SERGE **BARRAL**

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Who I am
personal summary

An aerospace engineer and PhD with an extensive management experience in the space industry and with fluency in a number of relevant engineering fields, ranging from propulsion to spacecraft simulators. An inquisitive and open mind with a broad spectrum of interests.

What I am good at
key competencies and highlights

Management

R&D activities management: inception of new products, introduction of new engineering tools, overview of R&D projects implementation, identification of funding opportunities (ESA, national bodies and industry).

Business development and **strategic management**: outreach to current and prospective clients and partners, preparation of proposals and bids for mainline and R&D activities, participation in company strategic management as steering committee member.

Technical project management: technical officer and similar positions held in several industrial & ESA projects.

Software team leadership: EGSE software department management, including organization of activity and overview of the development process.

Engineering

Software development: two decades of experience.

Thermal, mechanical and material engineering: very good general competence.

Electric propulsion: many years of expertise as scientist and industry consultant.

Electronics: good familiarity with digital and low-power analog electronics.

Computer skills

C++: excellent proficiency, 20+ years of experience.

Rust: excellent proficiency, 4+ years of experience.

Others languages: Python, Java, JS, Elm, PHP, several assembly languages.

Software: CAD, graphic and front-end design software.

Systems: Linux, Windows, various embedded platforms.

Languages

English: fluent

French: native

Polish: fluent

German: basic

What I did
professional experience

Head of R&D
2019-present
Software section lead
2018-2019
Senior software developer
2016-2018

I joined **Astri Polska**, an **Airbus Defence and Space** joint-venture, in 2016.

I was the lead developer and later the technical officer in a team working on the Software Validation Facility of the JUICE spacecraft, a high fidelity real-time simulation of most of the on-board spacecraft subsystems.

In early 2018, I took the role of software section lead in the EGSE department before moving a year later to the position of **head of R&D and new products** and becoming member of the company's **steering committee**.

In these latter roles, I have initiated a number of hardware and software projects related to EGSE hardware and simulator software. I have also introduced new tools (markdown-based technical documentation) and new competences (Rust software development) across the company, while playing a substantial role in business development and bidding activities.

Consultancy business 2014-2016

I ran **QuinteScience**, a solely owned consultancy activity for the aerospace industry.

A notable project performed under QuinteScience in partnership with Italian company Sitael was RAM-EP, a flagship **ESA TRP** project for an **air-breathing electric propulsion** demonstrator. I was responsible for most of the preliminary studies and for the design of the air intake, for which I developped a custom C++ Monte-Carlo code.

[link to ESA project page]

Senior scientist 2008-2014

I have worked as senior researcher at the **Institute of Plasma Physics and Laser Microfusion** (IPPLM) in Warsaw, where I initiated and took part in several international projects on electric space propulsion. I was responsible for much of the propulsion hardware design and construction activity at IPPLM, as well as for most of the thruster mathematical and numerical modeling activity.

While at IPPLM, I pursed my earlier research on interactions between plasma and wall surfaces in electric thrusters, which eventually led to an **international patent** filed by French company Snecma (now SAFRAN).

It was also at IPPLM that I devised, within the frame of a pan-European project, a **new type of Pulsed Plasma thruster** operating with a non-volatile liquid-state polymer propellant, a concept which development is now being pursued in several countries including Japan, Germany and the UK.

Senior scientist 2003-2008
Research assistant 2001-2003

After defending my PhD, I took a position of research assistant and subsequently, senior scientist, at the **Institute of Fundamental Technological Research** (Polish Academy of Science) where I performed electric propulsion research, including the development as part of my PhD thesis of a simulation code for Hall effect thrusters which eventually became used in the industry.

What I wrote
publications, patents & free software

Publications

I have authored or co-authored **more than 50 publications** related to electric propulsion in conference proceedings and peer-reviewed journals.

Patents

S. Barral, S. Zurbach, "Hall effect plasma thruster", **US patent** US9127654B2, granted 2015

S. Barral, S. Zurbach, "Hall effect plasma thruster", **EU patent** EP2433002B1, granted 2018

Free software

Rust UIO kernel module wrapper for PRU coprocessors: https://github.com/sbarral/prusst

ETF: a super-fast univariate sampling method (C++): https://sbarral.github.io/etf

What I learned
education

PhD 2003

PhD in Technical Sciences from Polish Academy of Sciences, awarded with distinction for a thesis on “Numerical Fluid Modeling of Hall Thrusters”. Institute of Fundamental Technological Research, **Polish Academy of Sciences** (IPPT-PAN), Warsaw, Poland.

MSc 1998

Mastère spécialisé in Mechanics and Aerospace Technologies from French aerospace engineering school SUPAERO (**Ecole Nationale Supérieure de l'Aéronautique et de l'Espace**), Toulouse, France.

MEng 1997

Master in Engineering.

ENSAM (**Ecole Nationale Supérieure des Arts et Métiers**), Paris, France.

What I like
hobbies

Coffee

My ideal off-duty activities: drink espresso and work on my custom espresso machine.