ROSWELD – ROS based framework for planning, monitoring and control of multi-pass robot welding

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PPM Robotics AS

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PPM Robotics AS

PPM Robotics AS “Cutting edge” industrial robotics using ROS I

Project	Type	FlexGui: User friendly UI framework	FlexGui: Factory 4.0 compliance	FlexGui: Upgrade legacy robots	FlexGui: Remote assistance	FlexGui: Rapid project setup	FlexGui: Alarms, notifications	ROS: Core	ROS: Rosbridge	ROS: Rosbag	ROS: Gazebo	ROS: MoveIt	Machine vision	Collaborative	3D visualization, planning	Custom software	Drivers: Robot	Drivers: PLC	Drivers: Laser	Services: Consulting	Services: Training	Services: Built-in Training	Services: Agile development	Services: Graphical design
Exhibition pieces	Entertainment																							
User interface for controller	Industry																							
Exhibition piece	Entertainment																							
Chess Robot	Entertainment																							
Multipass welding	Research																							
Pick&Place demonstration	Research																							
Graphical palletizing	Industry																							
UI for controlling a mobile robot	Research																							
Monitoring a palletizing application	Industry																							
Graphical palletizing	Industry																							
Process monitoring	Industry																							
Palletizing application	Research																							
Pick&Place application	Research																							
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[illegible] interface for existing system	Industry																							
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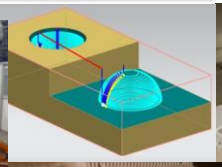
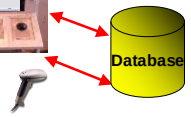
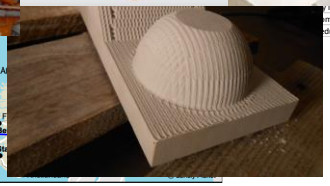
ROS I



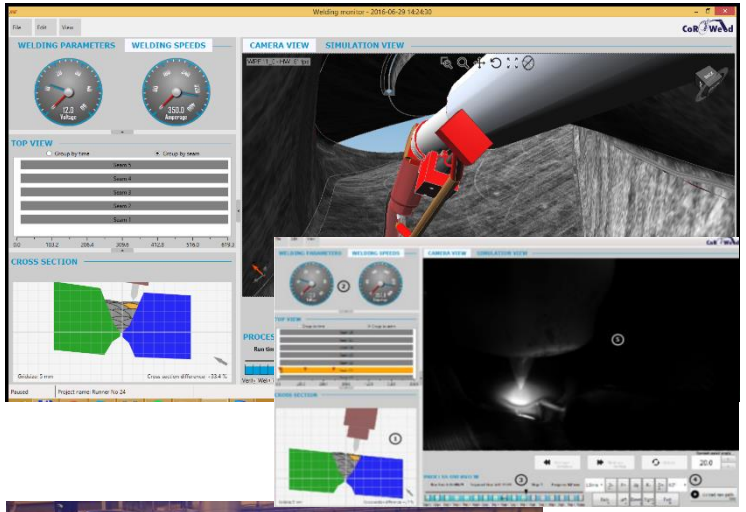




ROSWELD

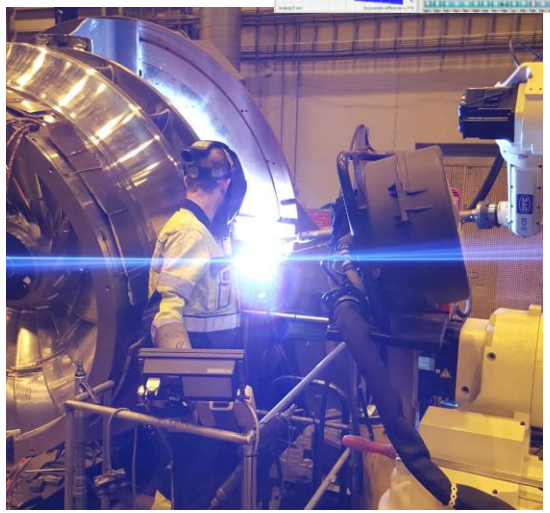
APPLICATION:

Multi-pass robot welding for one-of-a kind production



ROSWELD DEVELOPS:

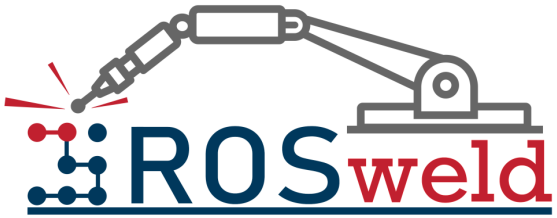
- Innovative ROS based framework for planning, monitoring and control of multi-pass robot applications
- Intuitive, user-friendly GUI



THE FRAMEWORK IS BUILT UPON:

- Components from the project partners' previous research
- Existing ROS technology

FTP ROSWELD



ROSWELD – ROS based framework for planning, monitoring and control of multi-pass robot welding

PROJECT TEAM: three partners from Norway

- PPM Robotics AS – Coordinator, Performer (Champion); High-tech robot system integrator
- Mechatronics Innovation Lab AS; Catapult Centre for industrial robotics in Norway
- Rainpower Norge AS; World wide leader within hydro power turbine design and manufacturing.

