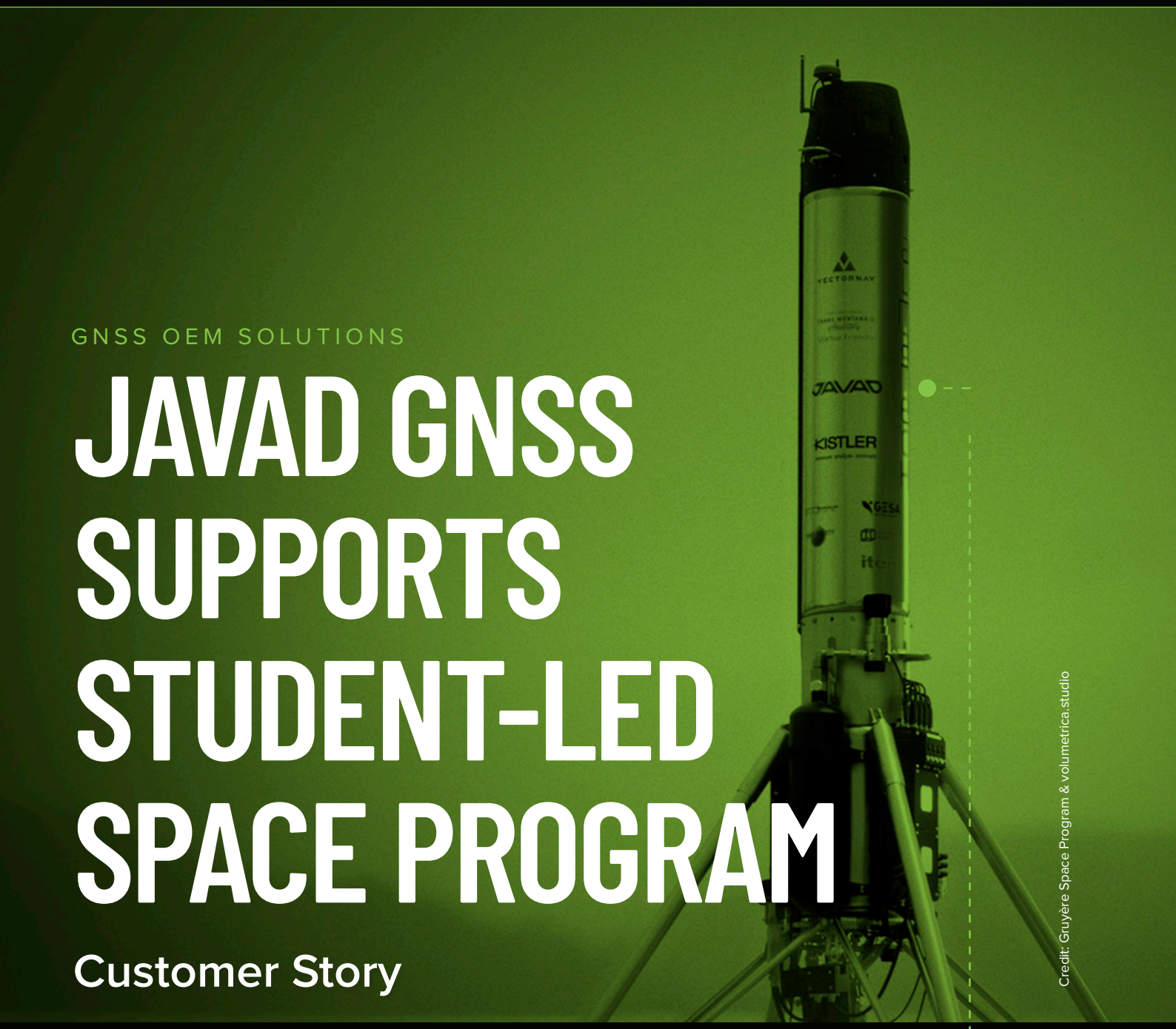
GNSS OEM SOLUTIONS

JAVAD GNSS SUPPORTS STUDENT-LED SPACE PROGRAM

Customer Story



Credit: Gruyère Space Program & volumetrica.studio

- The Gruyère Space Program (GSP) is a student-led program of 15 students that developed a reusable rocket: Colibri. The team utilized the JAVAD TR-2S GNSS OEM to consistently maintain a 1cm fix throughout Colibri's 100-meter flight,

