

# Henrick Deschamps

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

32 rue Saint Joseph, Toulouse, FRANCE

+33 (0) 6 64 19 94 94 | [contact@hnrck.io](mailto:contact@hnrck.io) | [www.hnrck.io](http://www.hnrck.io) | [hnrck](#) | [henrick-deschamps](#)



I am passionate about applied research, looking for technical challenges in the field of distributed systems.

## Summary

I am a French computer science and network Ph.D. and engineer, and I am interested in real-time distributed systems.

Distributed systems are nowadays essential in the field of software engineering. No system lives alone isolated from its environment, even among systems historically considered as monolithic, which raises questions of resource sharing, reliability, data partitioning with very often strong time constraints, crossed with the classical industrial constraints of capitalization and reuse, which can be alleviated by specific frameworks.

As an engineer and former PhD student in Critical Distributed Systems, I acquired experience in implementing and using frameworks to integrate business logic, embedded hardware and human-machine interfaces. My vision is constantly evolving with technological advances. Today I believe that for critical systems, the location of data is a bottleneck to their performance. In few words, the approach that I put forward is the use of re-location of optimized code execution at runtime, based on the use of partial compilation and specialization at runtime.

## Skills

|                                 |   |
|---------------------------------|---|
| <b>Programming</b>              | C/C++, Python, Haskell, Bash, Ada, LaTeX, Cypher, FPGA (VHDL)                                     |
| <b>Office softwares</b>         | Word processor, spreadsheet, database, scientific writing   |
| <b>Software design</b>          | UML, SysML, AADL, static code analysis, code instrumentation                                      |
| <b>Devops</b>                   | Versioning, virtualization, test automation, continuous integration, graph databases              |
| <b>Frameworks and libraries</b> | STL, HLA (CERTI), MQTT, MPI, OpenMP, asyncio, websockets, POSIX, Linux kernel, dask, Qt5, nl, elk |
| <b>Tools</b>                    | CMake, Make, formatters, linters, debuggers, valgrind, wireshark, TCP tools, coverage, afl        |
| <b>Languages</b>                | French, English, Chinese, learning Korean   |

## Work Experience

### Thales Group, Big Computing Competence Center

Toulouse, France

Solutions Engineer

Sep. 2019 - now

- R&D activities
  - Participation to the conception and modeling of the back-end of a real-time distributed system for computer scientists with the purpose of targeting big data and AI projects.
  - Principal developer of the PoC for demonstrations and MVPs.
  - Participation in the deployment of MVPs in scientific projects.
- IVV activities
  - Contribution to the analysis and validation of the implementation of a big data system.
  - Responsibility for the design and development of inspection tools for validation.
  - Supervision of a junior associate for the implementation of inspection tools.

### 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 aerospace-specific constraints.
- Analysis of simulation packages and frameworks for formalizing the logical components and the distributed execution architecture.
- Implementation of RROSACE - a simple flight controller case study from ROSACE, in Matlab and C. Available at [hnrck/rrosace](#).
- Implementation of sEaplanes - a simulation framework in C++ based on HLA, a publish-subscribe-based data exchange standard, with Qt interface. Framework available at [hnrck/seaplanes](#).
- 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), Ph.D. candidate

Mar. 2016 - Jul. 2019

- 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 linux kernel device, open-source library available at [hnrck/librle](#), and Quality of Service library for the satellite simulation environment, based on the `libns`.

## 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 4<sup>th</sup> 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 - 2019

- Engineering school of the A+ group, among the best internationally in aerospace, delivering internationally recognized doctorates.
- 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

- General 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 course, 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 4.2 / 4.3, A+ grade

### Jules Renard Highschool

Nevers, France

French scientific *Baccalauréat*

2008

- With honours.

## Honors & Awards

---

### Domestic

2014 **High-performing intern**, Airbus Group Innovations

Toulouse, France

## Publications

---

### Implementation of a Cyber-Physical System simulation components allocation tool

Ghent, Belgium

32<sup>nd</sup> European Simulation and Modelling Conf. - ESM'2018

Oct. 2018

### Coincidence Problem in CPS Simulations: the R-ROSACE Case Study

Toulouse, France

Proceedings of the 9<sup>th</sup> European Congress Embedded Real Time Software and Systems ERTS<sup>2</sup> 2018

Jan. 2018

### Distributing Cyber-Physical Systems Simulation: The Satellite Constellation Case

Toulouse, France

5<sup>th</sup> 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 21<sup>st</sup> International Symposium on Distributed Simulation and Real Time Applications (DS-RT)

Oct. 2017