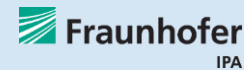


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# ROSIN – Industrial quality-assured robot software components

Journées Nationales sur ROS  
LAAS, Toulouse, 19-20 Juin 18  
Anthony Remazeilles  
TECNALIA

ROSIN  
Consortium



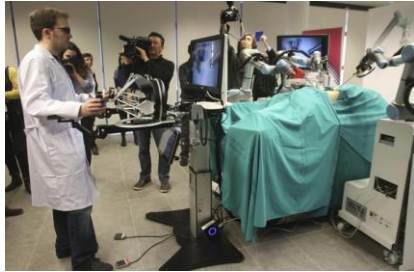
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[rosin-project.eu](http://rosin-project.eu)

# Robotics in Tecnalia

## HEALTH Division



## INDUSTRY AND TRANSPORT Division

### ROBOTIC PRODUCT



### ROBOTIC Tool to automate process

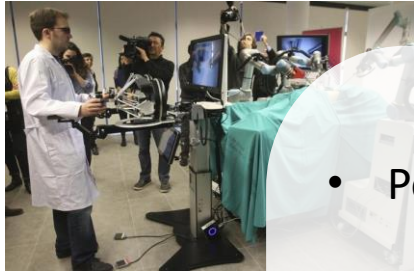


### ROBOT Autonomy as a key to Flexibility



# Robotics in Tecnalia

## HEALTH Division



## INDUSTRY AND TRANSPORT Division

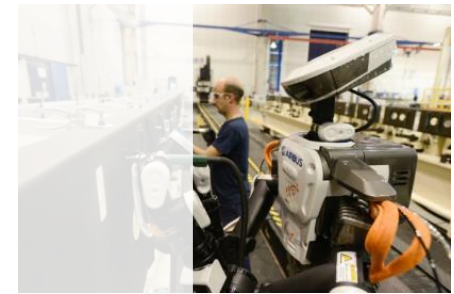
### ROBOTIC PRODUCT



### ROBOTIC Tool to automate process



### ROBOT Autonomy as a key to Flexibility



- Powered by  ROS

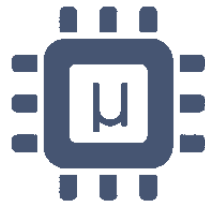
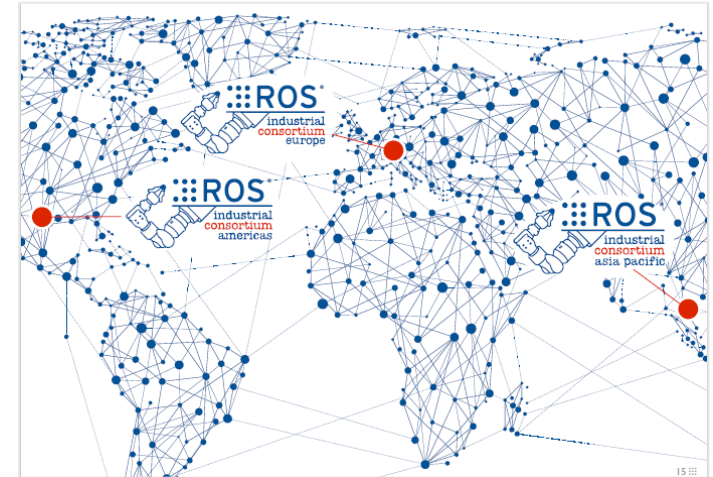
- Mutualize effort & development
- Ease development reuse, extension
- Ease complex problems implementation

- Looking towards 
  - Reduce gap between research and industry
  - Reduce project development cost
  - Ease collaboration with integrators, industrial clients

