ROSIN Funding Opportunities: Focused Technical Projects

Carlos Hernandez Corbato   c.h.corbato@tudelft.nl

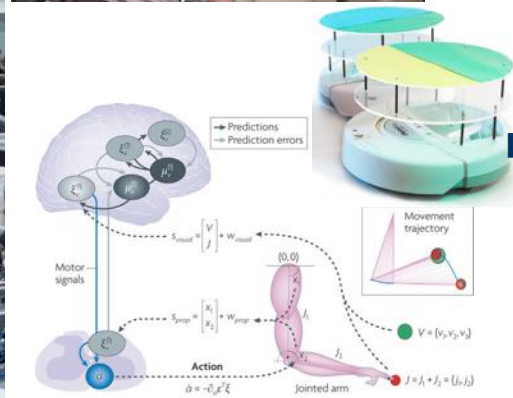ROSIN Coordinator   TU Delft - Robotics Institute

rosin-project.eu

TUDelft | Robotics Institute

6 facultles | **13** departments | **140** staff and PhD

- Fundamental research
- BSc and MSc education
- Industrial collaboration

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**

From: K. Friston. *The free-energy principle: a unified brain theory?* 2010

Nature Reviews | Neuroscience

https://surfdrive.surf.nl/files/index.php/s/QLaZHdH5Ja0doME

Flexible pick&place with dynamic obstacle avoidance developed in the Factory-in-a-day EU project

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

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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

on the market!

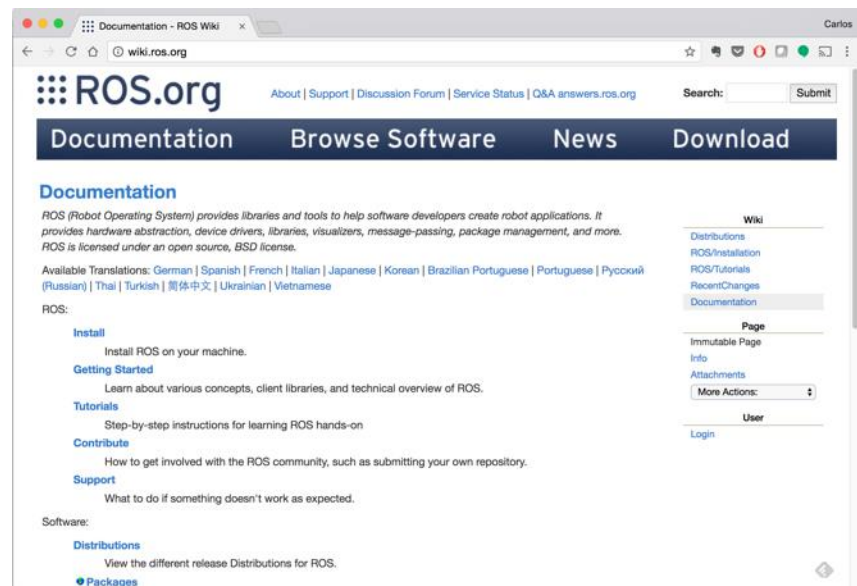ROS-Industrial the **EU Digital Industrial Platform for Robotics**

➢ widely accessible and adopted

➢ quality software available

➢ European companies leading ROS-enabled robot capabilities

➢ **Self-sustaining**

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

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■ **ROSIN Activities**

Quality Assurance tools	Education in ROS-Industrial	**Grants for robot software development**

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QUALITY ASSURANCE TOOLS

Quality Assurance

Working with the community to have better tools:

