

# CubeSat Quetzal-1: The First Guatemalan Satellite Legacy

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KiboCUBE: Expanding Possibilities for Space  
Emerging Countries  
Jun 2023



# ABOUT CUBESAT QUETZAL-1



- First Guatemalan satellite, winner of the 2<sup>nd</sup> round of the KiboCUBE program
- Deployed from the ISS in 2020
- Mission: Design, develop and operate a CubeSat satellite, testing a prototype of a multispectral sensor
- Objectives:
  - Introducing aerospace field in Guatemala
  - Develop capacities
  - Provide students the opportunity to work in a real space project
  - Motivate more children and youth to study science and engineering in Guatemala



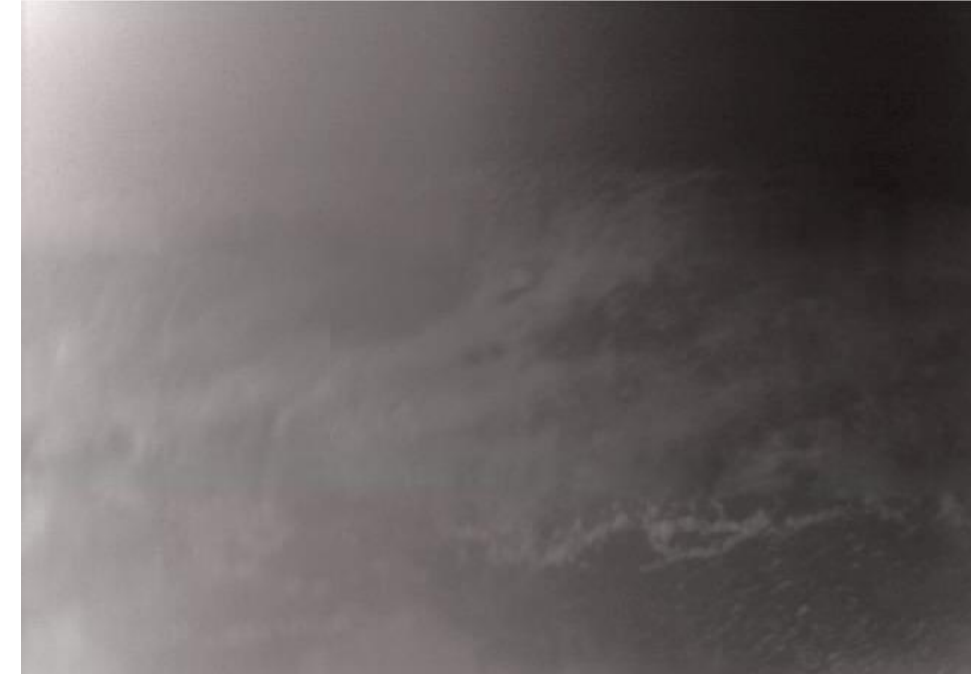


# SOME ACHIEVEMENTS

- Winner of:
  - 2nd round of the KiboCUBE program of UNOOSA & JAXA in 2017
  - Team recognized as person of the year in Guatemala 2019 by newspaper Prensa Libre
  - People's Choice Award of AIAA in 2020
  - CubeSat Delivery Initiative of Arizona State University Interplanetary Initiative in 2022
- Also nominated for the "Small Satellite Mission of the Year" award of AIAA in 2020

# Technical results

- Almost **85,000** data packages received on Earth during the 211 days Quetzal-1 operated in space
- **Six of eight modules** of the satellite were developed in UVG
- **First images** received on Earth taken by a satellite made in Central America



The clouds of hurricane Iota over the Atlantic Ocean, on Nov-17, 2020. Image taken by Quetzal-1





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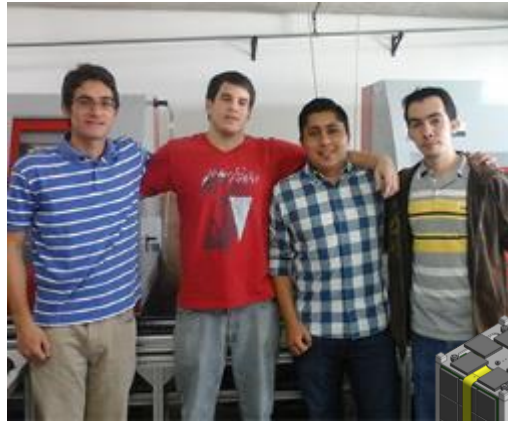
The real impact is  
more than just a  
satellite in space

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# Developing capacities

- More than **100 students**, faculty and counselors worked on Quetzal-1, with an average of **21 years-old**
- **13 courses** in engineering at UVG, use examples and materials of Quetzal-1



Phase 1: 2014



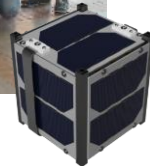
Phase 2: 2014-2015



Phase 3: 2015-2016



Phase 4: 2016-2017



Phase 5: 2017-2018



Phase 6: 2019





# The Aerospace Laboratory at UVG

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- New generation of students continue working on developing technologies for CubeSats in the aerospace laboratory at UVG
- The laboratory receives continuous visits from schools
- Other space missions:
  - DSRG: pieces manufactured for this experiment launched in Artemis I
  - Space Biofilms



