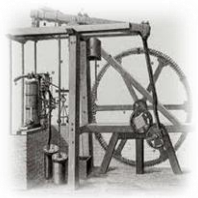


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SERVICE ORIENTED APPROACH IN FLEXIBLE MANUFACTURING USING ROBOTS

George Papanikolopoulos
CASP S.A.

OUTLINE

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- Service Oriented Architecture Overview
- Robot
- Dexterous Gripper
- Flexible Gripper
- Mobile Unit
- Vision Systems
- Conclusion

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SERVICE ORIENTED ARCHITECTURE OVERVIEW

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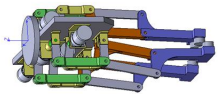
Robot Controller

TCP/UDP/IP

Robot Service

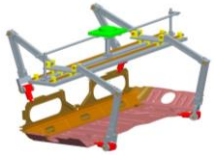
XML-RPC



Motor Drivers

Flexible Gripper Service

XML-RPC



Motor Drivers

Dexterous Gripper Service

XML-RPC

ROS Communication Framework

XML-RPC

Ontology Service

HTTP

Semantic Repository

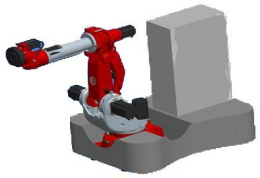
XML-RPC

Vision Service

GigaEthernet/ Firewire

XML-RPC

Mobile Unit Service



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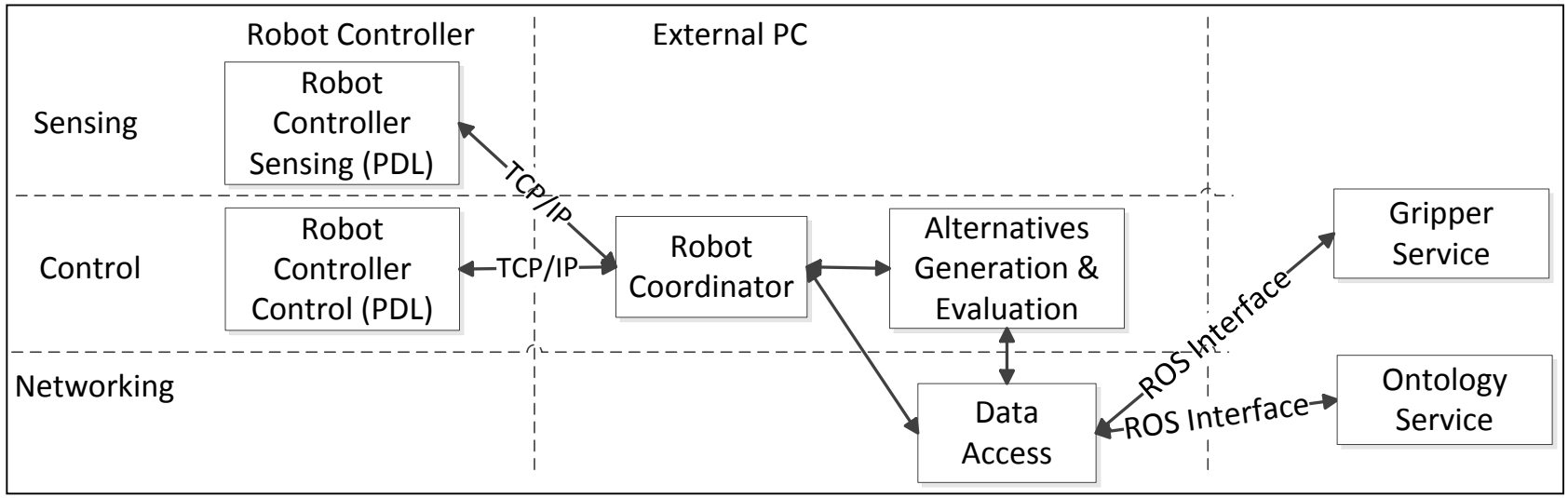
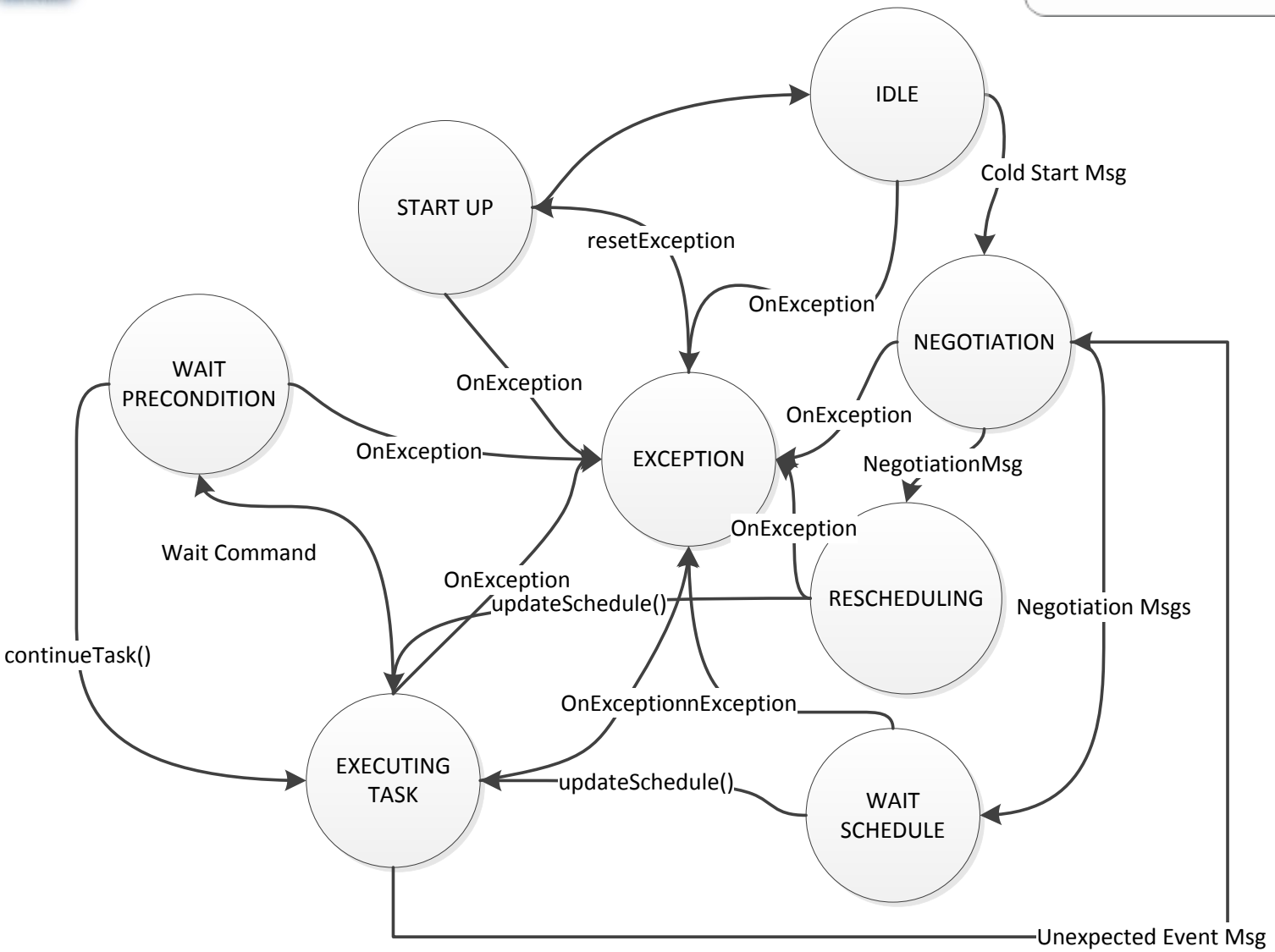
ROBOT SERVICE