- continuous integration

- model-in-the loop

- automated test generation

- code scanning

Andrzej Wasowski

ROSIN Quality Assurance

ITU *University of Copenhagen*

ferrein@fh-aachen.de
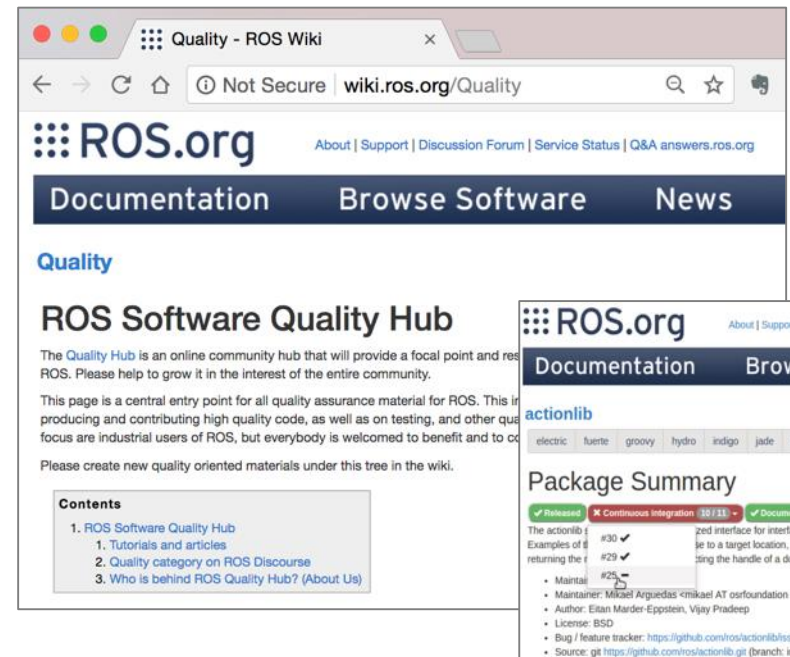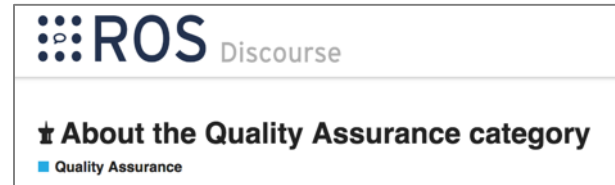
EDUCATION IN ROS-INDUSTRIAL

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 Scienc*
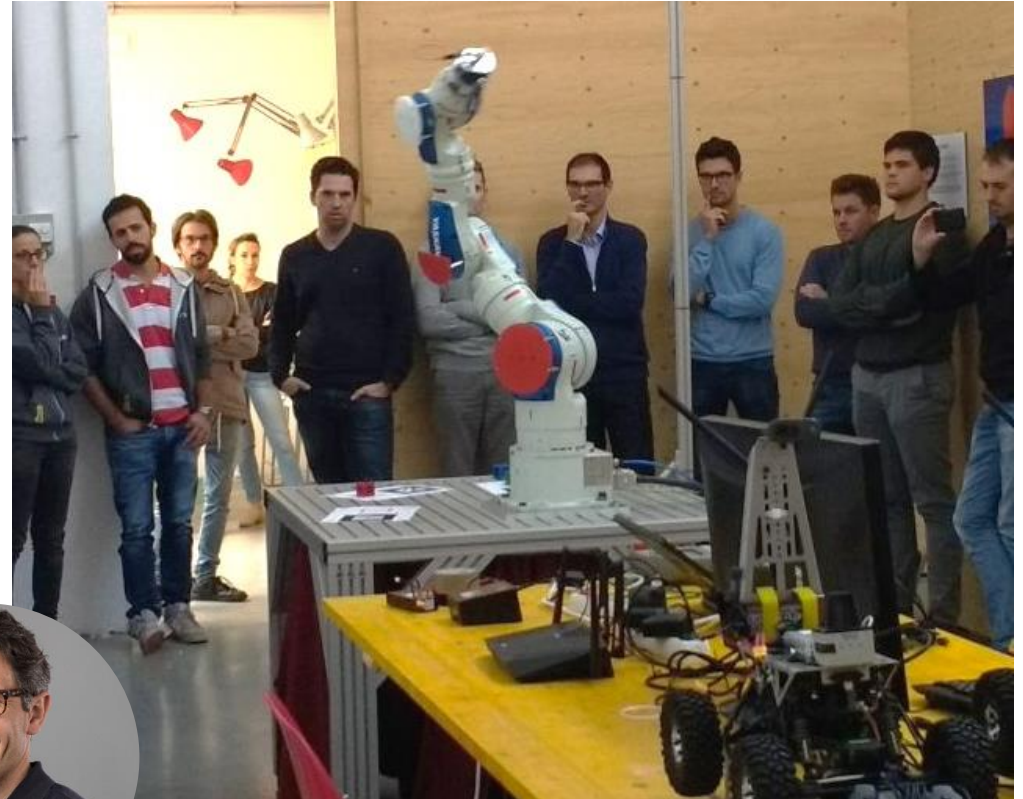
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OPENING IN 2018 @ TU DELFT **CAMPUS**

