





TTool An Open-Source Simulator for Real-Time SysML Models

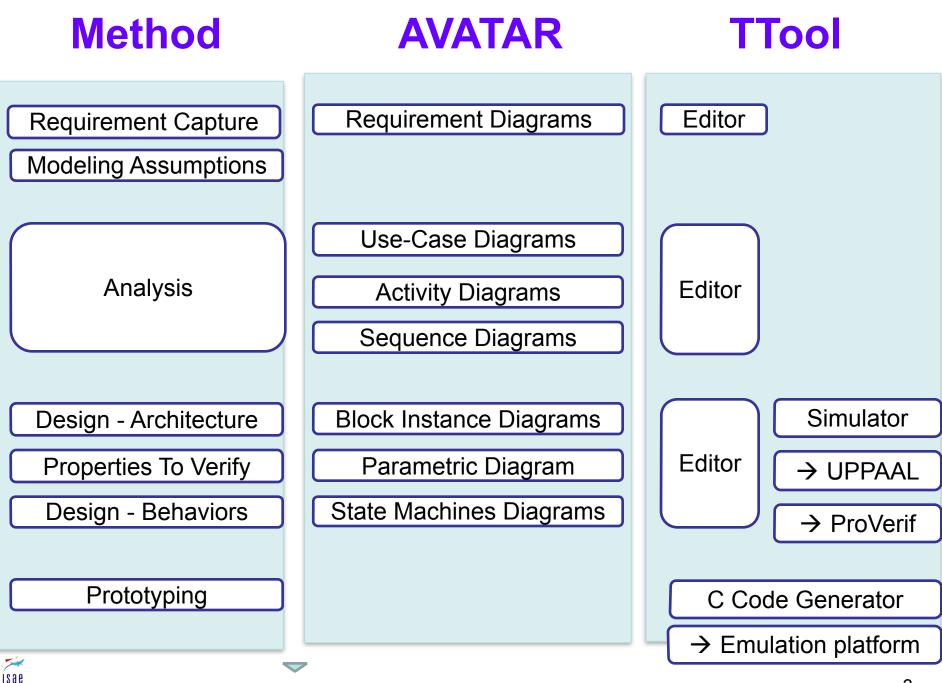
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IEEE Aerospace Simulation Workshop ISAE, Toulouse, France June 8, 2011

Rationale

- Real-time systems capture complex engineering problems that stimulate research work on model-based engineering
 - Early detection of design errors using model simulation
- Experience in joint use of UML (Unified Modeling Language) and formal methods (timed automata, timed process algebras)
 - TURTLE (Timed UML and RT-LOTOS Environment)
 - Open source toolkit TTool
- SysML (System Modeling Language) is the emerging modeling language for systems engineers
 - AVATAR (Automated Verification of reAl Time softwARe)
 - Open source toolkit TTool



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AVATAR and TTool by example

Future Air Navigation System

Connection Set Up



Real-Size Case Study

Autopilot

Conclusions and Future Work

• AVATAR

- Real-Time and distributed systems modeling
- Compliant with OMG's SysML
- Formal semantics

• TTool

- Open-source
- Google "TTool" or download from ttool.telecom-paristech.fr/
- Simulator
- Formal verification: safety (UPPAAL) and security (ProVerif)
- − Code generation \rightarrow emulation

Ongoing work

- Methodological assistant
- Case studies (protocols, aerospace engineering, medical systems)
- Tutorials and training material



Google "TTool"