

AMARSi

Adaptive Modular Architectures for Rich Motor Skills

www.amarsi-project.eu

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HARTING TECHNOLOGY GROUP

Rich Motor Skills (RMS): a pertinent research question

Scientific project hypothesis:

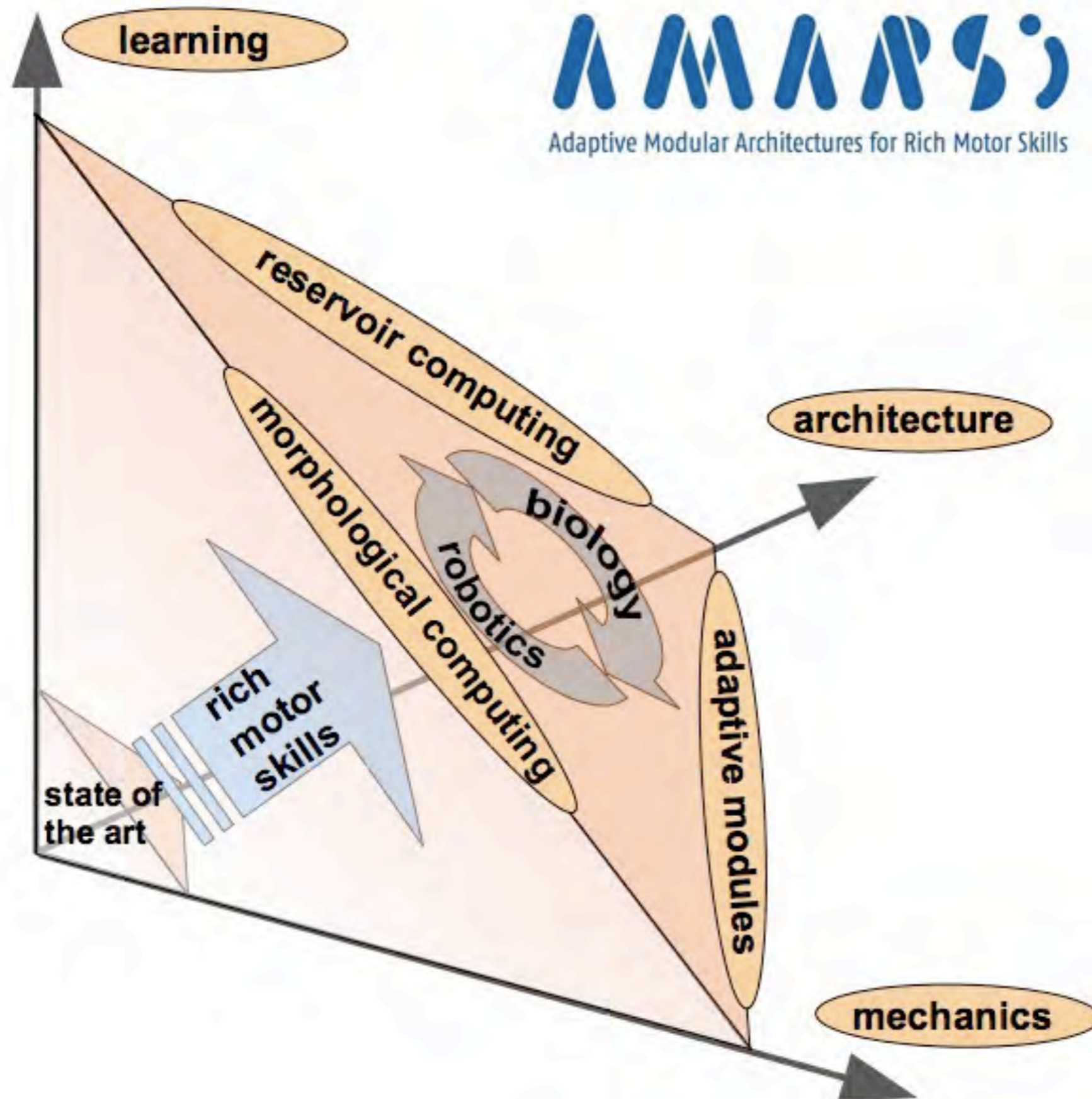
RMS by means of modular architecture, learning, and compliance with dynamical systems as building block for adaptive motor primitives.

Objectives of the call 7:

- (...) endow robots with (...) **action capabilities**
- scientifically **grounded** system **architectures** (...)
- Demonstration through suitable **experiments** (...)
- natural **interaction with people**
- (...) more **robust, flexible, effective, natural** (...) **safer and more autonomous** (...)



Adaptive Modular Architectures for Rich Motor Skills



MAR: 3.2 Adaptability (System Abilities)