- **ROS-INDUSTRIAL TRAININGS**
- **800 M^2 FOR ROBOTICS**
- **CONNECTS END-USERS <> ROBOT DEVELOPERS**
- **TESTING FACILITIES**
- **WORKSHOPS**

DISCOVER

TEST

DEVELOP

ROSIN Internships - http://rosin-project.eu/jobs
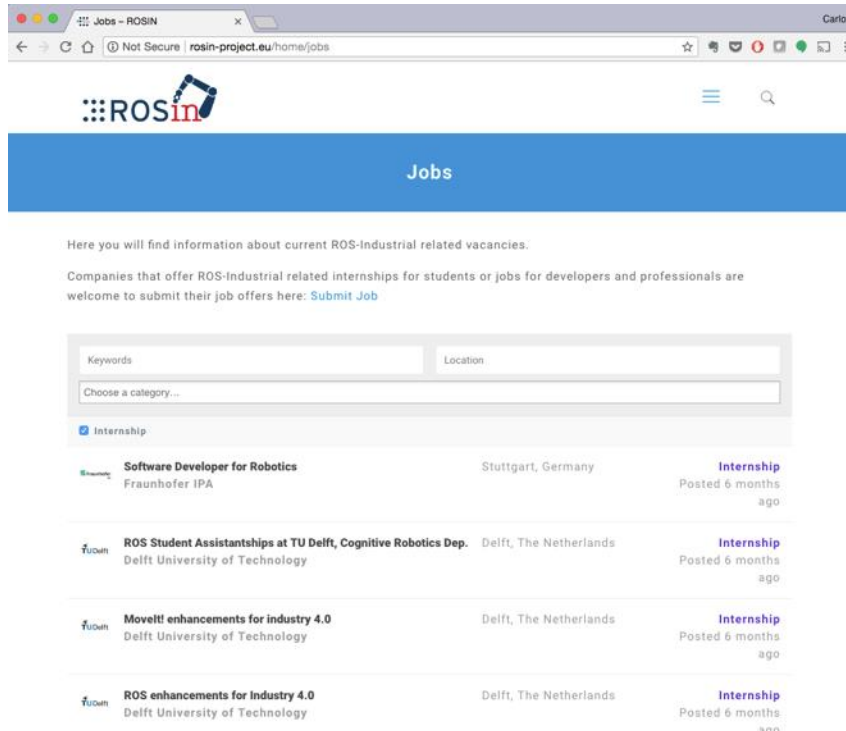
- **Companies**: find interns with ROS experience in Europe

- **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

May 29, 2018, Fraunhofer IPA Stuttgart– ROS-Industrial EU Spring'18 Workshop– Carlos Hernandez c.h.corbato@tudelft.nl

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**

- Simple application template (~5 pages):

  - Project description

  - Project implementation plan

  - Commitment to fund the remaining 2/3 costs

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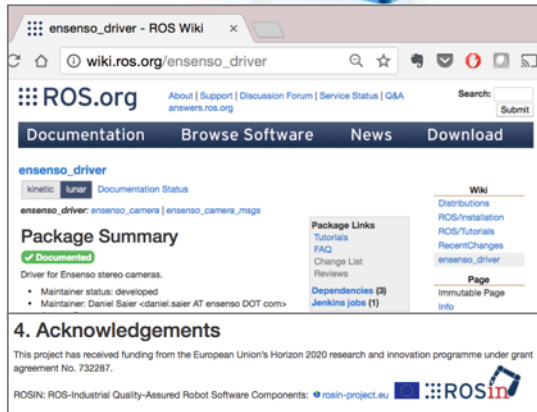
- **ALL industrial application areas:**
    - Manufacturing, but also
    - Intralogistics
    - Agriculture
    - Drones
    - …