Software Architecture



ROBOT SERVICE

State Diagram



GRIPPER SERVICE

Software Architecture

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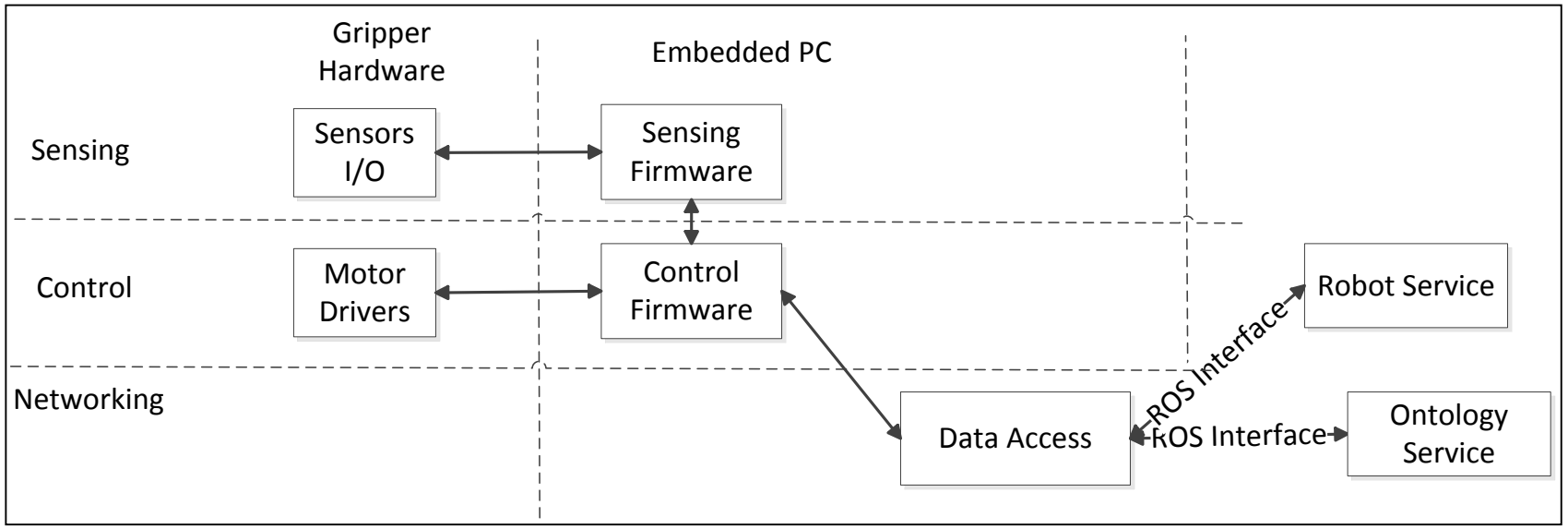