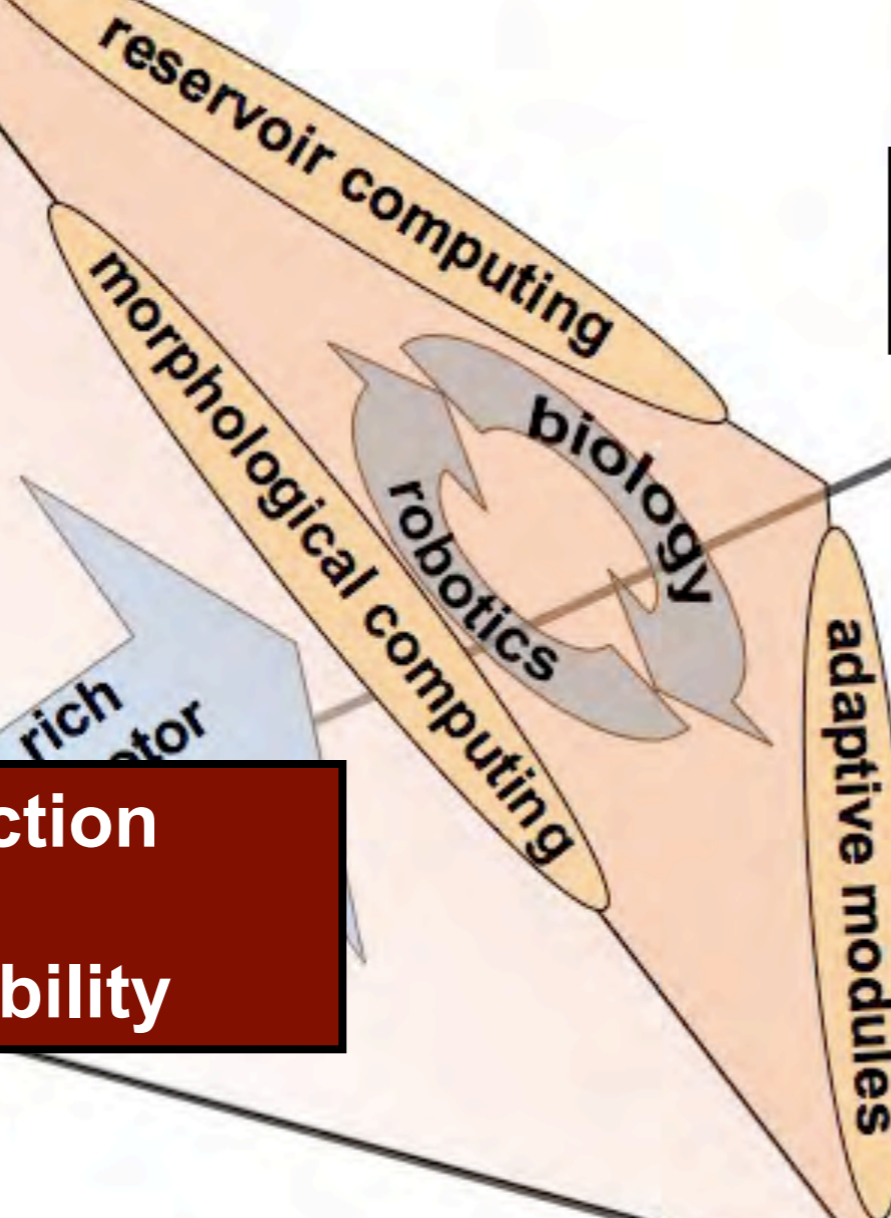


Adaptive Modular Architectures for Rich Motor Skills

**MAR: 4.2 Model Driven
Engineering, 4.7 Cognition**

**MAR: 3.3 Interaction
Capability,
3.5 Motion Capability**