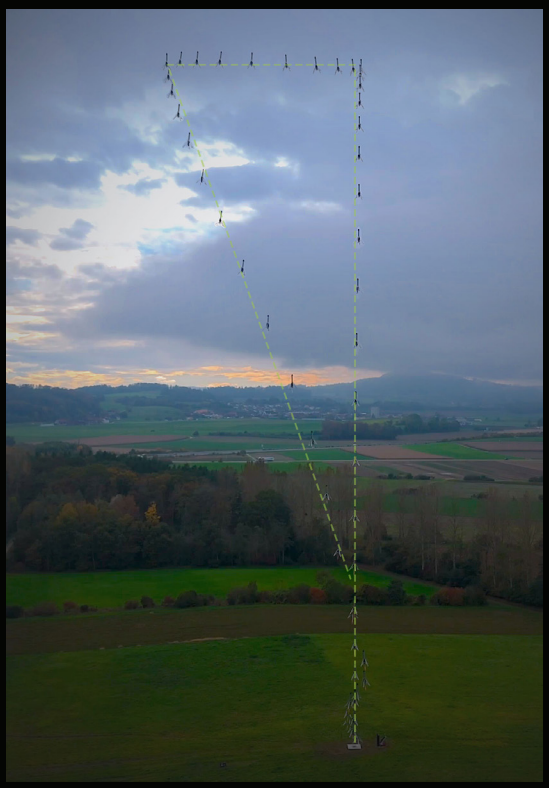
GSP
Gruyère Space Program

Guiding the Gruyère Space Program Mission

SUMMARY

For three years, the Gruyère Space Program (GSP), composed of 15 students primarily from the École Polytechnique fédérale de Lausanne (EPFL), assembled for a project to develop and successfully fly a unique reusable rocket: Colibri.

Colibri is the first rocket hopper to fly freely in Europe — a significant milestone in European aerospace.



MISSION OVERVIEW

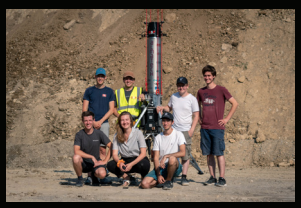
The Colibri project was intended to demonstrate the feasibility and precision of reusable rocket technology, achieving a world first in student-led aerospace associations. Over 50 flight tests were conducted, culminating in groundbreaking achievements such as Colibri's ascent to 105 meters and its precise vertical landing.

THE ROLE OF JAVAD GNSS

The success of Colibri's flights hinged on reliable navigation and control systems. The JAVAD GNSS OEM TR-2S consistently maintained a 1cm fix throughout Colibri's 100-meter flight, despite the harsh vibrations and dynamic flight conditions.

JAVAD's GNSS solutions ensured precise real-time tracking, enabling Colibri to maintain stability and meet its targeted trajectories.

Over three consecutive days, Colibri performed a series of eight free flights, progressively increasing in altitude and complexity. The climax was Colibri's 105-meter flight, a milestone achieved with the absolute precision provided by JAVAD GNSS systems.



TECHNICAL ACHIEVEMENTS

- **Thrust Vector Control (TVC):** The engine's orientable engine, guided by real-time data from the navigation system, maintained the rocket's stability throughout its flight, akin to balancing a pencil on a fingertip.
- **Rocket Engine:** Colibri's N2O/IPA engine, capable of delivering 1kN of thrust adjustable between 25% and 125%, was pivotal in achieving precise altitude control.
- **Cold Gas Thrusters:** These prevented undesirable spin, ensuring Colibri's correct orientation, informed by the navigation system.
- **Inertial Navigation System (INS) Integration:** Coupled with the JAVAD RTK GNSS data, the INS provided comprehensive insights into the rocket's movements, critical for dynamic adjustments during flight.