DSLRob-15, Hamburg, Germany

6th International Workshop on Domain-Specific Languages and models for ROBotic systems
(DSLRob-15)

Christian Schlegel, Ulm University of Applied Sciences, Germany
Ulrik P. Schultz, University of Southern Denmark, Denmark
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After the overwhelming push towards the design of robotics software platforms (e.g. ROS, Orocos, SmartSoft, OpenRTM, etc.) we now need to make robotics programming and configuration as accessible as possible to application domain experts. Domain-Specific Languages (DSLs) and Model-driven Engineering (MDE) are emerging areas of interest in the robotics research community, which have been instrumental for resolving complex issues in a wide range of domains (e.g. distributed and modular robotics, control, and vision) and have the potential for significantly facilitating how robots are programmed.

The goal of this workshop is to bring together robotics researchers working with DSLs and models in different aspects of robotics. The challenge of building complex systems that compose several lower-level models or domain-specific languages is considered of special interest this year.

The workshop will focus on the use of Domain-Specific Languages and Models for Robotic Systems. The main objective of this workshop is a cross-pollination of ideas between robotics researchers in DSLs and models from different domains. DSLs and models are key elements in many robotic systems presented at leading conferences such as IROS, ICRA and SIMPAR, but the domain-centric structure of the typical robotics conference and the limited amount of time assigned to the paper presentations do not provide enough room for discussion and exchange of ideas regarding MDE, DSLs and models.

The intended audience is those robotics researchers throughout the entire robotics community who use DSLs and models as a key component of their robotics software infrastructure. In addition, robotics researchers with an interest in modern approaches to solving complex software-related issues will find the workshop inspirational.