**MAR: 4.4 Mechatronics
(Technologies)**



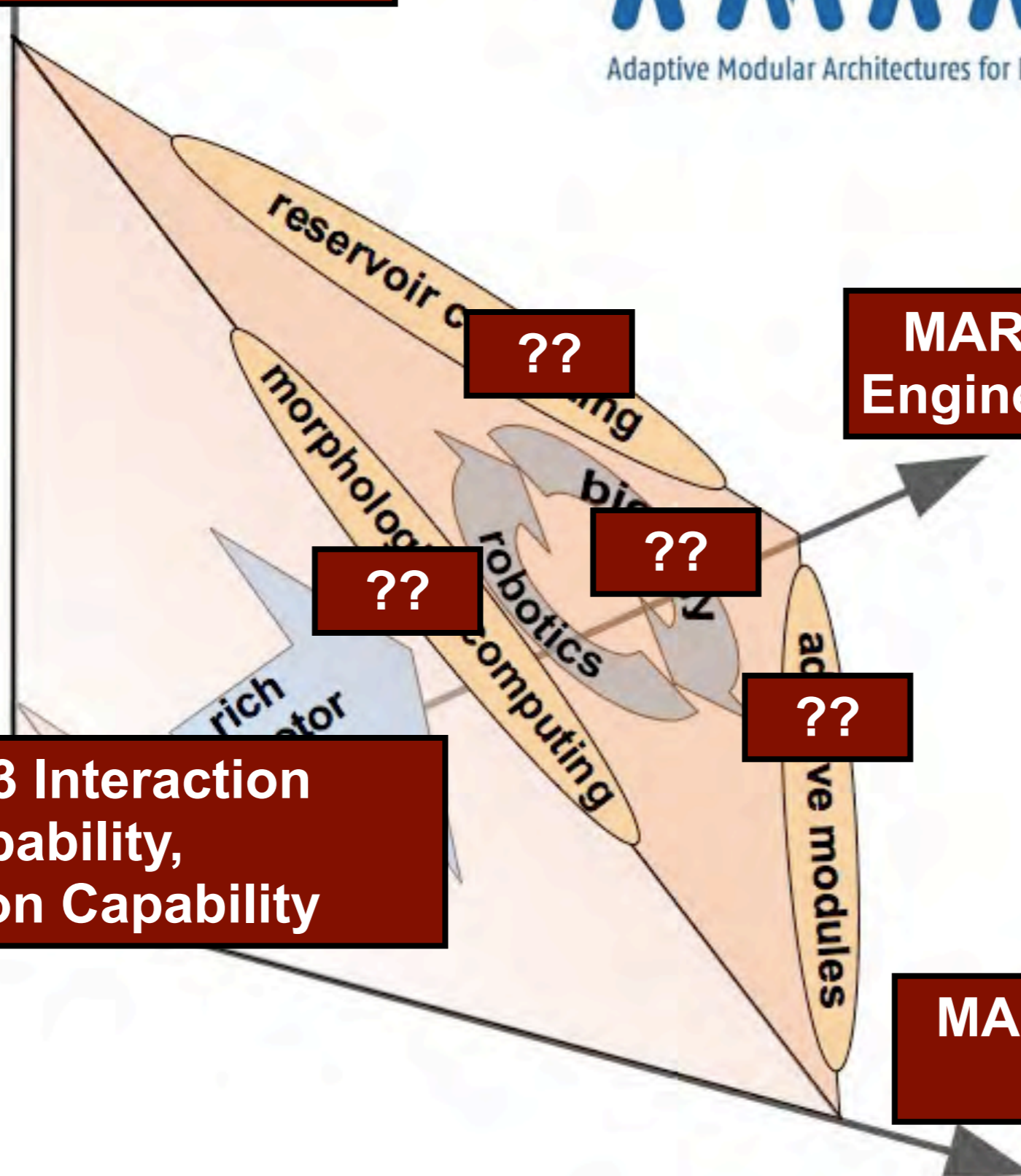
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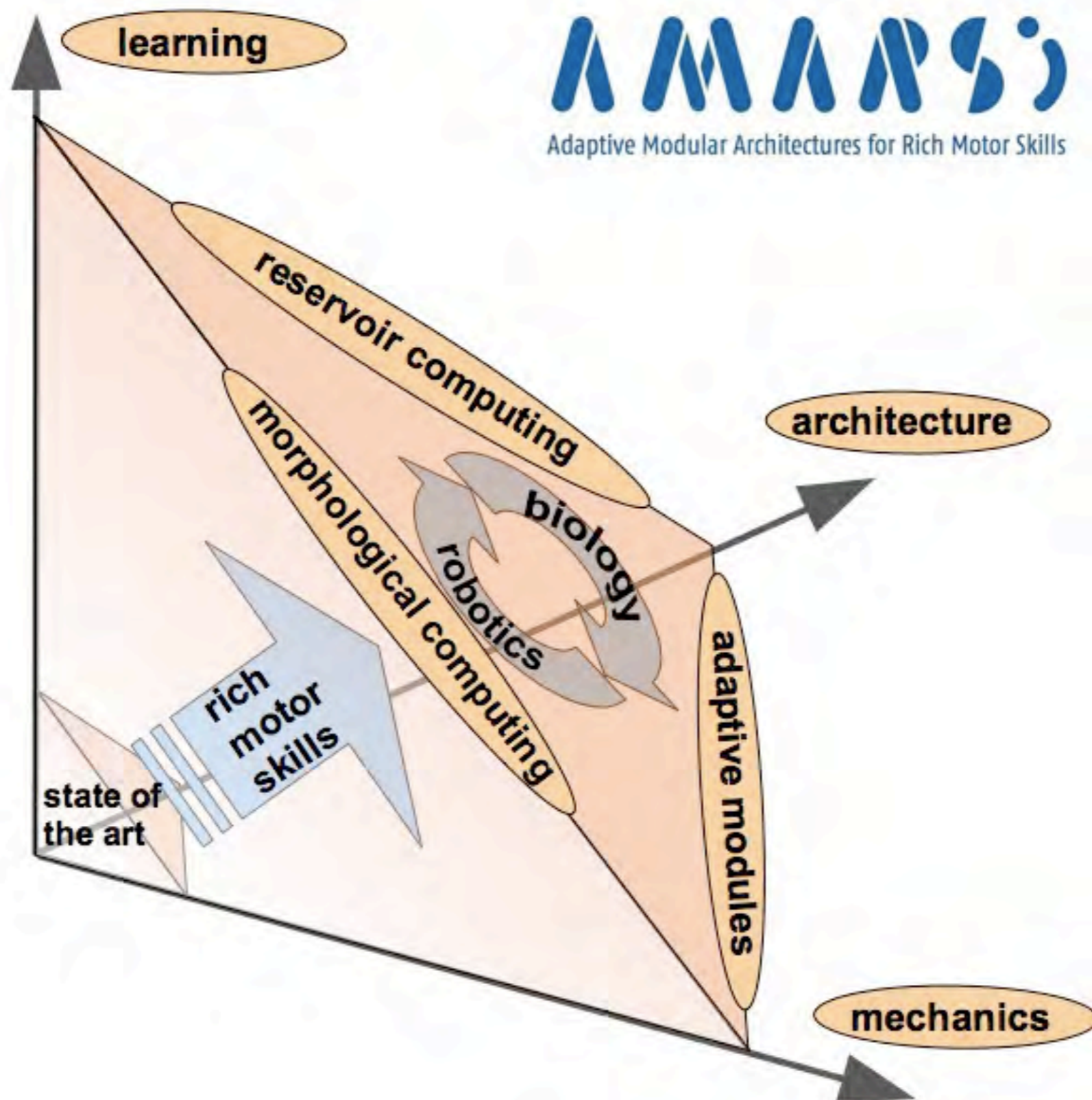
10 Partners, 6 countries, 4 years, 1052 PM