DURATION: 12 months, kick-off in June 2018

BUDGET: 304k EUR

ROSIN SUPPORT: 100k EUR

PROJECT GOAL

SOFTWARE AT INDUSTRIAL QUALITY LEVEL:

- ROSWELD aims to develop a planning, monitoring and control software suite on industrial quality level, for heavy industrial robot applications
- Components will partly be open-sourced and uploaded to the ROS community to be further applied in R&D and industrial applications
- Documentation and training material will be made available.

INDUSTRIALLY VERIFIED AND DEMONSTRATED:

- Pilot case at Rainpower AS (Oslo, Norway)
- Generic setup at The Mechatronics Innovation Lab (Kristiansand, Norway)

REFERENCE PROJECT FOR ROS-INDUSTRIAL:

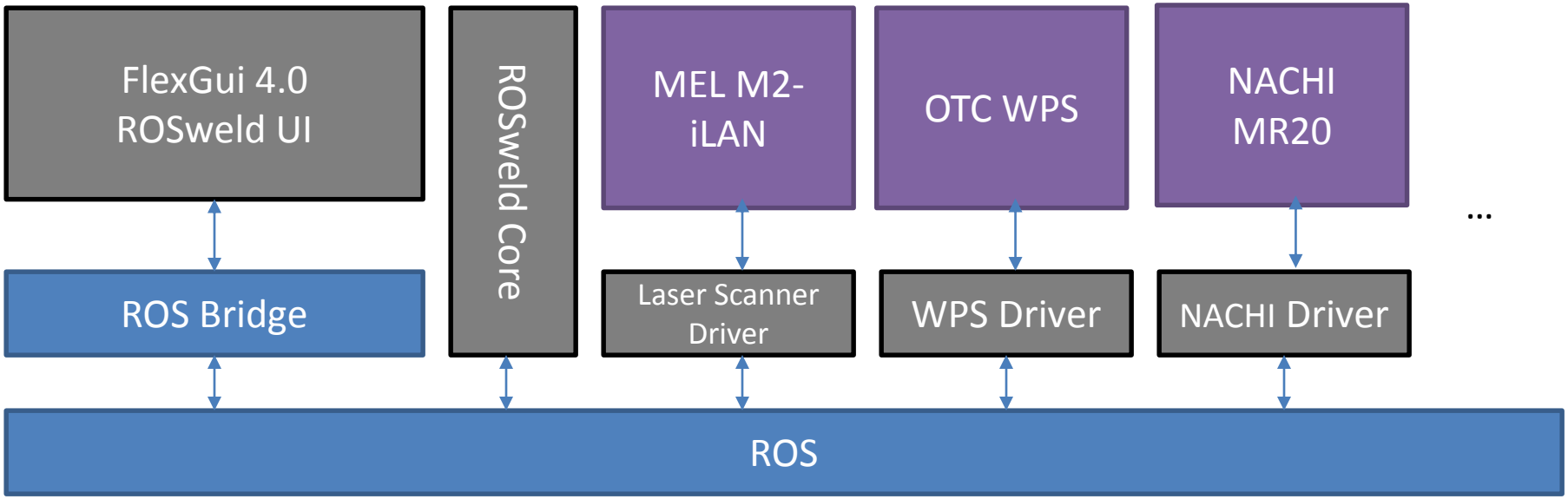
- International showcase to demonstrate the power of ROS on a best practice example

GENERAL SOLUTION

- General interface for different vendors: modular, easy to replace hardware components
  - Robot: **NACHI/OTC**, Hyundai, MoveIt!
  - Welding Power Sources (WPS): Fronius, **OTC**
  - Arc sensor: Fronius, **OTC**
  - Touch sensor: Fronius, OTC
  - Laser scanner: MEL M2-iLAN
  - Welding camera: BlackMagic Design Intentsity Shuttle HDMI/Svideo digitalizer, Cavitar Cavilux, Cognex
  - IP camera: any mjpeg stream over http capable network camera
- The main concept is welding, but based on the main planning interface and drivers, it can be extended to grinding, polishing, painting, cutting or machining