- **ROS(1) and ROS2**

Scope of FTPs
Examples: projects already granted

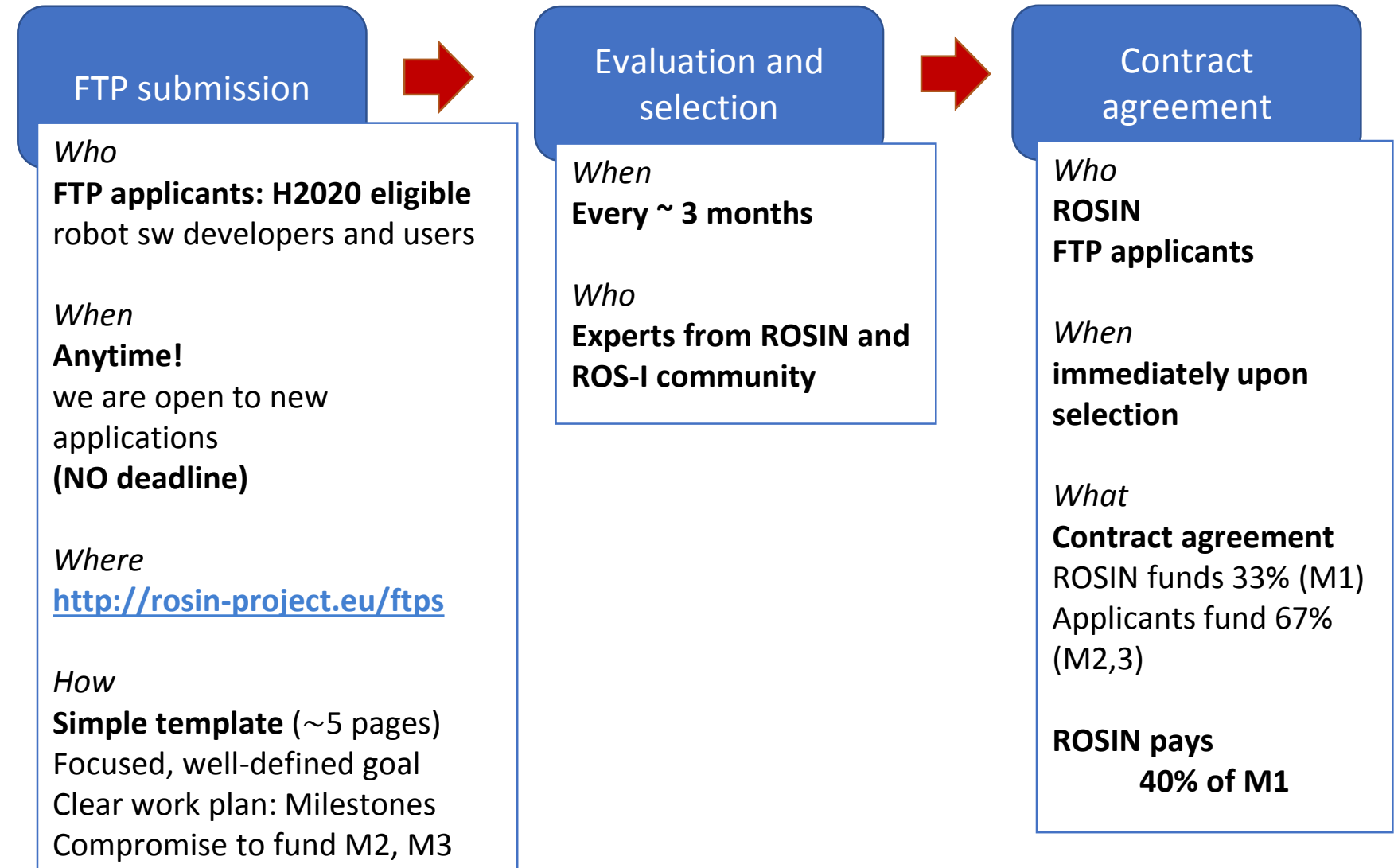|		
Ensenso-ROSIf *by* Ensenso	15k	ROS interface node for Ensenso stereo cameras supported by the manufacturer.
Robot Language by Robot Care Systems	54k	Modular and user-extendable domain-specific robotics language for ROS.
Zivid-ROS by Zivid Labs	100k	Linux and ROS support forthe Zivid 3D color camera.
Visard4ROS *by* Roboception GmbH	25k	ROS interface to the rc_visard sensor providing ego-motion, depth data and point clouds.
Coverage path plan. **and control** *by* Nobleo	44k	Package providing coverage path planning and trajectory tracking functionalities
ROSdyn *by* CNR-ITIA	27k	Fully automated procedure able to calibrate the robot dynamics model.