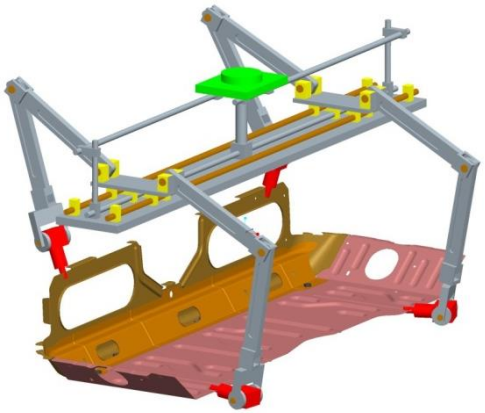

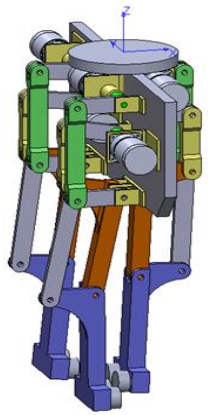

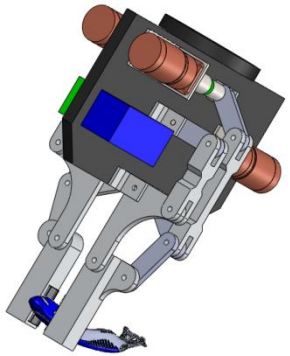

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MOBILE UNIT SERVICE

Software Architecture

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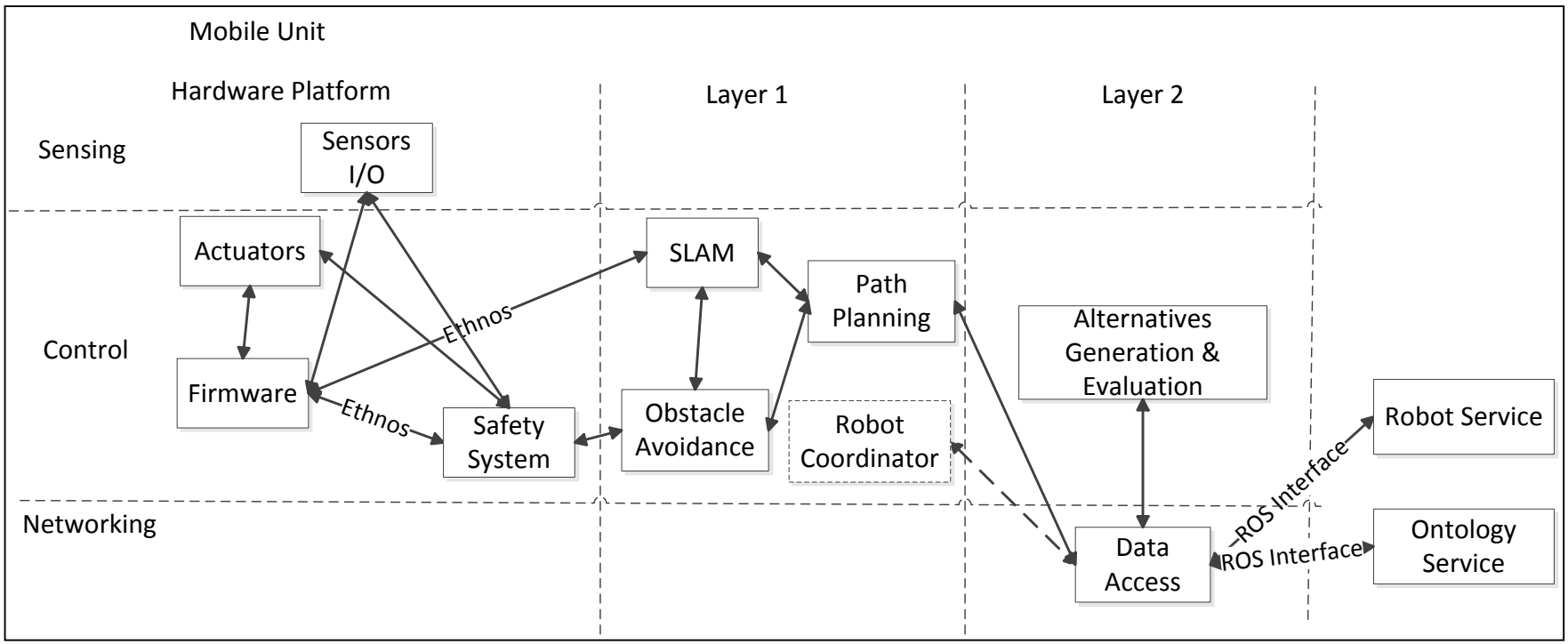

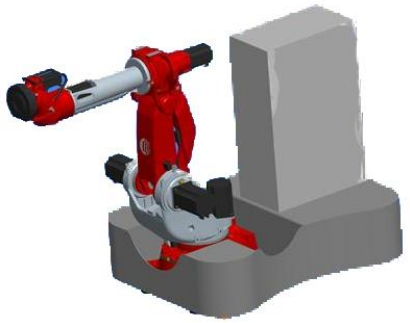

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VISION SYSTEM SERVICE

Software Architecture

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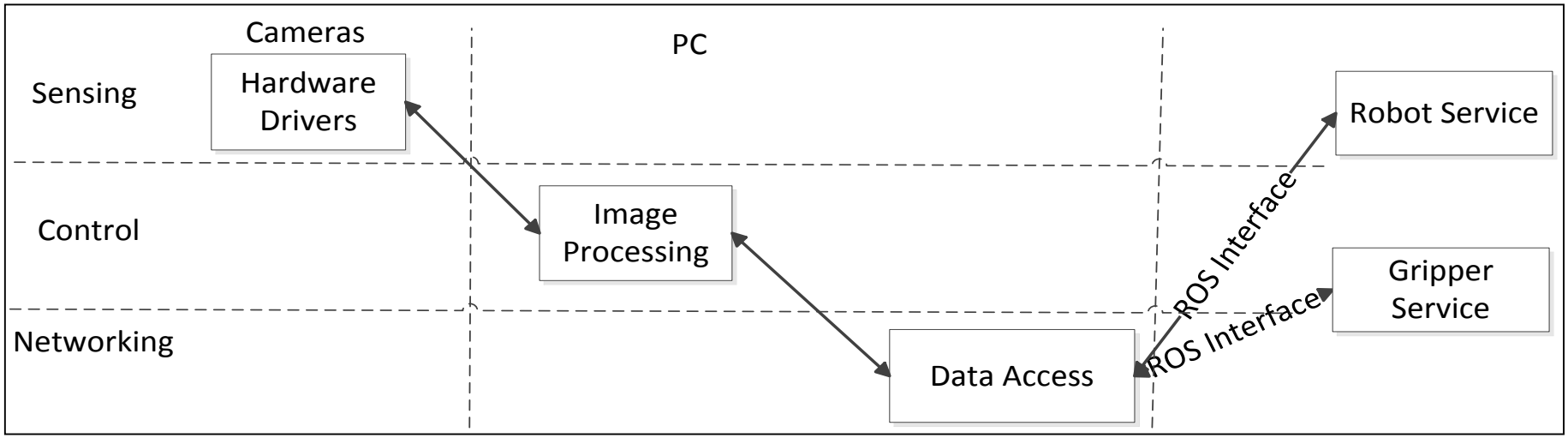