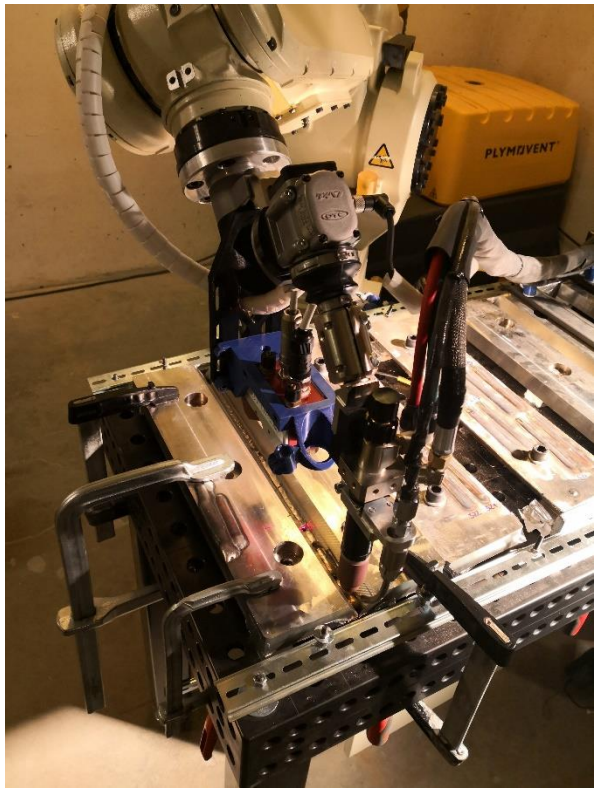
SYSTEM STRUCTURE

- Following the ROS System Structure
- Each driver/component is a NODE and offers the same functionality (topics and services) in a driver group (robot, WPS, sensors)
- ROS: general and robust communication layer and standards for the different modules
- Used ROS main components: MoveIt!, Rviz, RobotWebTools ROS3d.js, PCL, pyros, rosbridge



LAB SETUP

- NACHI MR20 7-axis robot
- OTC DA300P Welding Equipment
- MEL M2-iLAN laser scanner
- Cisco WVC210 IP Camera
- Asus VivoPC VM62 server
- Samsung Galaxy Tab / Windows laptop clients



