robotics

smart cards

ground transportation

telecommunication

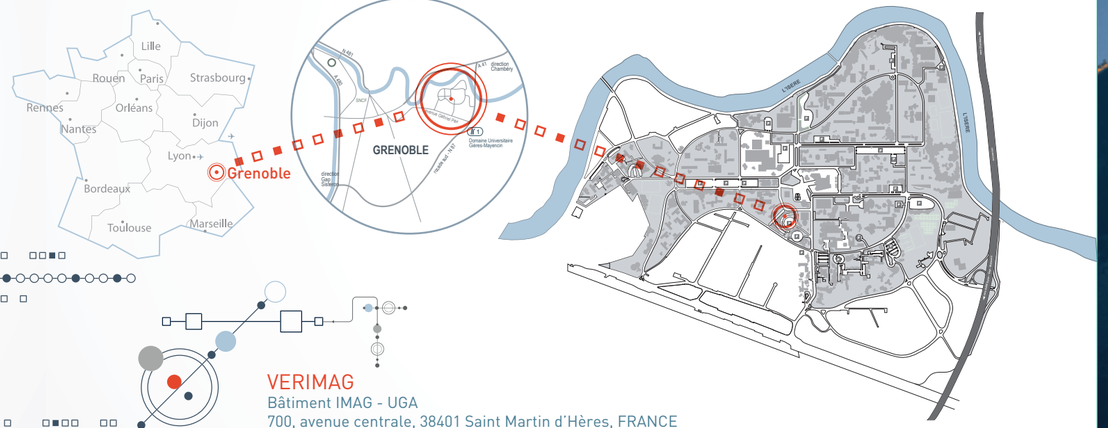
aerospace

energy

internet of things

health systems

avionics



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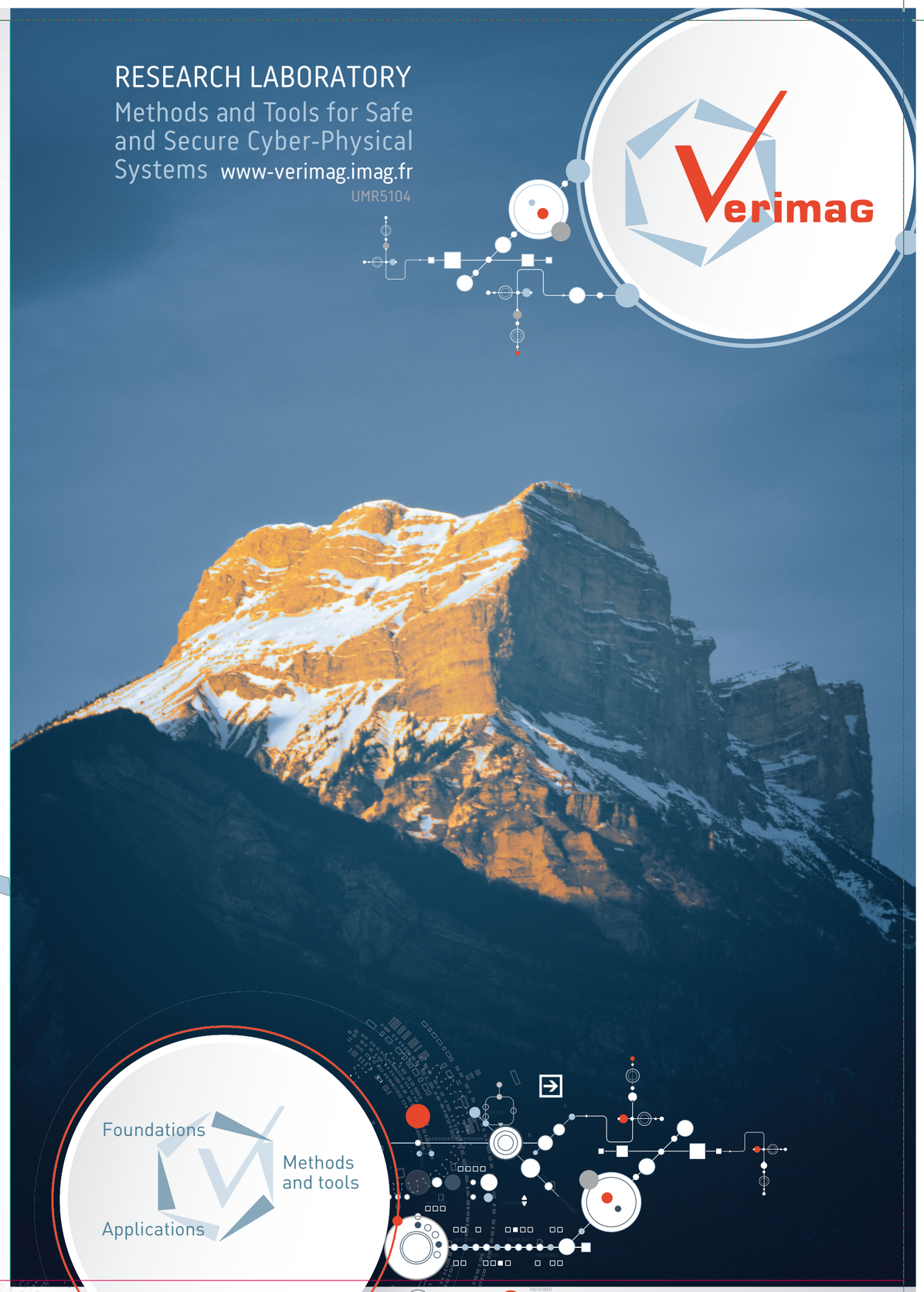
RESEARCH LABORATORY