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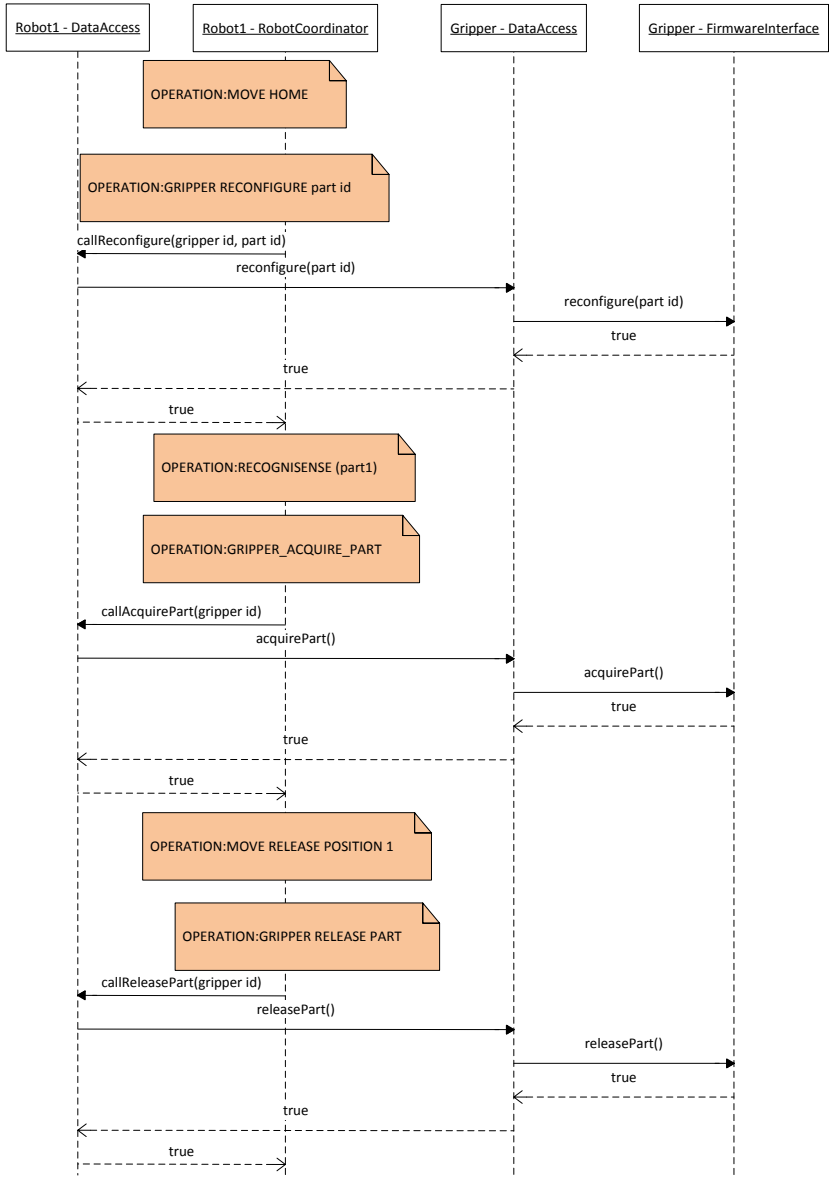
GRIPPER COMMUNICATION SEQUENCE DIAGRAM



CONCLUSIONS

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1. Autonomy

- ✓ Autonomous cooperative system.
- ✓ Each resource has its own interface and is completely independent.
- ✓ No master – slave relationship between the machines.
- ✓ No resource will play the role of the supervisor during the whole process.

2. Online Dynamic Scheduling

- ✓ Dynamic process plan.
- ✓ When any resource fails, all the others will be informed and one will be responsible for *rescheduling* the process plan.
- ✓ Thus, another resource will replace the broken down one and do its tasks.

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ACKNOWLEDGEMENT

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This research has been partially supported by the research project AUTORECON, http://www.autorecon.eu funded by the European Commission under the Factories of the Future programme.

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Thank you for your attention!

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