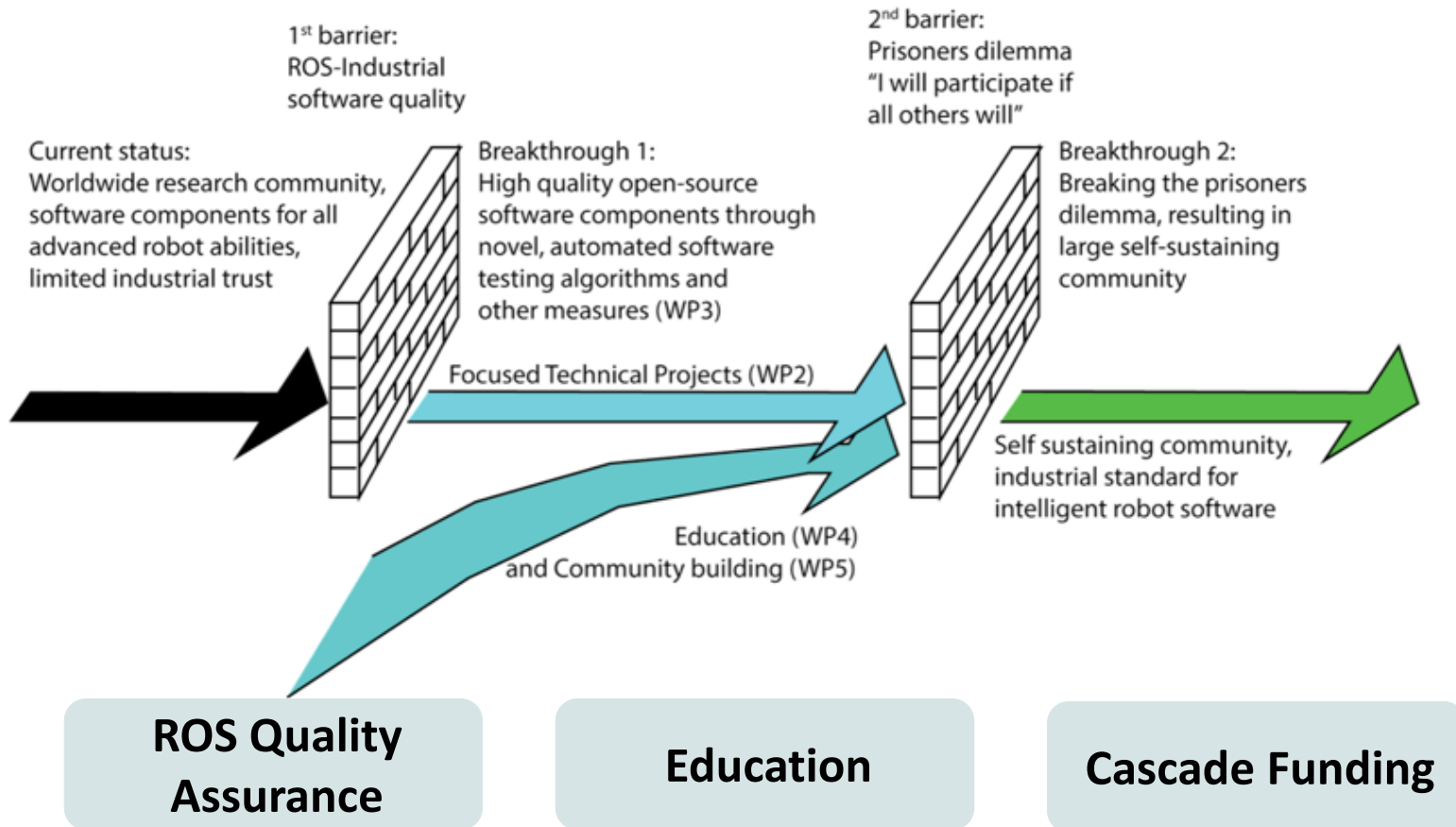


# ROSin Project

- ROSIN: 4 years, ~8 million EUR IA H2020-ICT-2016-1
  - Speed-up the **industrial** uptake of advanced **robotics** applications.
  - Aims to **consolidate** the (many) EU-based ROS activities.
  - Builds upon the **ROS-Industrial Europe** community, to make it sustainable and leading worldwide.
- ROSIN is an EU Digital Industrial Platform for Robotics