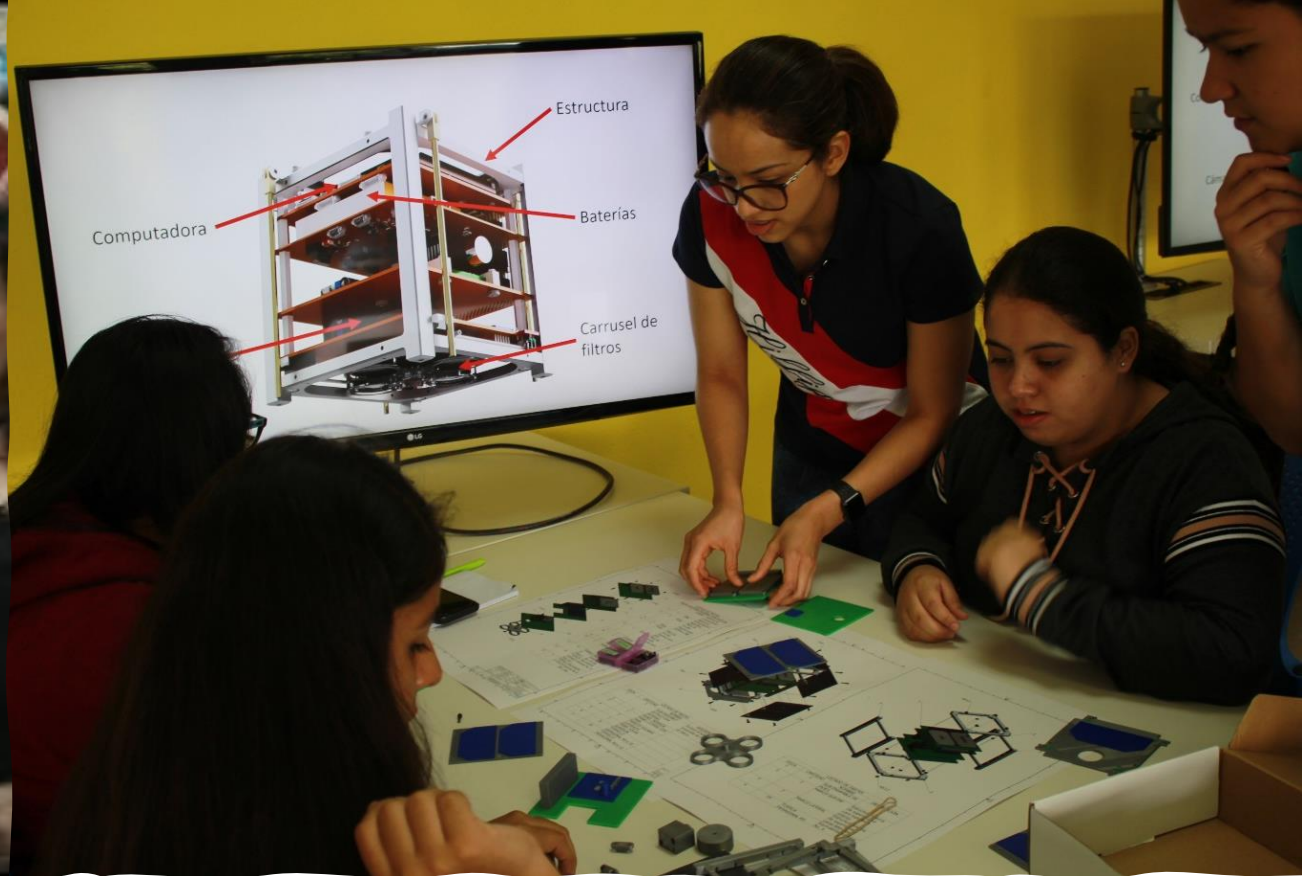


## **Eliminating barriers**

Legal regulations in Guatemala did not include frequencies to communicate with low earth orbit satellites

Due to Quetzal-1, the Superintendencia de Telecomunicaciones en Guatemala (SIT) approved a modification in the local regulations that established free frequencies for this, for research purposes





Images credit: Prensa Libre / UVG

Quetzal-1 helped to promote balance gender  
in engineering

# After Quetzal-1 in Guatemala

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The National Secretary of Science and Technology works educational workshops in schools about Quetzal-1

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An initiative to create a National Secretary of Space was proposed in Congress

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Two more universities in Guatemala started projects related with space

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Guatemala became a COPUOS member in 2022





Since Quetzal-1 motivated the next generation in Guatemala to **believe everything is possible**





New enrollment in  
Mechanical Engineering at  
UVG **grew 176%** in 2020

Now these new students  
ask when are they going to  
send to space **Quetzal-2?**

JAXA

LIVE

1 Quetzal-1

Thank you very much  
KiboCUBE!

International Space Station

Image credit: JAXA / NASA



JAXA