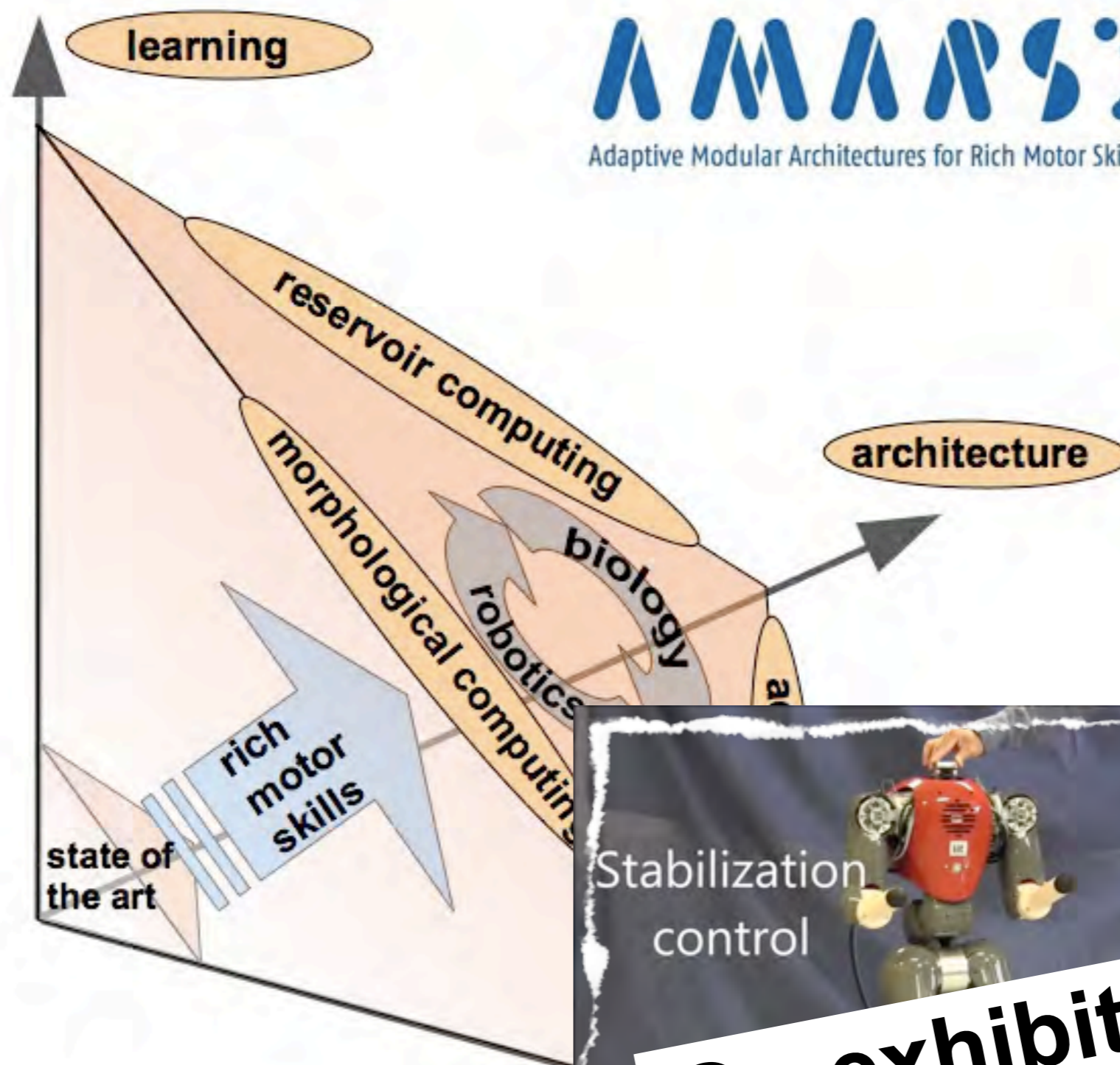
7 Mio EU-contribution

Does AMARSi make a difference ?