# ROSin approach



# ROS Quality Assurance

- Working with the community to have better tools:

- Continuous integration
- Model in the loop testing
- Automated test generation
- Code scanning

- Study of ROS community:

- Open-source ideology
- Motivated by challenges (less by QA tasks)
- Meritocratic culture
- Lack of working sustainability culture

- Actions towards: Community engagement, QA valorisation, QA tools development

*[Robotic developer / integrator]*



*I need a software component for X*

- Is there something already available?
- **How does it work?**
- **Has it been tested?**
- **Can I rely on this component?**

# ROSIN QA Actions

- Community Engagement: ROS QA working group

- 23 members

- From 7 countries
- From 3 continents, under European leadership

- 20 organizations:

- 16 companies,
- 2 universities,
- 2 research institutions

- 5 meetings have taken place

Iterations	ROSIN Initiatives	No. Of vote points
Iteration 1	Make ROS packages quality visible.	42
	Appoint ownership	32
	Energize the code review process	32
	Implement a code scanning method and tool	31
	Maintenance issues	31
Iteration 2	Energize Continuous Integration	31
	Quality Hub website	30
	Formalize the code ownership process	29
	Onboarding process for core and non-core community members	29
Iteration 3	Model-in-the-Loop testing	28
	Implement a continuous improvement process	26
	Automated unit test generation	26
	Quality Discourse	23
Iteration 4	QA promotion events	19
	Model Driven Development	18
	#ROSQA	15

All minutes on  ROS Discourse

# ROSIN QA Actions

## Quality Discourse

## Quality HUB

ROS Discourse

Quality Assurance ▾ Latest New Unread Top + New Topic

Topic	Users	Replies	Views	Activity
What quality metrics do we need to make packages quality visible?		2	60	16h
Input validation as a metric for quality		11	230	3d
Design By Contract		45	1.6k	3d
ROS Quality Assurance Working Group meeting minutes - Feb. 2018 Meeting		0	56	5d
Chaos testing tool for Docker		3	92	9d
Maintaining and releasing orphaned packages		0	92	10d
Quality guide for ROS2 <small>Latest Quality Assurance topics - Discourse.ros.org</small>		2	82	10d
Documentation for maintainers		10	194	12d
Better Tagging of Issues to increase community involvement		0	60	20d
ROS Quality Assurance Working Group meeting minutes Kick Off Meeting - 10/01/2018		10	291	Jan 17
About the Quality Assurance category		0	77	Jan 4

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### Quality

## ROS Software Quality Hub

The **Quality Hub** is an online community hub that will provide a focal point and resources to foster quality related activity in ROS. Please help to grow it in the interest of the entire community.

This page is a central entry point for all quality assurance material for ROS. This includes tutorials and patterns on producing and contributing high quality code, as well as on testing, and other quality oriented practices. The particular focus are industrial users of ROS, but everybody is welcomed to benefit and to contribute.

Please create new quality oriented materials under this tree in the wiki.

#### Contents

- ROS Software Quality Hub
  - Tutorials and articles
  - Quality category on ROS Discourse
  - Who is behind ROS Quality Hub? (About Us)

### 1. Tutorials and articles

See [Quality/Tutorials](#) for tutorials & articles on quality assurance with ROS and for ROS.

### 2. Quality category on ROS Discourse

There is a dedicated software quality category on ROS Discourse: [discourse.ros.org/Quality](#).

Go there to discuss issues of quality policies in the ROS projects, and in ROS-based applications, including proposals of content for this webpage, offers to help, etc.

### 3. Who is behind ROS Quality Hub? (About Us)

So who is behind this page? The answer is simple: **It's you!** We need your help to create a solid resource on building high quality industrial level systems with ROS. We are a group of self-appointed editors who are generously funded by the European Union H2020 project [ROSIN](#).

