costs

Max ROSIN contribution

© ROSIN – ROS-Industrial Quality-Assured Robot Software Components
ROSIN FTP Contract

- Obligation by the applicants to execute the development planned in the FTP in time, specifically Milestone 1.
- Commitment to collaborate with other selected FTPs with overlapping scopes.
- Milestones and payment schema.
- **Lump sum** schema for costs.
  - No time sheets or overhead costs
- The FTP results need to be open source under **appropriate open-source license**.
  - Apache 2.0 license recommended
    - Business friendly, standard in ROS-industrial community.
  - Background IP can be defined.
Execution of selected FTPs

**FTP developers** execute

- **M1 Execution**
  - FTP developers execute
  - **What**
    - results open source
  - **Who**
    - FTP participants and developers
  - **FP developers** execute

- **M1 eval**
  - ROSIN experts evaluate
  - **What**
    - ROSIN pays M1 60%
  - **Who**
    - FTP developers M1 report
  - **When**
    - completion M1

- **M2, M3**
  - FTP developers execute
  - FTP participants pay 60% completed Mil.
  - ROSIN experts evaluate
  - **What**
    - 40% next Mil.
  - **Who**
    - FTP participants pay M2 40%

- **FTP completed**
  - ROSIN - Dissemination
  - **What**
    - results open source
  - **Who**
    - Maintenance and Support
  - **help disseminate**
First results: Ensenso-ROSIf

**ensenso_driver beta release**

http://wiki.ros.org/ensenso_driver

https://github.com/ensenso/ros_driver
First results: Robotics Language

- Program robot behavior at a high level
- Extendable: mini-languages allow extra features, automations, etc.:
  - Automatic generation of tests listings
  - Automatic generation of documentation for certification.
  - Generation of HTML5 GUIs
- Ready to extend for ROS 2.0

https://github.com/robotcaresystems/RoboticsLanguage
QA in ROSIN FTPs

- Apply **reasonable QA measures**:
  - Unit testing
  - Version control system
  - Continuous integration
  - Code scanners
  - ROS and ROS-I conventions, code style guides
  - License information
  - Documentation

- ROSIN expects from FTPs:
  - FTP applicants: present a **convincing QA strategy**
  - FTP Milestone I report: present QA implemented and its results

- ROSIN support to FTPs for QA
  - ROSIN QA rools -> early adopters
  - FTP can request specific support
  - Workshops
Call opening August 2018:
Grants for Education Projects

What service?
- Financial support new **ROS-related education activities**
  - Grant covers 1/3 of the costs
  - Setting up a training center  max 30000 €
  - Software develop. to support ROSIN trainings  max 15000 €
  - ROS training materials  max 2500 €

Who can benefit?
- Robot **education and training entities**
  - H2020 eligible entities (typically 1)

How to apply?
- Apply **anytime** at: [http://rosin-project.eu/ftps](http://rosin-project.eu/ftps)
- Simple application template:
  - Project description
  - Project implementation plan
  - Commitment to activity sustainability
SUMMARY

- ROSIN FTP funding
  - Focused projects to develop ROS-Industrial quality software.
  - ~1 year, 50-100K
  - Simple and quick application process.

QUESTIONS?
More information

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More information: http://rosin-project.eu/
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