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/ftps

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

::::ROSin

FTP budget and ROSIN grant

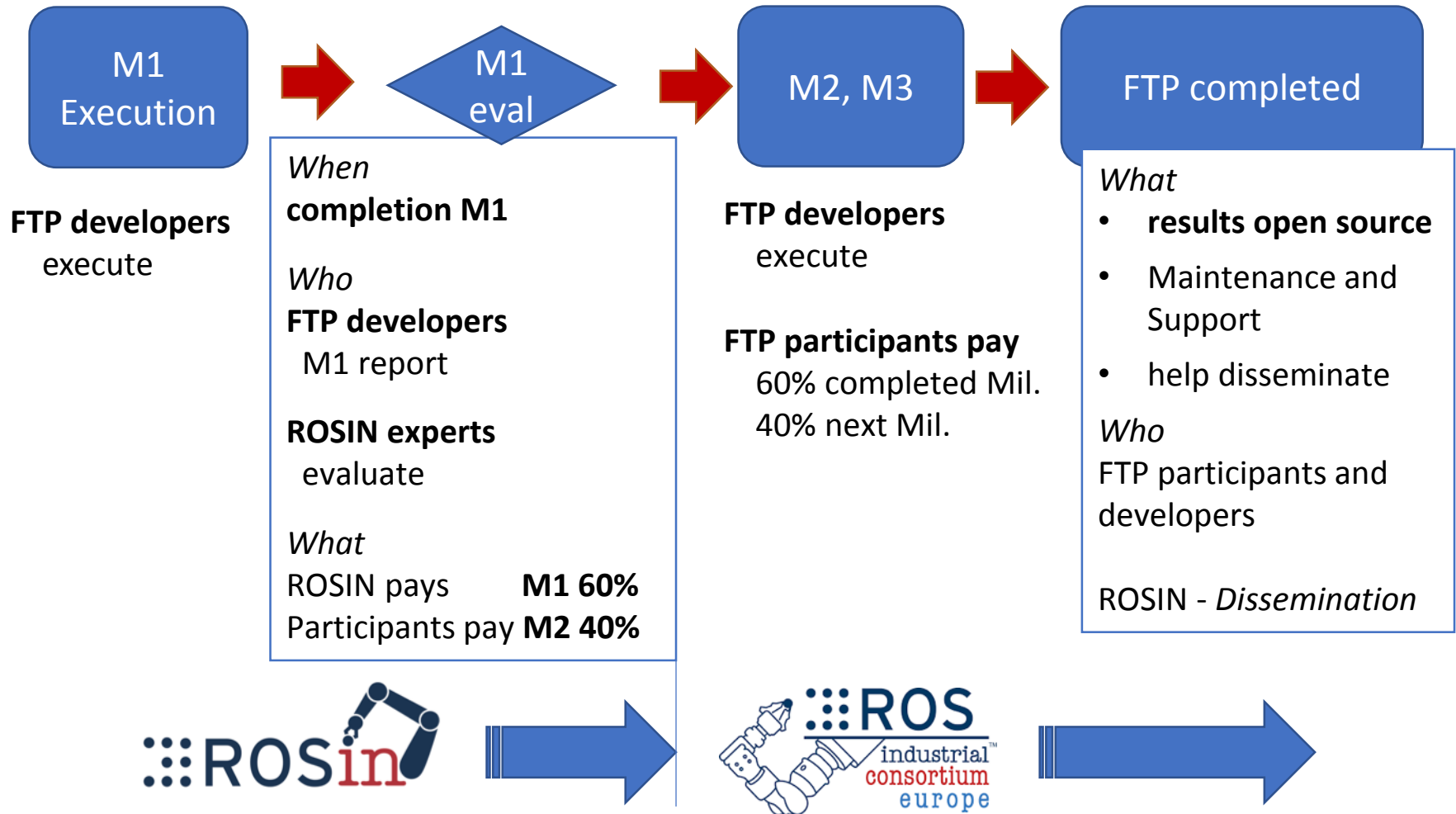- ROSIN grant funds up to **33% of person months of software development**

