INSTITUT MAUPERTUIS

PRODUCTION

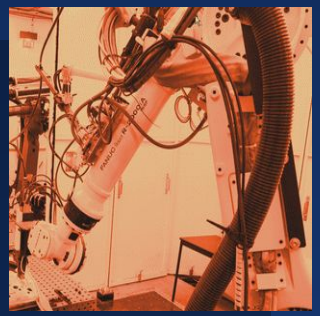
INNOVATION

ROS-Industrial
industrial_calibration

Innovating engineering projects

RFID technologies

Robotic Process Automation



Welding, cutting, laser cladding

Robotic Friction Stir Welding

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in INNOVATIONS PRODUCTION

Context 1/2

- David SLS-2
  - Structured light 3D sensor
  - Projector + camera
  - Camera can me moved closer/further to the projector to scan small/big objects

- David SLS-2 sensor integrated into PCL

Context 2/2

- Mounting the sensor on the robot is easy :

Extrinsic calibration

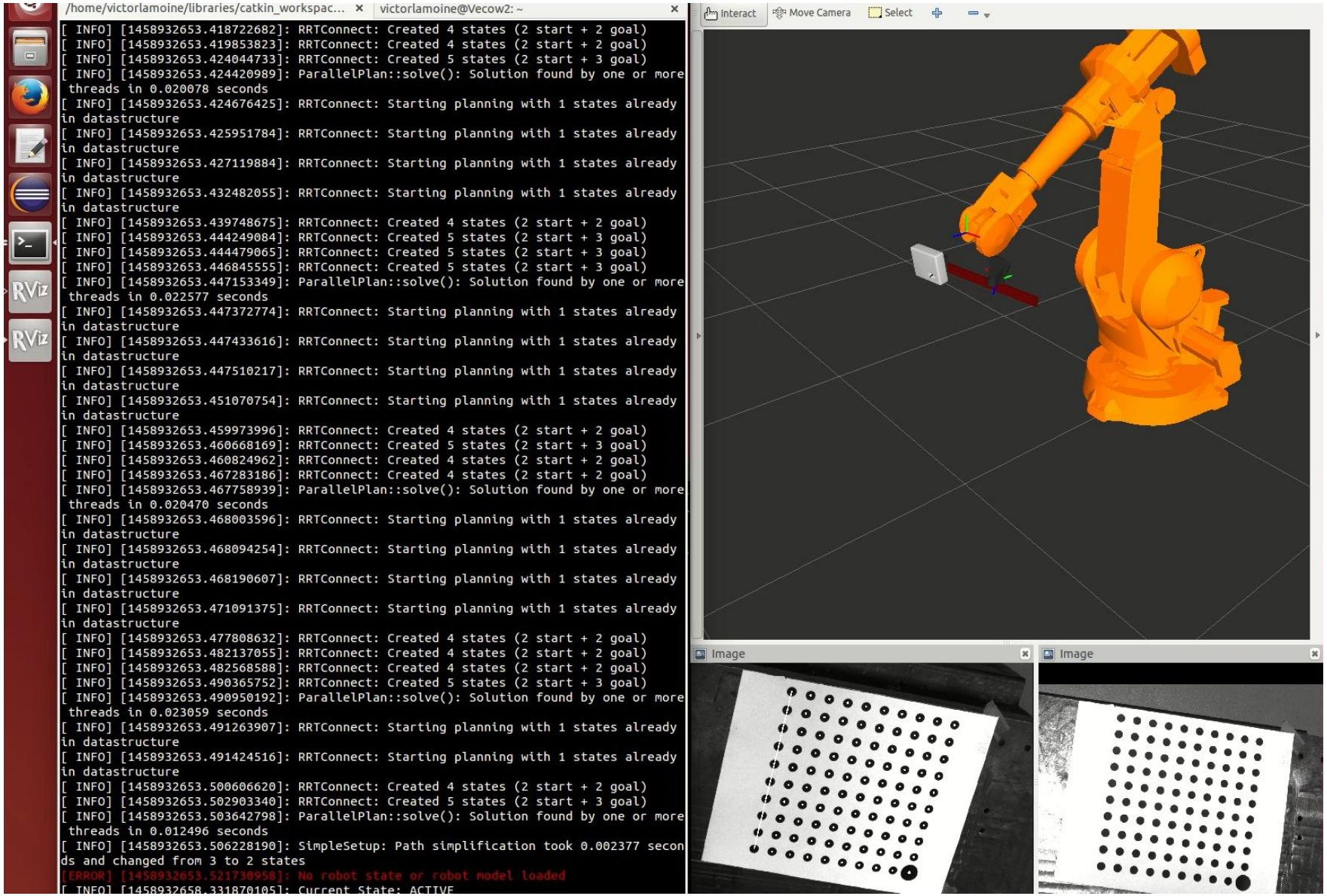
- To use the sensor we need to calibrate the sensor on the robot :
  - Where is the sensor in regards to the robot tool?
  - It allows to get sensor data in the robot frame
- Extrinsic calibration

- 1 week training at SwRI « how to use the calibration package »

What has been done

- Mounting the David SLS-2 sensor on the SwRI ABB IRB robot
- Tweaking godel calibration packages to use them for the SLS-2
- Writing a node that publishes SLS-2 images
- Defining a new trajectory for the SLS-2 (caljob)
- Printing a new target that fits the SLS-2 field of view
- Running the calibration !

RViz + terminal



Problems encountered

- Axis in the David SLS-2 definition were wrong : the X, Y, Z axis must be defined in the right order. (not documented from what I know)
- Target was not detected :
  - Debug the OpenCV detection node
  - Target was too close!
- Wrong YAML configuration
  - YAML is hard to debug
  - Wrong target type

Personal opinion

- Calibration is a **KEY** package in ROS-Industrial.
- Pros:
  - It works!
  - It is sensor/robot agnostic
  - You don't need to understand the underlying optimization to use it
- Cons:
  - Documentation/tutorials are bad (or missing!)
  - Code needs some cleaning (simplification)
  - A lot of tweaks needs to be done in the YAML / launch files
  - Organization of the code could be improved
- It would be nice to have a simple GUI (I think it already exists)

Institut Maupertuis

The Institut Maupertuis is a technological research center in production and mechatronics. The institute guides companies into products and production tools innovation by making skills, production tools and methods available to them.

Innovative engineering projects
Guidance into collaborative technical focused projects : research of industrial or academical partners, seeking for funding, project management.

Neutral technological consulting
Consulting on production technologies and industrial applications : RFID, automation, monitoring, sensors ...

Consulting in processes automation
Technical and economical feasibility studies, prototypes. National expert for the RobotStart PME program

Expertise in laser processes
Industrial consulting, tests on laser platform, qualification, prototypes : Welding, cutting, cladding, 3D cutting, polishing, surface finishing.

Friction Stir Welding
Expertise in robotic FSW assembly

L'association s'inscrit dans la politique régionale de soutien à la recherche appliquée et à l'innovation. Son pilotage est assuré par des personnalités industrielles locales en partenariat avec l'UIMM Bretagne et le CETIM. L'association est soutenue et subventionnée par l'Union Européenne (Fonds FEDER), la Région Bretagne, le Conseil Général d'Ille et Vilaine et Rennes Métropole. L'Europe s'engage en Bretagne avec le Fonds Européen de Développement Régional.

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