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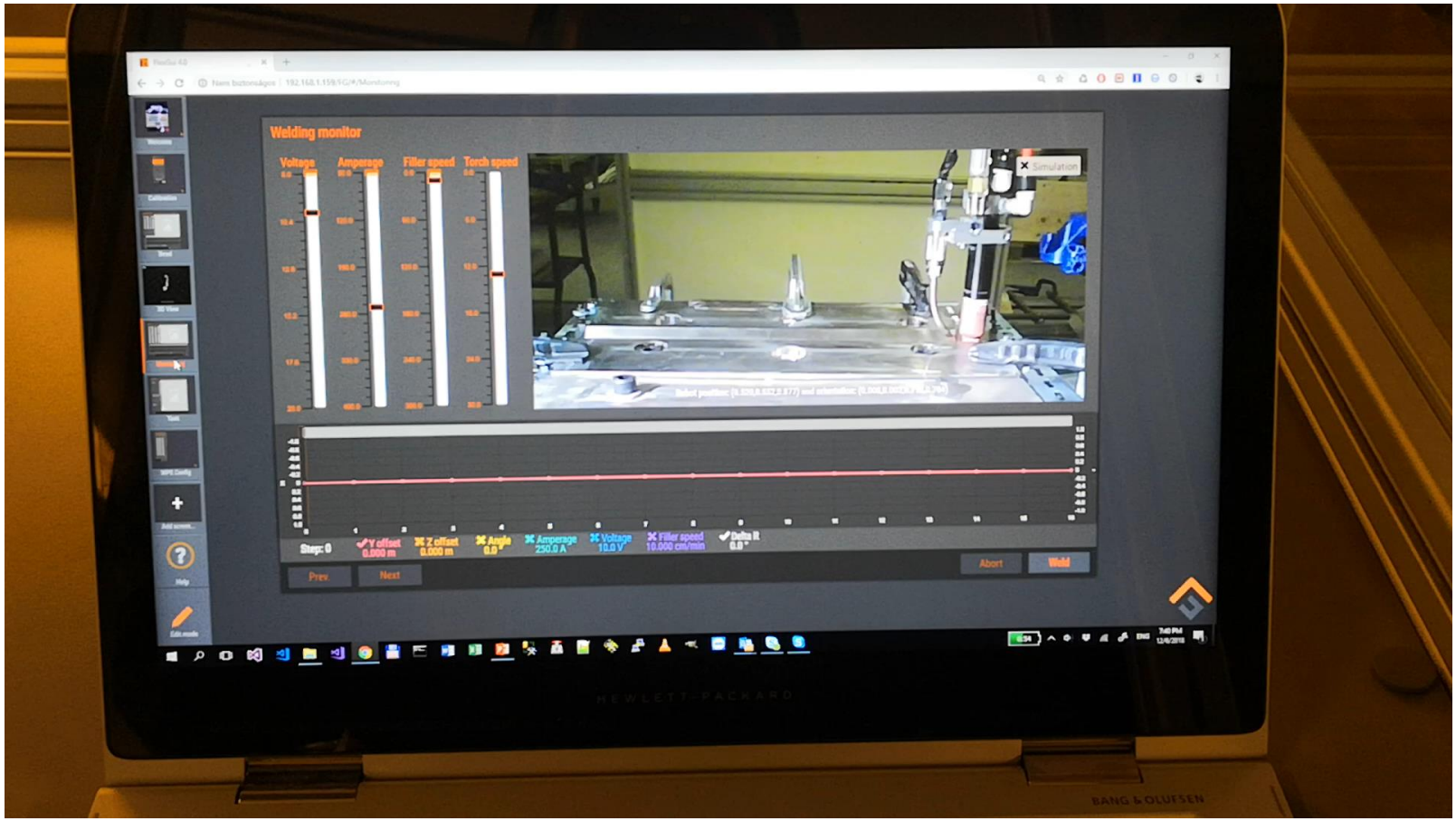
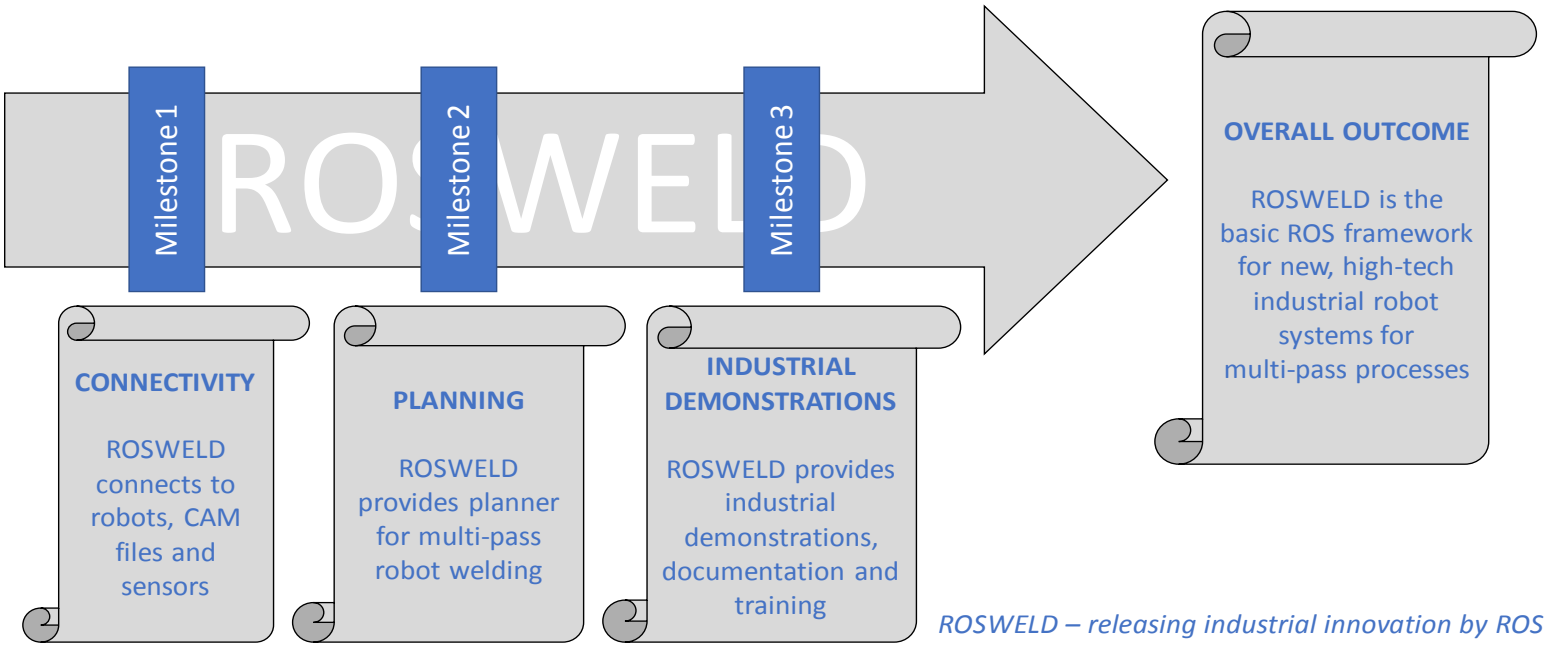

Welding monitor
Voltage
Amperage
Filler speed
Torch speed
Simulation
Prev
Next
Abort
Weld

MILESTONES

ROSWELD – using robot welding as target demonstration, to create general software framework for high-high tech industrial robot applications



ROSWELD – releasing industrial innovation by ROS

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