or

**Does AMARSi achieve a
“step-change” in motion capability ?**



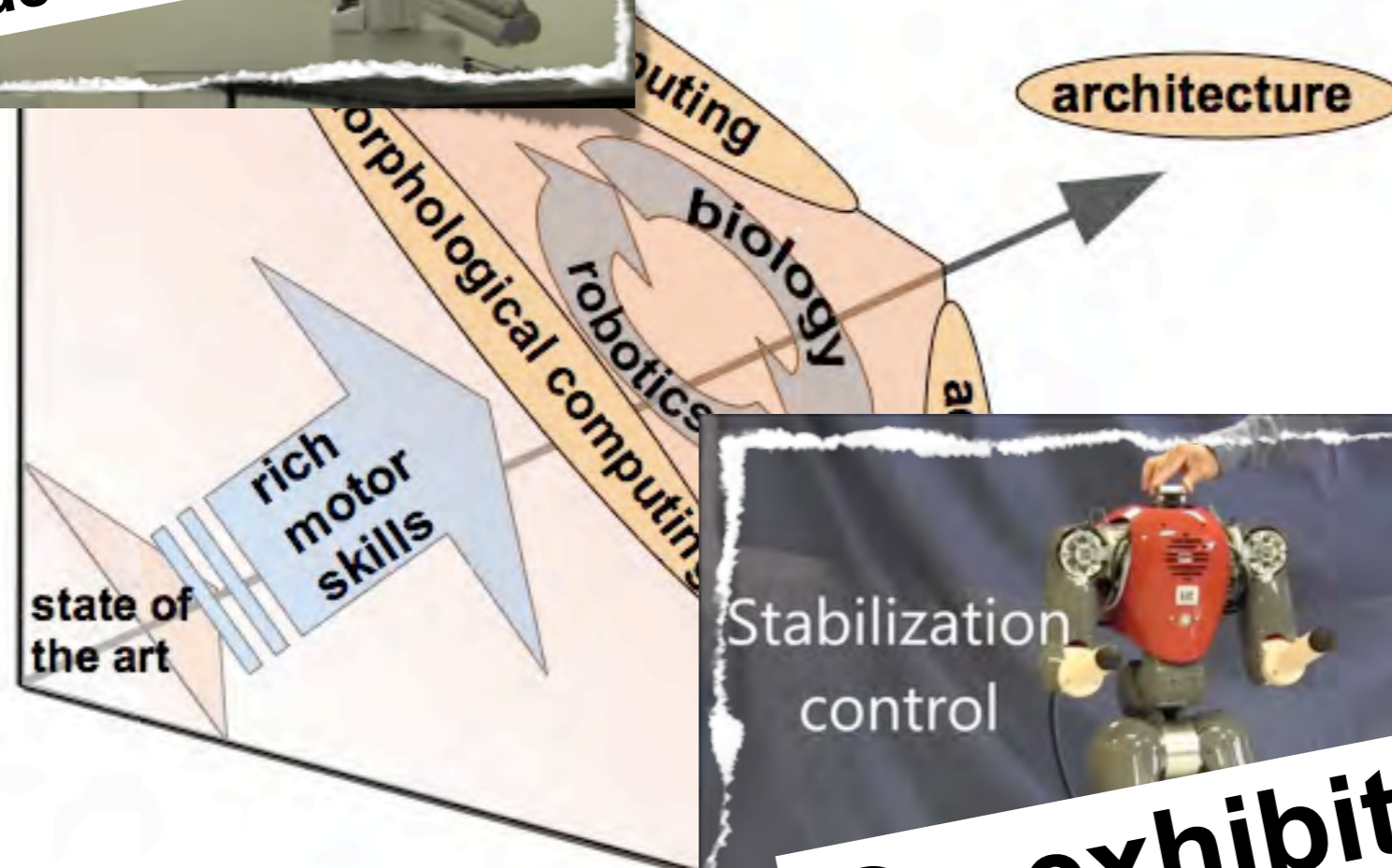


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Plenary talk ICRA
by Aude Billard

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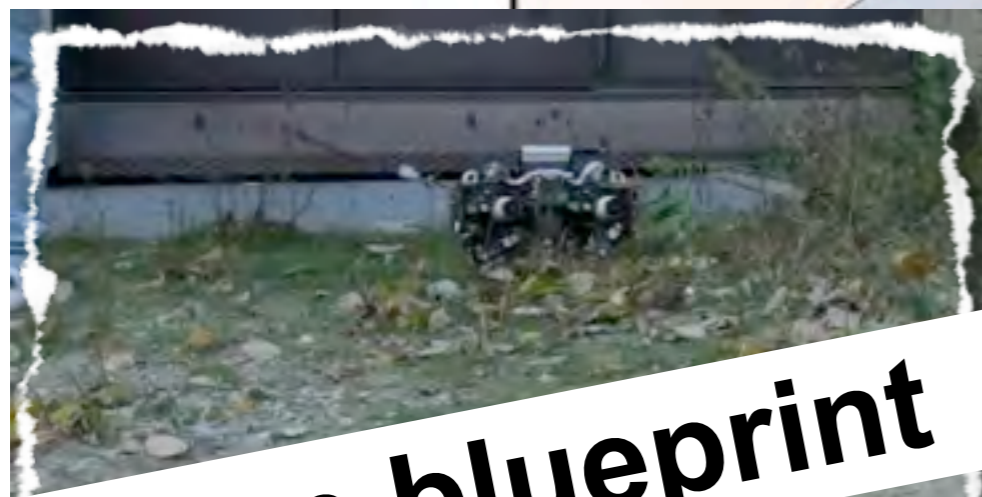
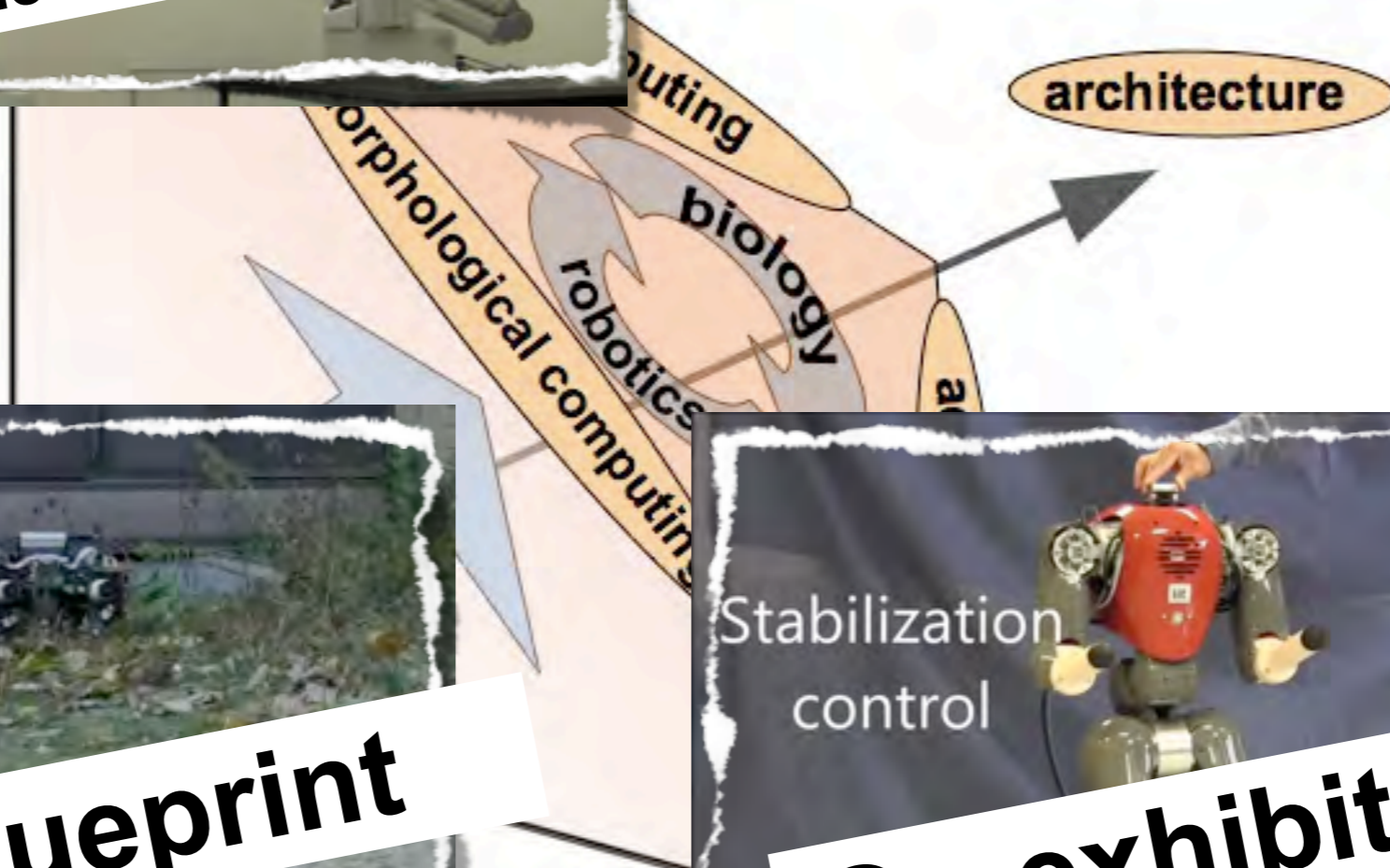


