

Workshop on
Autonomous Systems: Legal/Regulatory Aspects
and Verification & Validation

Chair: Michael Fisher

[London campus, Univ. Liverpool, *22nd February, 2016*]

Funded through the *EPSRC Network on Verification & Validation of Autonomous Systems*

Verification & Validation of Autonomous Systems Network

EPSRC funded Academic Network

Start of funding: 1st Sept 2015, for 3 years.

Aims to

stimulate, coordinate, promote, and disseminate
academic research on the verification and validation
of autonomous systems

Website: <http://cgi.csc.liv.ac.uk/~michael/VaVAS>

Soon moving to: <http://www.vavas.org>

Across all *Techniques*

- Simulation and Testing
- Formal Proof
- User Validation
- Autonomous Agents and Multi-Agent Systems
- Hybrid Control Systems
- Human Robot Interaction
- Probabilistic Verification
- Model-Checking
-

Across all *Potential Applications*

- Safety Critical Systems
- Certification of Unmanned air vehicles
- Safe (and road-worthy) driverless cars
- Autonomous robotics in nuclear/chemical/biological processes
- Human-robot teamwork, both in work and home contexts
- Deep underwater/space/underground exploration
- Autonomous ocean surface monitoring and exploration
- Autonomous sensing and control in smart cities
- Trustworthy robotic assistants for home and health-care
- Robotic diagnosis, rehabilitation, or surgery
- Autonomous satellites handling sensing/monitoring/comms
- Precision farming
- Robotic search, cleanup or rescue
- Nano-robotics
-

Across all *Issues*

- Legal Issues, Standards, and Certification
- Validation
- Reliability and Robustness
- Robot Ethics
- Predictability and Uncertainty
- Safety and Security
- Fault Tolerance
- ...

Activities so far

Sep 2015: *Agent Verification Workshop*, Liverpool

<http://cgi.csc.liv.ac.uk/~maryam/AVWorkshop15.html>

Dec 2015: *Winter School on Verification of Mobile and Autonomous Robots*, York

<https://www.cs.york.ac.uk/circus/RoboCalc-event>

Feb 2016: *Workshop on Autonomous Systems: Legal/Regulatory Aspects and V&V*, London

Planned

Jun 2016: *Workshop on Industrial Perspectives on the V&V of Autonomous Systems*, Sheffield
[Part of TAROS 2016]

www.sheffieldrobotics.ac.uk/conferences/taros-2016

Sep 2016?: *Annual Academic Workshop*, (Bristol?)

Get Involved

Join the mailing list — see

<http://cgi.csc.liv.ac.uk/~michael/VaVAS/members.html>

Come to events

Propose future activities

Why are we here? (1)

Is the deployment of truly autonomous systems being held up by regulation/certification/standards problems?

Traditionally, regulation has either assumed that a human is “responsible” or that all the situations that automated components might encounter are able to be predicted before deployment.

Why are we here? (1)

Is the deployment of truly autonomous systems being held up by regulation/certification/standards problems?

Traditionally, regulation has either assumed that a human is “responsible” or that all the situations that automated components might encounter are able to be predicted before deployment.

As systems increase in autonomy/complexity,

- human(s) may be present, but not responsible, or
- no human present at all

yet

- decisions on safety/security/ethics must be made by system,
- we cannot predict everything that might happen (in uncertain/complex environments), and
- if our systems learn/evolve, we cannot easily predict behaviour

Why are we here? (2)

All is not lost, since

there is an increasing range of research being carried out on the *verification and validation of autonomous systems* (some of which we will hear about today)

Aims of today are

1. to see if there are common problems (or, even, common solutions) among regulators when considering increasingly autonomous systems; and
2. to explore how we might bridge the gap from academic research to potential (and viable) regulatory solutions.

Outline of day

09:40-11:15 Regulation/certification short talks

11:30-12:30 Discussion: common problems/opportunities in future autonomous system regulation/certification.

11:30-12:10 Breakout to rooms A, B, and C

12:10-12:30 Plenary

12:30-13:30 LUNCH

13:30-15:00 V&V background short talks

15:00-16:00 Discussion: directions/opportunities in V&V for future autonomous systems regulation/certification.

15:00-15:40 Breakout to rooms A, B, and C

15:40-16:00 Plenary

16:00-17:00 EPSRC balancing capability (mainly for academic participants) — Miriam Dowle and Diane Howard

17:00 CLOSE

- *Future Air Regulation*
[Mike Gadd](#), Civil Aviation Authority
- *Autonomous Robotics in the Nuclear Industry*
[Andrew White](#), Office for Nuclear Regulation
- *Challenges for the regulatory framework, national rules and standards due to greater automation of the railway system*
[Vaibhav Puri](#), Rail Safety and Standards Board
- *V&V Opportunities for Robotics Standards*
[Steven Cameron](#), British Standards Institution
- *Safety of Future Autonomous Vehicles*
[Austen Okonweze](#), Centre for Connected and Autonomous Vehicles

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- *Certification Challenges in the V&V of Bayesian Networks for Safety Critical Fault Diagnosis in Aerospace*
Mark Douthwaite, York
- *Formal Analysis of Railway Signalling Data*
Alexei Iliasov, Newcastle
- *High-fidelity Simulation as a Route to UAS Certification*
Mike Jump, Liverpool
- *Sheffield Field Robotics Facility*
Sandor Veres, Sheffield
- *Harwell Robotic Autonomy Facility*
Roger Ward, SciSys

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