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1st DSLRob 2010 at IROS 2010 (Taipei)
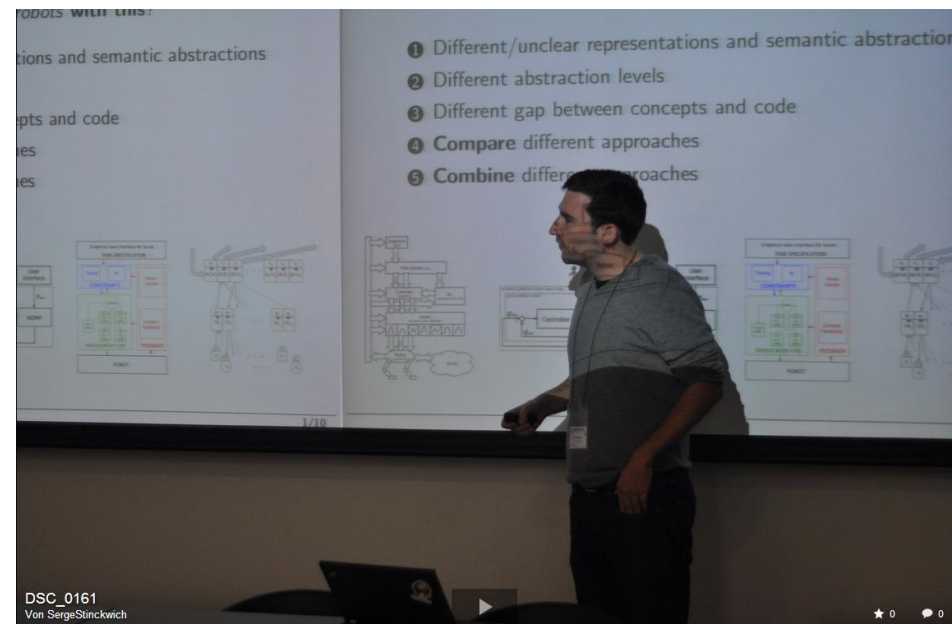4 papers
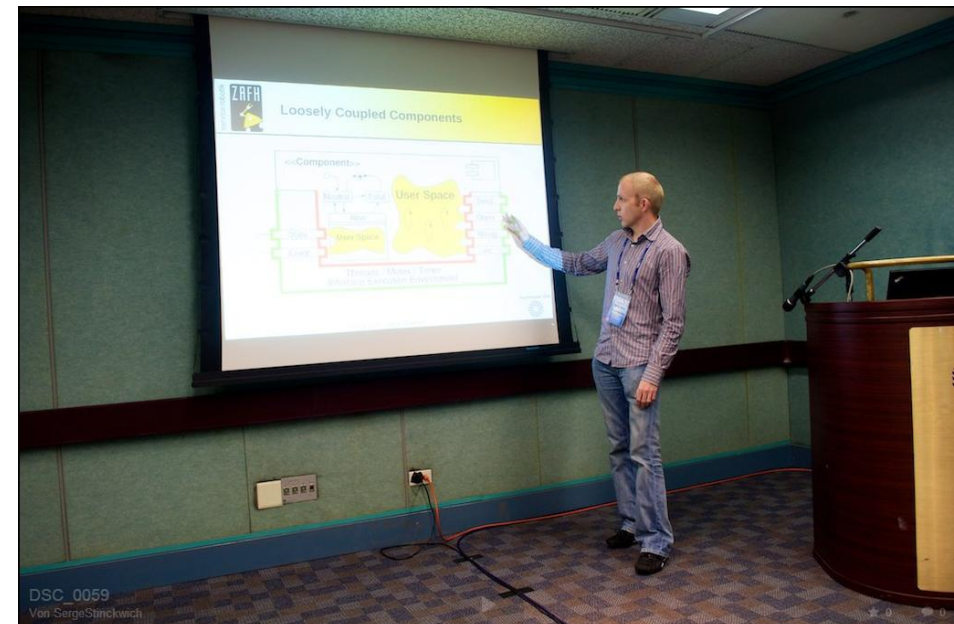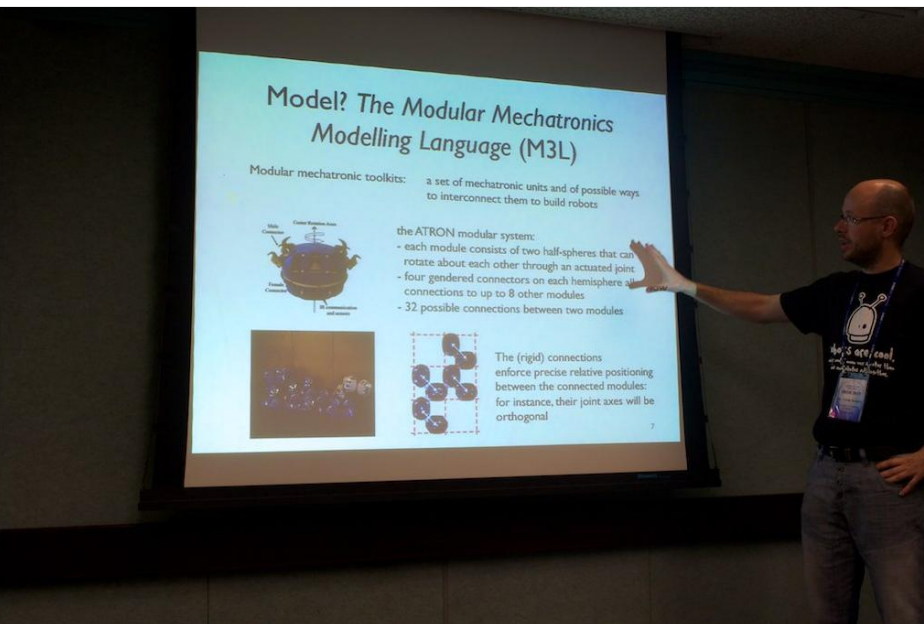
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2nd DSLRob 2011 co-located at IROS 2011 (San Francisco)
4 papers

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3rd DSLRob 2012 at SIMPAR 2012 (Tsukuba)
6 papers

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**4th DSLRob 2013 at University of Tokyo (co-located at IROS 2013)
7 papers**

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5th DSLRob 2014 at SIMPAR 2014 (Bergamo)
6 papers

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6th DSLRob 2015 at IROS 2015 (Hamburg)

- **6 Papers**
- **2 Invited Talks**
  - **Dr. Markus Völter, Independent Researcher, Consultant, Coach for itemis AG in Stuttgart**
  - **Dr. Arne Hamann, Software-Intensive Systems, Robert Bosch GmbH**
- **2 Late Breaking Results with Posters**
- **Scientific Community Reports**

