

# Curriculum Vitae/Resume

João de Barro Monteiro Cavalcanti

Aerospace Engineering Ph. D.

U-M ID: 25653250

I am a fighter pilot with more than 1000 hours of flight and an aeronautical engineer. I have experience with flight instruction for fighter aviation and as a researcher in the field of Hypersonic Aeroelasticity and Control at the Institute for Advanced Studies (IEAv) working in the Brazilian Hypersonic Vehicle Demonstrator Project and the development of Flight Mechanics Models for electric aircraft. Moreover, I worked with Guidance, Navigation and Control (GNC) in the Hexafly International Project, which involves partners across Europe, Russia, Australia, and Brazil, supported by the European Commission and ESA. Currently, I am a PhD Candidate in Aerospace Engineering at University of Michigan. My research interest comprises Model Predictive Control and designing of control systems for Gust and Maneuver Load Alleviation in Very Flexible Aircrafts.

## AREAS OF EXPERTISE

- Aerospace Engineering
- Aeroelasticity
- Control Systems
- Computer Programming
- Flight Mechanics
- Management

## TECHNICAL SKILLS

<b>Programming/Scripting</b>	C/C++, Matlab, Python.
<b>Softwares</b>	Microsoft Excel, Microsoft Powerpoint, FEMAP Nastran, Autodesk Inventor.
<b>Some Other Skills</b>	Strong foundation in mathematics and physics.

## EDUCATION

<b>PhD Candidate in Aerospace Engineering, U-M, University of Michigan.</b> <ul style="list-style-type: none"><li>• GPA: 4.00/4.00 (in progress).</li></ul>	<b>Aug 2022 — Sep 2026</b>
<b>PhD Pre-Candidate in Aerospace Engineering, U-M, University of Michigan.</b> <ul style="list-style-type: none"><li>• GPA: 4.00/4.00.</li></ul>	<b>Aug 2022 — May 2023</b>
<b>MBA in Public Administration and Leadership, FGV, Getulio Vargas Foundation.</b> <ul style="list-style-type: none"><li>• Grade: 10.00/10.00 (in progress).</li></ul>	<b>Feb 2021 — May 2022</b>
<b>Master of Science, ITA, Aeronautics Institute of Technology.</b> <ul style="list-style-type: none"><li>• Grade: 9.82/10.00.</li></ul>	<b>Jul 2020 — Dec 2021</b>
<b>Bachelor's Degree in Aeronautical Engineering, ITA, Aeronautics Institute of Technology.</b> <ul style="list-style-type: none"><li>• Grade: 9.81/10.00.</li></ul>	<b>Mar 2016 — Dec 2020</b>
<b>Bachelor of Aeronautical Sciences, AFA, Brazilian Air Force Academy.</b> <ul style="list-style-type: none"><li>• Grade: 9.55/10.00.</li></ul>	<b>Jan 2007 — Dec 2010</b>
<b>Bachelor's Degree in Public Administration, AFA, Brazilian Air Force Academy.</b> <ul style="list-style-type: none"><li>• Grade: 9.55/10.00.</li></ul>	<b>Jan 2007 — Dec 2010</b>
<b>High School Diploma, EPCAR, Brazilian Air Force Academy Preparatory School.</b> <ul style="list-style-type: none"><li>• Grade: 9.47/10.00.</li></ul>	<b>Fev 2004 — Dec 2006</b>

## PUBLICATIONS

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### Conference Papers

- Galembeck, L.; Cavalcanti, J.; Silva, B.; Passaro, A.; Fraile, A.; Ferreira, M.; Souza, D.; Boas, F.; Mendonça, C.; Steelant, J. **High-speed system modeling, simulating, and in-flight test design**, 2nd International Conference on High-Speed Vehicle Science and Technology (HiSST), HiSST-2022-0426, 11-15/09/2022, Bruges, Belgium.

## ACADEMIC PROJECTS

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### GNC team (in progress)

May 2021 — May 2022

- Development of a closed-loop system in order to control the vehicle in the Hexafly International Project during the final phase of flight (below Mach 2).

### Master of Science Final Thesis

Jan 2021 — Mar 2022

- Computational analysis and design of a vehicle in hypersonic flight, considering the dynamics of flexible structures.

### Undergraduate Final Thesis

Jan 2020 — Nov 2020

- Computational implementation and Flight/Handling Qualities Analysis of a flexible aircraft derived from a system identification model based on the output error method in SEV (Flight Test Simulator) from Institute of Research and Flight Test (IPEV).