We are trying to spin this effort with a good speed and trajectory, but it will die, if you don't join us. Talk to us on the discourse category for Quality (see above), or just grab an article devoted to Quality that needs improvement and work on it! You can take the article from anywhere in the wiki, and link it from here, as a sign that it has been edited. If you think an article on a topic is missing, create a new one, or ask others to do so in a discourse discussion.

Wiki

- Distributions
- ROS/Installation
- ROS/Tutorials
- RecentChanges
- Quality/Tutorials
- Quality

Page

- Edit (Text)
- Edit (GUI)
- Comments
- Info
- Subscribe
- Add Link
- Attachments

More Actions:

User

- Adam Alami
- Settings
- Logout



# ROSIN QA Actions

- ROS Time Machine for bug reproduction

- Enables access to historical releases of ROS packages



- ROS linting tool based on bug history analysis

- Identifying bugs that can be caught by pattern matching
- Ongoing work: Zhoulai Fu [zhfu@itu.dk](mailto:zhfu@itu.dk)

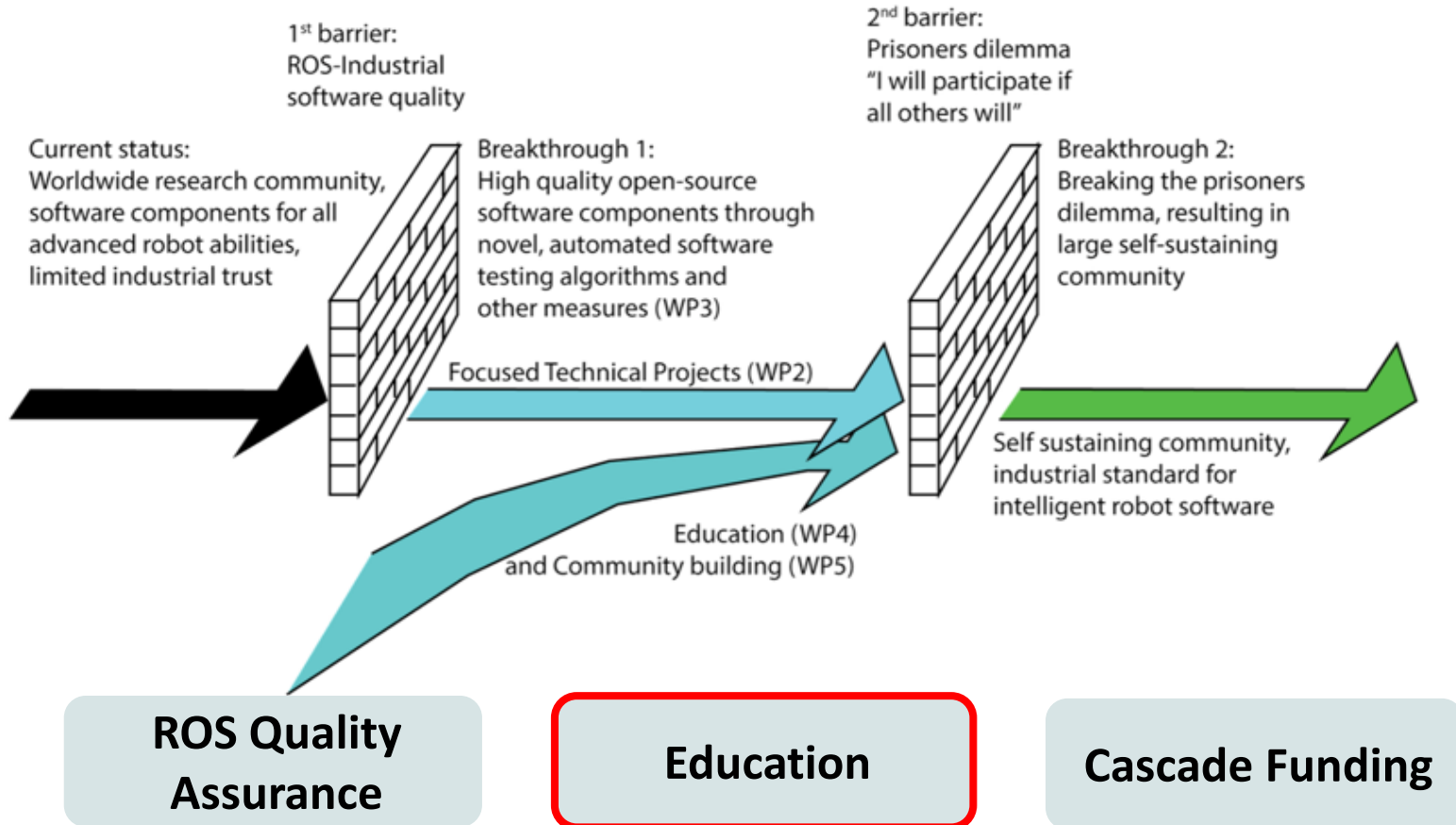
- Fuzzing: automatic testing using random inputs