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This workshop will focus on the use of Domain-Specific Languages and Models for Robotic Systems. Topics that are of special interest include:

- domain-specific languages for robotics, languages to teach robotics, visual languages for robotics
- domain-specific languages to express reactive behaviors, composition of behaviors, motion description languages (MDL),
- domain-specific languages to express uncertainty, modeling of physical systems, real-time constraints,
- domain-specific languages to describe cooperative robotics and modular robotics systems,
- models to represent robotics software architectures and their variability,
- runtime models for reasoning and dynamic adaptation,
- tool support and frameworks for describing and manipulating DSLs and models for robotic systems,
- code generation and code transformation for robotics systems, variability in robotic systems,
- frameworks to combine DSLs in a uniform manner,
- benchmarks to compare the use of DSLs vs general-purpose programming languages, and
- programming languages in the context of robotic systems

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Program committee

Geoffrey Biggs, National Institute of Advanced Industrial Science and Technology (AIST,) Japan

Mirko Bordignon, Fraunhofer IPA, Germany

Noury Bouraqadi, Université de Lille Nord de France, Ecole des Mines de Douai, France

Luc Fabrese, Ecole des Mines Douai, France

Johan Fabry, PLEIAD lab – Department of Computer Science (DCC), University of Chile

Nico Hochgeschwender, Bonn-Rhein-Sieg University, Germany

Juan F. Inglés-Romero, Technical University of Cartagena, Spain

Alex Lotz, Ulm University of Applied Sciences, Germany

Ali Paikan, Italian Institute of Technology (IIT), Italy

Andreas Wortmann, RWTH Aachen University, Germany

Mikal Ziane, Laboratoire d'Informatique de Paris 6 (LIP6), France

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08:30 – 08:45 Opening Remarks and Introduction of Participants

08:45 - 09:30 Invited Keynote by Dr. Arne Hamann, Robert Bosch GmbH
  What high-level software engineering in robotics could learn from embedded software engineering (and vice versa)?

09:30 - 10:00 Alex Lotz, Arne Hamann, Ingo Lütkebohle, Dennis Stampfer, Matthias Lutz and Christian Schlegel
  Modeling Non-Functional Application Domain Constraints for Component-Based Robotics Software Systems

10:00 - 10:30 COFFEE BREAK

10:30 - 11:00 André Dietrich, Sebastian Zug, Luigi Nardi and Jörg Kaiser
  Reasoning in Complex Environments with the SelectScript Declarative Language

11:00 - 11:30 Arvid Butting, Bernhard Rumpe, Christoph Schulze, Ulrike Thomas and Andreas Wortmann
  Modeling Reusable, Platform-Independent Robot Assembly Processes

11:30 - 12:00 Stefan Zander, Georg Heppner, Georg Neugschwandtner, Ramez Awad, Marc Essinger and Nadia Ahmed
  A Model-Driven Engineering Approach for ROS using Ontological Semantics

12:00 - 12:30 Huaxi Yulin Zhang and Lei Zhang
  Towards An Architecture-Centirc Approach to Manage Variability of Cloud Robotics

12:30 - 14:00 LUNCH BREAK

14:00 - 14:45 Invited Keynote by Dr. Markus Völter, Independent Researcher, Consultant, Coach for itemis AG Stuttgart
  State of the art in language workbenches and development of DSLs for embedded software

14:45 - 15:15 Johann Thor Mogensen Ingibergsson, Ulrik Schultz and Dirk Kraft
  Towards Declarative Safety Rules for Perception Specification Architectures

15:15 - 15:30 Lightning Talks on Late-Breaking Results

15:30 - 16:00 COFFEE BREAK

16:00 - 16:30 Poster Session

16:30 - 17:00 Report on activities and discussion on topics from *RAS TC-SOFT* meeting

17:00 - 17:30 Report from and discussion on *euRobotics Topic Group on Software Systems Engineering*

17:30 - 18:00 Report from and discussion on the *DSL Zoo Initiative on a Reference Collection of DSLs in Robotics*

18:00 - 18:30 Concluding discussion: identification of research challenges, plans for DSLRob 2016

18:30 End