

# Iridium 9523 Satellite Modem Development Platform and Integration

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## Background

Current satellite communication schemes by the Vandal Atmospheric Science Team and NASA's TechEdSat use a Short Burst Data mode to transmit single data packets at regular intervals. Upgrading to the Iridium 9523 Modem enables the Dial-Up data streaming mode that significantly increases throughput at critical intervals of flight.

## Objectives

- Design dial-up data system for planetary probes
- Learn to interface with 9523
  - Required hardware
  - Software libraries
- Demonstrate on near-space flight
- Integrate with TechEdSat

## Members

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## Electrical Design

A development printed circuit board (PCB) was designed to breakout the power and data interfaces of the modem. Design took place in EAGLE and power electronics simulation took place in LTspice. Verified component layouts from this PCB will be transferred to the TechEdSat hardware stack.



## Flight Software

A C++ class breaking out all the 9523's functionality allows simple interfacing of any Arduino-based microcontroller and the 9523 in the Short-Burst Data and Dial-Up modes. Flight software can take advantage of these methods to be easily adapted to the mission. The 9523's software interface is thoroughly documented to simplify implementing flight software.

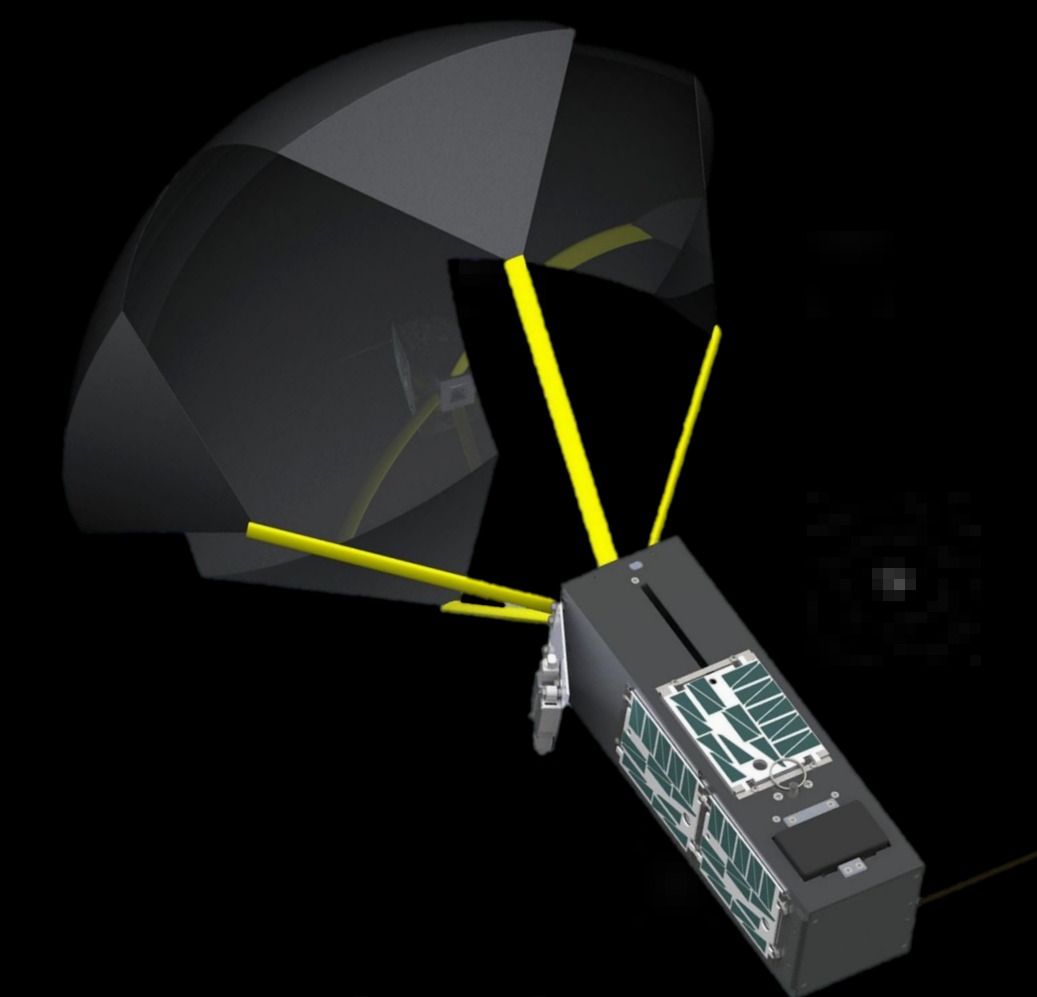
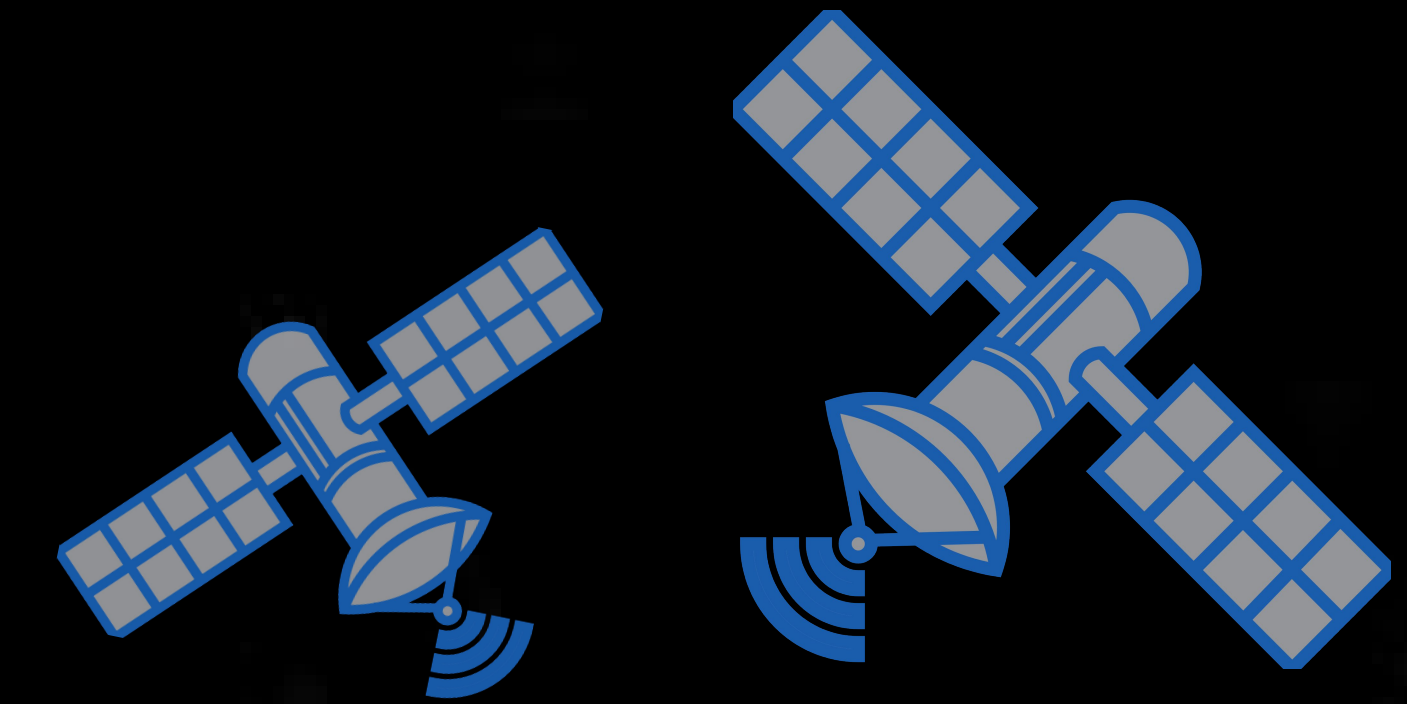
## Server Software

Once the modem dials-up, a C++ server on the ground acts as a hub for receiving the data stream and transmitting responses and commands.

Ground Station



Iridium Constellation



TechEdSat

Iridium Gateway



## Special Thanks

Marcus Murbach and the TechEdSat Team (NASA ARC),  
Dr. Feng Li (UI), Dr. Ata Zadehbol (UI), Mike McMenemy (UI)



engineering • design  
expo 2017