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Open blueprint



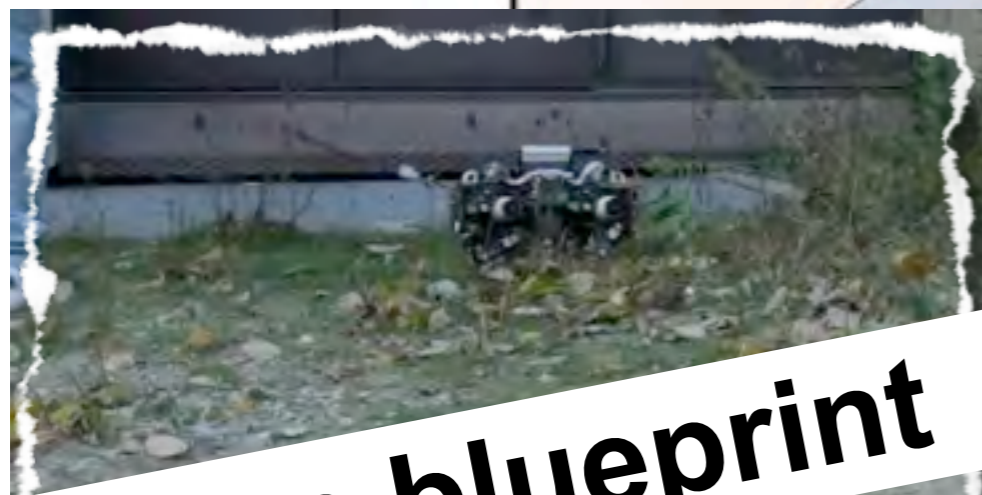
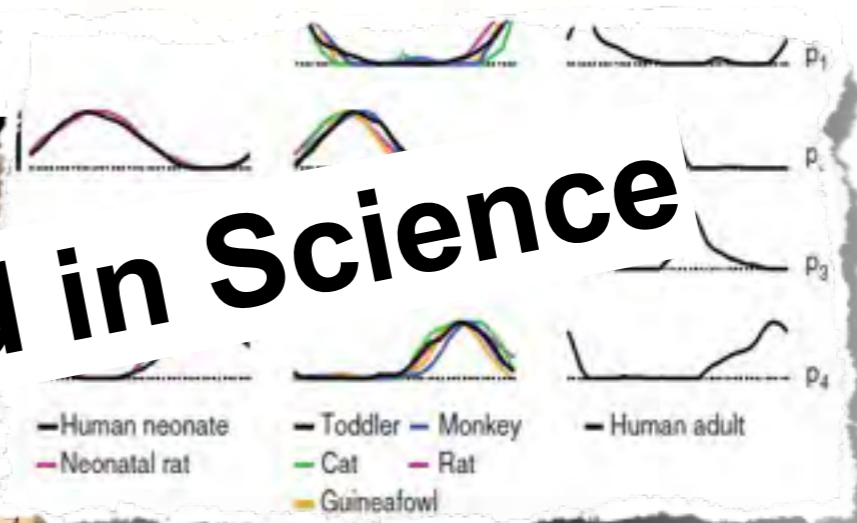
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Published in Science



