Henrick **Deschamps**

Ph.D. candidate, Eng. in Computer Science and Network · Critical Distributed Systems Specialist

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Seeking a challenging, responsible position as a distributed systems engineer in an agile aerospace structure with the objective of becoming an industrial expert.

Summary

I am a French computer science and network engineer, and Ph.D. student at the ISAE-Supaero. I am Interested in critical real-time distributed systems.

Distributed systems are nowadays inevitable in the field of engineering, no system lives alone isolated from its environment, even among systems that were historically considered monolithic, which raises questions about resource sharing, reliability, and data partitioning.

Although each problem requires a customized solution, my preferred approach consists in respecting the partitions and dividing a system into components that can be interconnected by a framework, whatever the scale of this interconnection, from embedded networks to international distribution. Such an approach makes it possible to apply good industrial software practices while addressing emerging problems from networks and system states.

I have experienced this modular approach in software and systems, and I had the opportunity to develop it on the simulation of cyber-physical systems that can integrate humans, software and hardware.

Skills

Programming	C/C++, Python, Java, Haskell, Bash, Ada, LaTeX
Office softwares	Word processor, spreadsheet, database, scientific writing
Software design	UML, SysML, AADL, static code analysis, code instrumentation
Devops	Versioning, virtualization, test automation, continuous integration
Frameworks and libraries	STL, HLA (CERTI), MQTT, MPI, OpenMP, POSIX, Linux kernel, Qt5, nl
Tools	CMake, Make, clang (-format, -tidy), debbuger, valgrind, wireshark, TCP tools, coverage, afl
Languages	French, English, Chinese

Work Experience

Airbus, Aircraft simulation department

Toulouse, France

Software Engineer for simulation architecture, Ph.D. Candidate — *Mar. 2016 – Mar. 2019*

- Formalization of the execution of a distributed simulation for the *a priori* validation of a simulation scheduling respecting aerospatial-specific constraints.
- Analyzis of simulation packages and frameworks for formalizing the logical components and the distributed execution architecture.
- Analyzis of existing simulations and technical documentations for formalizing of aerospatial-specific distributed simulation constraints.
- Implementation of RROSACE — a simple flight controller case study from ROSACE, in Matlab and C.
- Implementation of sEaplanes — a simulation framework in C++ based on HLA, a publish-subscribe-based data exchange standard, with Qt interface.
- Implementation of a modulable and extensible allocation tool in Python, with multiple heuristics.

ISAE-Supaero (Superior Institute of Aeronautics and Space)

Toulouse, France

ATER (Temporary Teaching and Research Assistant) — *Mar. 2016 – current*

- Teaching assistant in C, Java, Real-time systems, SysML, and numerical analysis.

Viveris Technologies

Toulouse, France

Software Engineer consultant for satellite ground segment communications — *Dec. 2014 – Feb. 2016*

- Implementation of a DVB-RCS2 communication protocol in satellite communications ground segment for Thalès Alenia Space.
- Development and integration of network modules in multi-threaded telecommunication kernel device. Open-source library available at hnrck/librle.
- Development of Quality of Service library for the satellite simulation environment, based on the libns.
- Development of test tools for continuous integration in Python, Ruby and Perl.
- Analysis of network packet scheduling for QoS validation.

Airbus Group Innovations *Toulouse, France*

Software Engineer Final year project *Feb. 2014 – Aug. 2016*

- Internship in the modeling of avionic ethernet network QoS for validation of the quality of service rules.
- OmNet++/OmNest development of network scheduler models (C++ and NED languages).
- Minor bugs found in the OmNet++/OmNest inet library, one correction proposed and merged in the original library: inet-framework/inet/pull/18.
- Implementation of analysis tools in Python and Excel macro.

LAAS (Laboratory for Analysis and Architecture of Systems) *Toulouse, France*

Software Engineer 4th year internship *Jun. 2013 – Aug. 2013*

- M2M energy efficient communication. Software defined radios for wireless sensors network, with consideration for home automation and avionics applications.
- Manipulation of SDRs (Etus B 100/Etus N 100) and SDR software (GNURadio, Minicom, Iris, and LabView).
- Development of physical and mac layers for sensors network.

Education

ISAE-Supaero (Superior Institute of Aeronautics and Space) *Toulouse, France*

Industrial Ph.D. in Networks, Telecoms, Systems and Architecture *2016 – (expected) 2019*

- Ph.D. thesis entitled Scheduling of a cyber-physical system simulation.
- Supervised by Prs. Pierre Siron and Janette Cardoso.
- Co-supervised by Airbus through a CIFRE (Industrial Agreement of Training through Research).

INSA (National Institute of Applied Sciences) *Toulouse, France*

Engineering Degree in Computer Science and Communication Networks *2009 – 2014*

- Engineering school part of French Group A, delivering engineering degrees (master's level, 5 years of study), recognized by the French Engineering Title Conferment Commission, with international equivalence
- Computer Science, Modelling and Communication background.
- Specialization in Computer Science and Telecommunication Networks.
- Major in Communicative Distributed Systems, minor in IT Security.
- Student Clubs President and Secretary.

UQO (Quebec University in Ottawa) *Ottawa, Canada*

Exchange student, Master in Computer Engineering, Telecommunication Networks and IT security *2013*

- Exchange semester administered by the CREPUQ (Conference of Rectors and Principals of Québec Universities).
- GPA 4.3 / 4.3, A+ grade

Jules Renard Highschool *Nevers, France*

French scientifical *Baccalaureat* *2008*

- With honours.

Honors & Awards

Domestic

2014 **High-performing intern**, Airbus Group Innovation *Toulouse, France*

Publications

Implementation of a Cyber-Physical System simulation components allocation tool *Ghent, Belgium*

32nd European Simulation and Modelling Conf. – ESM'2018 *Oct. 2018*

Coincidence Problem in CPS Simulations: the R-ROSACE Case Study *Toulouse, France*

Proceedings of the 9th European Congress Embedded Real Time Software and Systems ERTS^2 2018 *Jan. 2018*

Distributing Cyber-Physical Systems Simulation: The Satellite Constellation Case *Toulouse, France*

5th Federated and Fractionated Satellite Systems Workshop *Nov. 2017*

Toward a formalism to study the scheduling of cyber-physical systems simulations *Rome, Italy*

2017 IEEE/ACM 21st International Symposium on Distributed Simulation and Real Time Applications (DS-RT) *Oct. 2017*