### Scientific Initiation

Oct 2016 — Oct 2017

- Computational simulation of convergent-divergent nozzles for rocket propulsion in Plasmas and Processes Laboratory (LPP) from Aeronautics Institute of Technology (ITA).

## WORK EXPERIENCE

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### Scientific Researcher

Jan 2021 — July 2022

Institute for Advanced Studies (IEAv)

São José dos Campos-SP, Brazil

- Developing algorithms to analyze the flight mechanics/behavior of flexible structures in hypersonic flight regime and in Brazilian hypersonic vehicle project (PROHIPER 14-X).
- Working on the conceptual architecture for electric aircrafts in order to develop some control algorithms considering Model Predictive Control.

### Engineer Intern

Jan 2020 — Nov 2020

Institute of Research and Flight Test (IPEV)

São José dos Campos-SP, Brazil

- Developed the architecture in Simulink Matlab for the Flight Test Simulator, considering the aeroelastic effects of the aircraft modeled by the mean axis method.

### Fighter Pilot Activities

Jan 2011 — Dec 2015

Brazilian Air Force (FAB)

Natal-RN, Brazil

- Flew fighter pilot air defense missions in Amazon rainforest and conducted flight instruction for novice Brazilian Air Force fighter pilots.

## VOLUNTEER EXPERIENCE

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### Aeronautics Institute of Technology

Aug 2019 — Dec 2019

- **Teaching Assistant.** Teaching assistant as a volunteer in undergraduate course on Foundations of Control Theory.

### Own Business

Jan 2021 — Feb 2022

- **Mentoring.** Helping students without financial means to pay for a good preparatory school in their efforts to join great universities, military careers, and STEM careers.

## AWARDS & HONORS

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	Brazilian Air Force Academy Preparatory School
2004	Gold Medal in Brazilian Physics Olympiad
2005	Gold Medal in Brazilian Physics Olympiad
2006	Honorable Mention in Brazilian Physics Olympiad
2006	Bronze Medal in Brazilian Chemistry Olympiad
2006	Gold Medal in Minas Gerais State Chemistry Olympiad
2006	Bronze Medal in Minas Gerais State Mathematics Olympiad
2006	First in class and valedictorian.
	Brazilian Air Force Academy
2010	Cadet Wing Commander
2010	Air Force Prize. Best undergraduate student in the Brazilian Air Force Academy.
2010	INCAER Prize. Best undergraduate student in the Brazilian Air Force Academy.
2010	First in class and valedictorian.
	International Prizes
2010	Aviador "Honoris Causa". Uruguayan Air Force.
2010	Diploma de Honor. Ecuadorian Air Force.
2010	Medaglia dell'Aeronautica Militare. Italian Air Force.
2010	Medalla Fuerza Aérea de Chile. Chilean Air Force.
2010	Prize of Honor. Republic of Korea Air Force.
2011	Medalla al Mérito Mayor General FAP Armando Revoredo Iglesias. Peruvian Air Force.
	Aeronautics Institute of Technology
2017	MTP-02: best engineering fundamentals final design. Development project of a walking stick cane with Arduino, using emitters and ultrasound sensors for use by visually impaired people.
2020	Distinction of the department of fundamental sciences.
2020	<i>Summa cum laude</i> .
2020	CREA Prize. Best undergraduate student in the Aeronautical Engineering Course.
2020	Embraer Prize. Best undergraduate student in the Aeronautical Engineering Course.
2020	Air Force Prize. Best undergraduate military student at the Aeronautics Institute of Technology.
2020	Best undergraduate thesis of the Department of Aeronautical Engineering.
2020	First in class and valedictorian.
	Other Awards
2021	Honor to Scientific Merit. Recognition by the relevant services rendered to brazilian education from Legislative Assembly of Ceará.
2021	Rachel de Queiroz Medal of Merit. Ceará State Fire Department Medal due to relevant services rendered to public education.

## LANGUAGES

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- **Portuguese.** Native language.
- **English.** Full professional proficiency.  
TOEFL: 90/120. Reading: 26/30. Listening: 25/30. Speaking: 17/30. Writing: 22/30.
- **French.** Full professional proficiency.  
DELFB2: 74/100. Production écrit: 19.5/25. Compréhension écrit: 20/25. Production oral: 21/25. Compréhension oral: 13.5/25. Credential ID: 055012-000153.
- **Spanish.** Intermediate level.
- **German.** Basic level.

## HOBBIES

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- Running, swimming and physical exercise in general.
- Martial arts: Karate and Brazilian Jiu-Jitsu.
- Reading philosophy and history.

- Attending and learning with massive open online courses.