Open blueprint



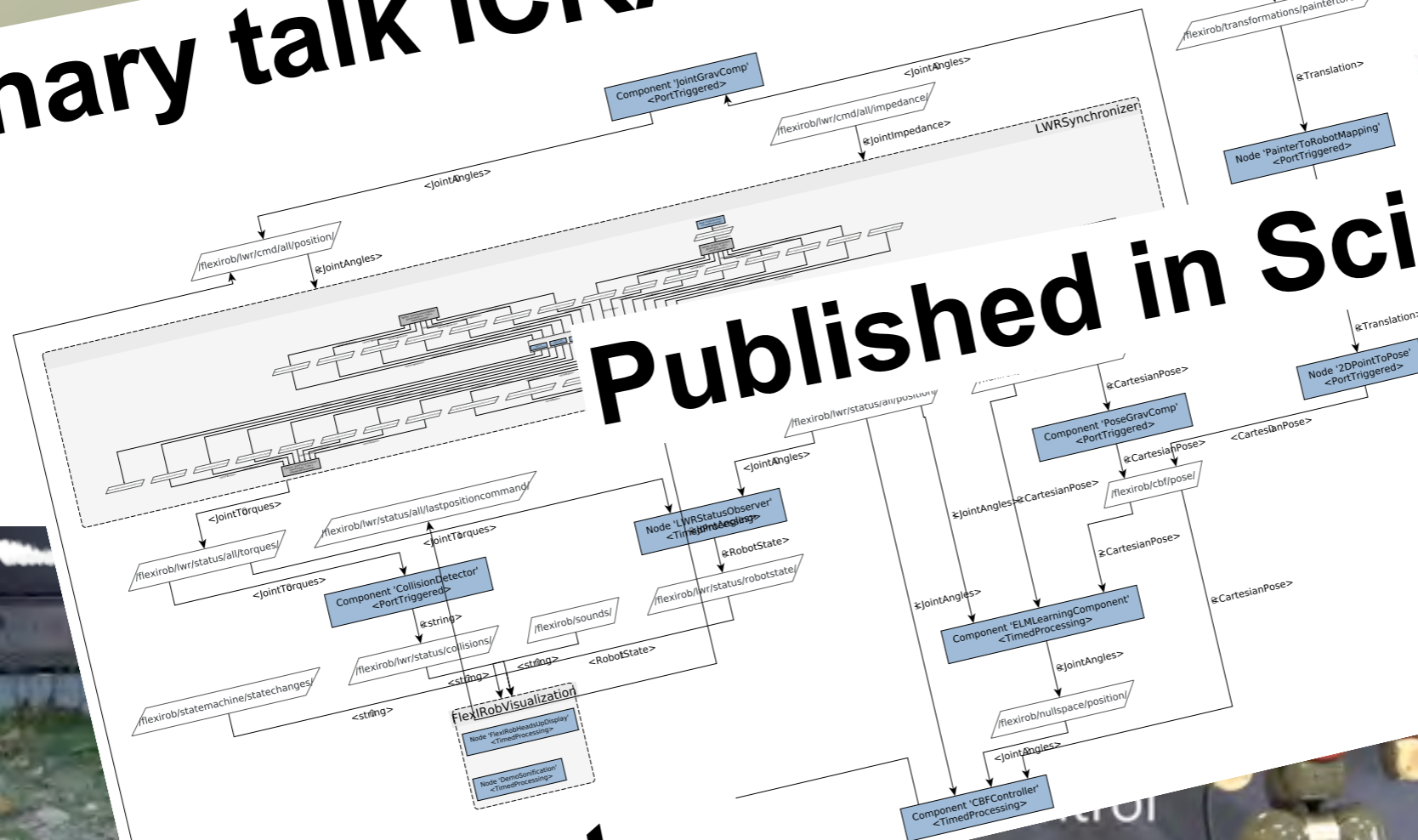
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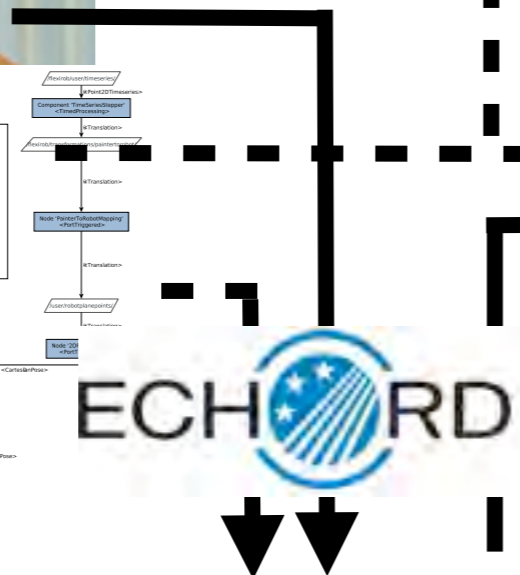
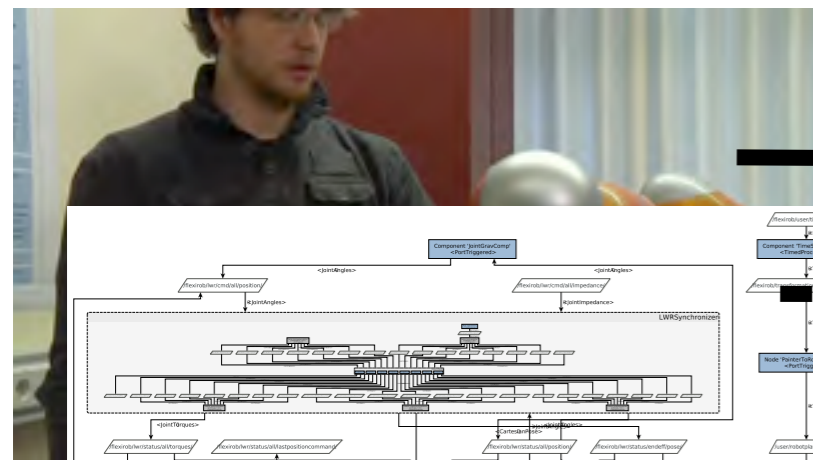
Scientific impact

- 210** scientific publications (and counting)
- >100** journal paper* (from the 210 total)
 - >1** paper per 5 PM
- > 200** dissemination events (e.g. scientific talks)
- ~ 10.000** unique visitors to website from 110 countries
- > 17.000** views youtube watching **> 140 h** video
- ~ 48.000** website views

* Science, PLoS One, Front. Comp. Neuroscience, Trans. Robotics, Front. Neurorobotics, Biological Cybernetics, Neural Computation, J. Neurophysiology, Trans. Robotics, PLoS Comp. Biology, J. Vision, Exp. Brain Res., Neurocomputing, J. Sport and Exercise Psy., Physica D, Artificial Life, J. Automation and Computing, Advanced Robotics, ASME Trans. Mechanisms Robotics, sJ. Robotics Research, Front. Movement Disorders, J. Human-Robot Interaction, Autonomous Robots, Acta Psychologica, J. Computational Science, Cerebral Cortex, Robotics Autonomous Systems, Trans. Neural Networks Learning Systems, Neural Networks, ...