- Ongoing work: Zhoulai Fu [zhfu@itu.dk](mailto:zhfu@itu.dk)

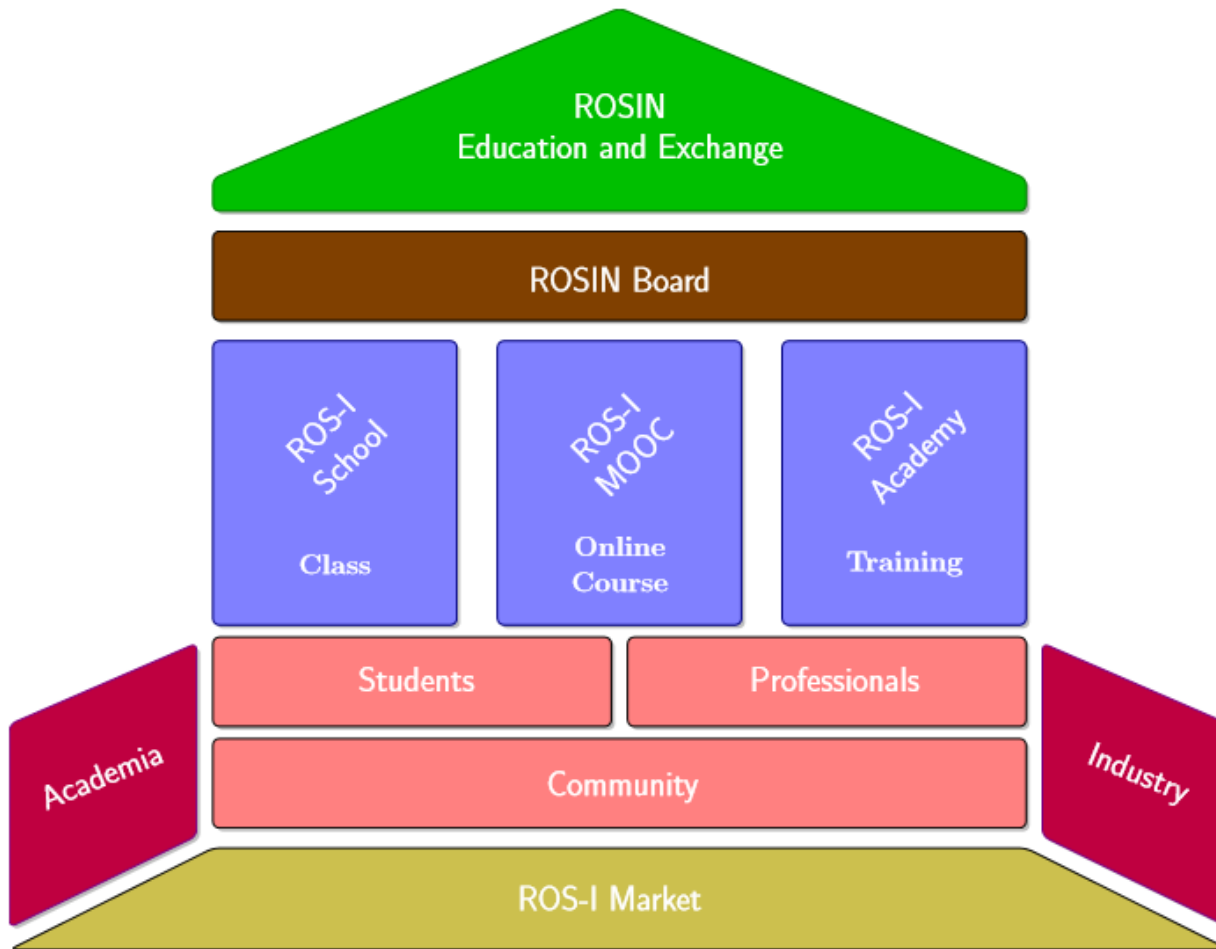
- ROS package generator based on node templates