Methods and Tools for Safe and Secure Cyber-Physical Systems

www-verimag.imag.fr

UMR5104

Verimag



Foundations

Methods and tools

Applications

Graphisme : CNRS Alpes - service communication - LRF

Verimag

DESIGN and IMPLEMENTATION

- high-level design
- model-driven implementation
- mixed criticality
- compilation
- scheduling, optimization, synthesis
- distributed algorithms, self-stabilization
- reconfigurable systems
- implementation on multi, many-core architectures, distributed systems

MODELING

- language: modeling, programming, and specification
- synchronous and asynchronous
- efficient simulation, virtual prototyping
- functional and extra-functional properties
- discrete, continuous

Method and tools for safe and secure cyber-physical systems

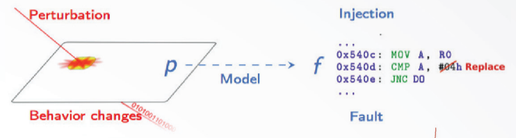
VALIDATION

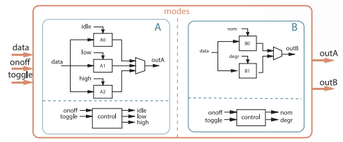
- verification, validation, certification
  - model checking
  - abstract interpretation
  - decision procedures
  - automated proofs
  - interactive proofs
- security
  - detection of vulnerabilities
  - side-channel attack detection
- quantitative properties, timing analysis, performance evaluation
- run-time verification, monitoring
- automatic testing

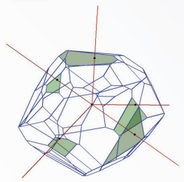
VERIMAG: a leading research centre in cyber-physical systems since 1992

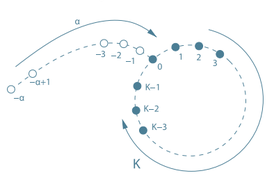
- STATOR: ERC project on static analysis of programs, lead by David Monniaux (2013-2017)
- Argosim: start-up company developing the requirements-analysis tool Stimulus (2013)
- Turing award to Joseph Sifakis, shared with Ed Clarke and Alan Emerson (2007)
- Monpetit Prize of the French Academy of Science to Paul Caspi and Nicolas Halbwachs (2004)
- Coordination of the European Networks of Excellence Artist (2002-2004), Artist-2 (2004-2008) and ArtistDesign (2008-2012)
- Co-founder of the conferences CAV (1989), HSCC (1998), EMSOFT (2001), and FORMATS (2003)
- Scade/Lustre: industrial development environment for critical embedded software, used worldwide (commercialized by Ansys)

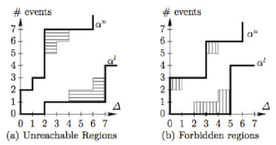
Joseph SIFAKIS

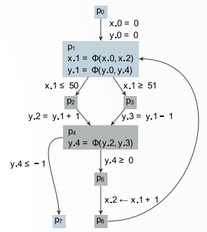












MAIN TOOLS

- SpaceEX: analysis tool for systems combining continuous and discrete semantics
- BIP: component-based design framework
- Lustre toolbox
- VPL: certifying library of polyhedral operations