Innovation and competitiveness



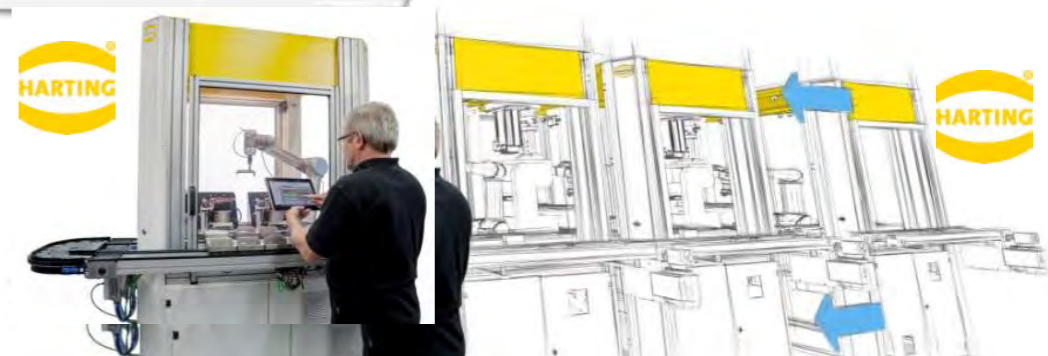
transfer
projects



SME
projects



own resources



2015-17



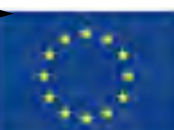
2009

2010-2014

2012

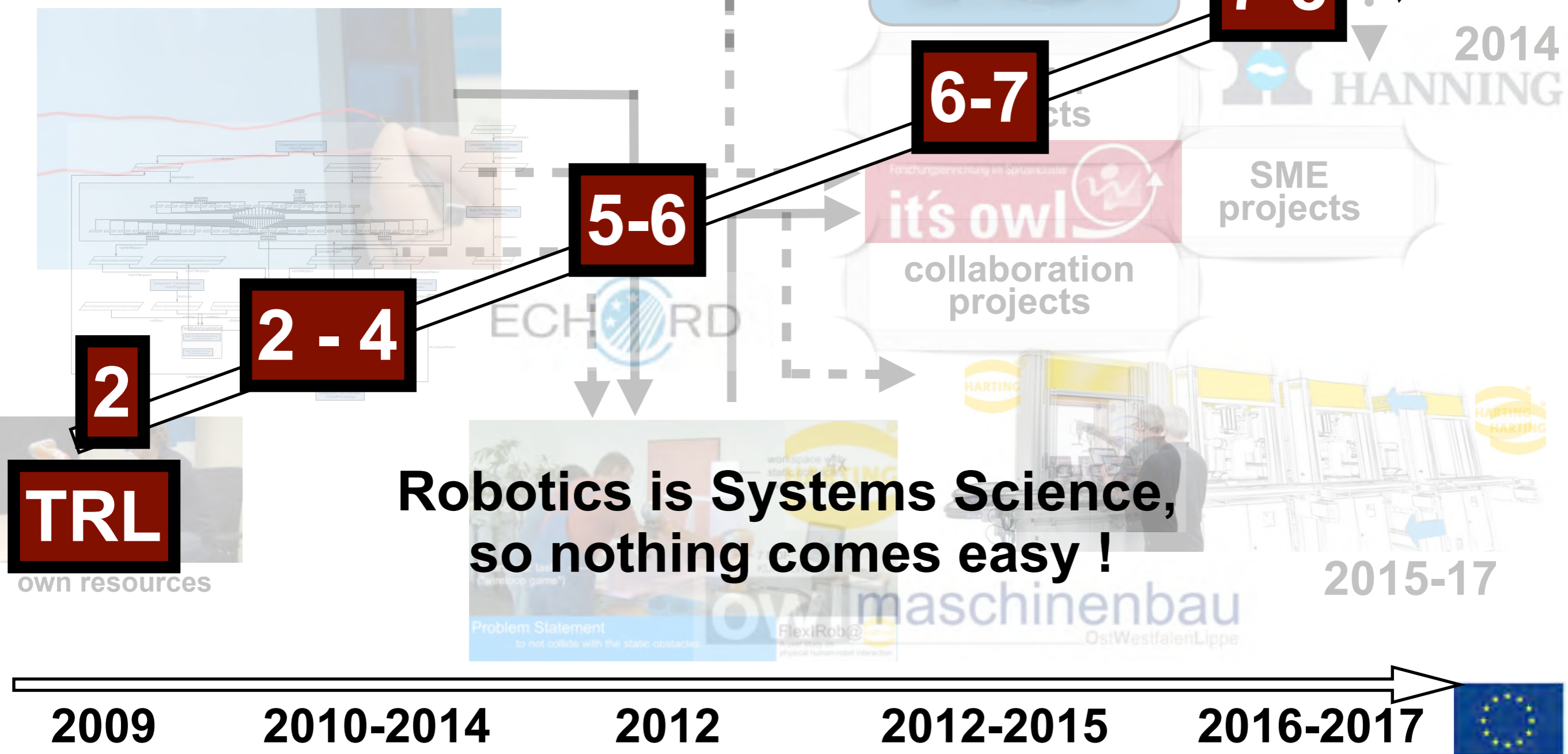
2012-2015

2016-2017





Innovation and competitiveness







Family owned hidden champion.

Machinery & Robotics



People



Transportation



Energy



Power



Partnership



Industrial Network Infrastructure



Automation

Embedded Computing Systems



Medical

Broadcast and Entertainment

**turnover 2012/2013
484 million Euro**

**more than 3800
employees**

Some lessons on impact & transfer:

Did we plan it ? ***No. But we seized opportunities.***

Did the workplan foresee the results ? ***Mostly not !***

(not walking COMAN, not DSL language, not catching objects in flight, not to find out that we are quadrupeds at birth, not transfer of interaction capabilities, ...)

Can you plan it ? ***I don't think so. But provide opportunities.***

Why did it work ? ***People. (As Gisela Eickhoff).***

Why often not ? ***People. Management capacity.***

We tried many NOT successful things !

My account: ***science is the key,
trust your researchers,
application domains of minor importance,
sustain transfer chains,
educate people.***

Thanks to the project team !

Thanks to George and Juha, and the reviewers !

Thanks to Gisela Eickhoff and the Harting Technology Group !

Its a long way ...



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Thanks to George and Juha, and the

Thanks to Gisela Eickhoff and the Technology Group !

**Thanks for YOUR
attention !**

Its a long way ...