- Ongoing: Anthony Remazeilles [anthony.remazeilles@tecnalia.com](mailto:anthony.remazeilles@tecnalia.com)

# approach



# ROSIN Education



## ROS-I School

Target: students

Format: class

## ROS-I MOOC

Target: everybody

Format: course

## ROS-I Academy

Target: profesional

Format: training

## Education projects

Detailed later on

# ROSIN Education effort

## Next education sessions

- Free and Open Source Software (FOSS) Compliance - Berlin Seminar,

- ROS-industrial training, London



- ROS-I Academy, Stuttgart July 2-6 ([soldout](#)) , Stuttgart October 8-12

- MOOC: hello (Real) world with ROS

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

- October 2018, enroll opening soon

- More to come on: <http://rosin-project.eu/>

# ROSIN Education: Grant for Education Projects

Call Opening August 2018

**What**  
is funded?

- Financial support to 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 €

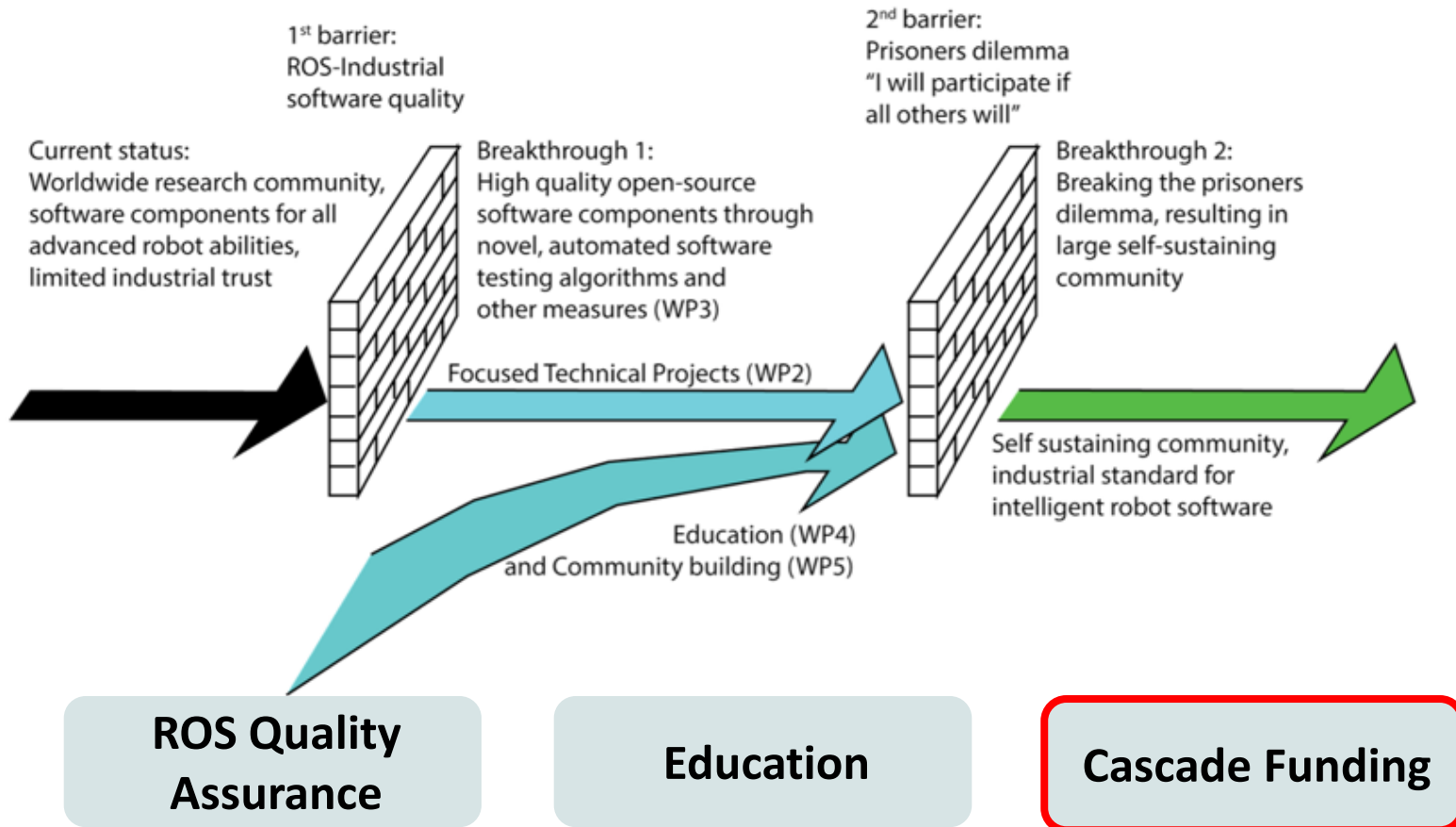
**Who**  
can benefit?