- Additional project costs are **not considered** when calculating the requested ROSIN contribution

  - hardware

  - travelling

  - demonstrators

Total project budget

total PM

hardware costs
other

33%

Max ROSIN contribution
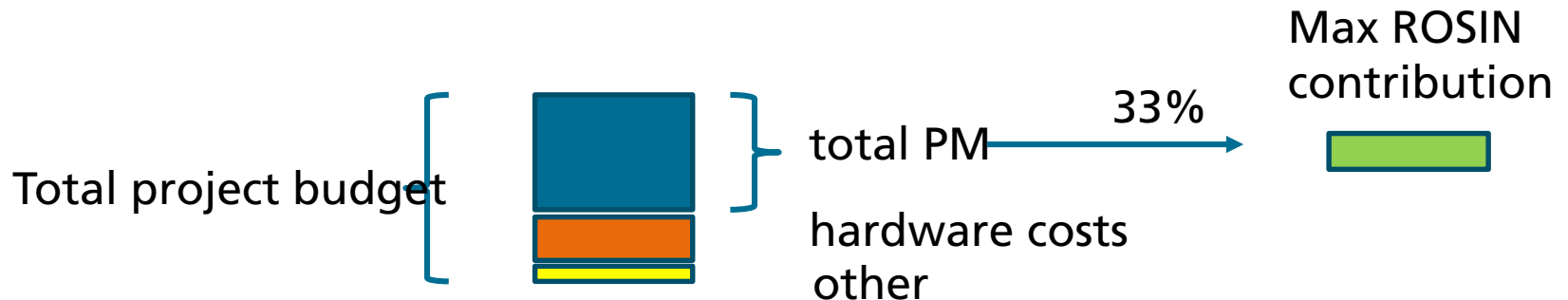
:::ROSin

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

M1 Execution

FTP developers execute

M1 eval

When
completion M1

Who
FTP developers
 M1 report

ROSIN experts
 evaluate

What
ROSIN pays   **M1 60%**
Participants pay **M2 40%**

M2, M3

FTP developers execute

FTP participants pay
 60% completed Mil.
 40% next Mil.

FTP completed

What
- **results open source**
- Maintenance and Support
- help disseminate

Who
FTP participants and developers

ROSIN - *Dissemination*

First results: Ensenso-ROSIf

■ ensenso_driver beta release

http://wiki.ros.org/ensenso_driver

https://github.com/ensenso/ros_driver

4. Acknowledgements

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

ROSIN: ROS-Industrial Quality-Assured Robot Software Components: 🌐 rosin-project.eu 🇪🇺 :::ROSin

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

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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**

- Simple application template:

  - Project description

  - Project implementation plan

  - Commitment to activity sustainability

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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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http://rosin-project.eu/ftps
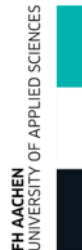
info@rosin-project.eu

http://rosindustrial.org

Supported by ROSIN – ROS-Industrial Quality-Assured Robot Software Components.
More information: http://rosin-project.eu/
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ROSIN Consortium

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