- Robot education and training entities
  - H2020 eligible entities

**How**  
to apply?

- Apply anytime at: <http://rosin-project.eu/ftps>
  - Simple application template: Project description, Project implementation plan, Commitment to activity sustainability

# ROSin approach



# Focused Technical Projects

## What is funded?

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

## 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>
- Simple application template (~5 pages):
  - Project description
  - Project implementation plan
  - Commitment to fund the remaining 2/3 costs

# FTP Examples

- **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**



# FTP projects already granted

FTP	Organisation	grant	Details
Ensenso-ROSif	Ensenso GmbH	15k	ROS interface node for Ensenso stereo cameras supported by the manufacturer. <a href="#">ROS wiki</a>
Robot Language	Robot Care Systems	54k	Modular and user-extendable domain specific robotics language for ROS. <a href="#">Github</a>
Zivid-ROS	Zivid Labs	100k	Linux and ROS support for the Zivid 3D color camera.
Visard4ROS	Roboception GmbH	25k	ROS interface to the rc_visard sensor providing ego-motion, depth data and point Clouds
Coverage path planning and control	Nobleo	44k	Package providing coverage path planning and trajectory tracking functionalities
ROSdyn	CNR-ITIA	27k	Fully automated procedure able to calibrate the robot dynamics model.

[more details](#)

# Specific Tecnalia contributions

ROS-I Academy, March 2018

How to ease ROS deployment into customer environment?

How to handle correctly dependencies ?

How to protect know-how within delivered code?

How to combine public and private content in delivered solutions?

→ **ROS Buildfarm for (private) entities?**

How to standardize package and node structure?

How to generate nodes based on their interface?

How to make it quick?

→ **ROS package generator**



# Questions?

More info:

<http://rosin-project.eu/ftps>

[info@rosin-project.eu](mailto:info@rosin-project.eu)

Anthony Remazeilles

Tecnalia

[anthony.remazeilles@tecnalia.com](mailto:anthony.remazeilles@tecnalia.com)

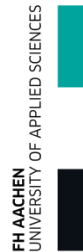


Supported by ROSIN – ROS-Industrial Quality-Assured Robot Software Components.

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

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 732287.

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