



EyeStar-S2 Satellite Simplex Radio

Globalstar, 200 Kbytes/day*, Anywhere-Anytime,
Flight Ready, TRL 9

Features

- Flight Ready
 - Technical Readiness level 9
 - 3 LEO Flights: TSAT, GEARRS #1 & 2
 - Orbit tested from 110 to 700 km
 - FCC & Globalstar license approved
 - Commercial & Research Link
 - Ideal for Beacon, GPS, summary data
- Good link from tumbling satellite (< ~3rpm and 360 degree link)
- Ground Segment Included
 - No Ground Station Required
 - Near Real-time data to your server
 - Console display software included
- Fully Operational Globalstar & NSL ground segment for data & display
- 9 Bytes/sec, data transferred continuously,
- About 70% connect time
- RF packets received a few seconds after first turn-on for con-ops
- Near Real-time data latency: ~1s
- Microchip Flight micro-controller included, analog and digital IO
- Globalstar ~30 satellites at 1414km
- Globalstar Capacity for TT&C for 1000's of satellites
- Ideal for MultiSatellites: Unified/Time-Ordered Smallsat Database
- Critical Piece for Mission Success

Notes and References

- 1) Globalstar Experiment And Risk Reduction Satellite (GEARRS-AFRL): 2015 inorbit tested Simplex, Duplex SMS, Gateway connects, Duplex connects, & Signal Strength (RSSI).
- 2) Coverage Maps Available.
- 3) ICD and STEP Files Available
- 4) AIAA Small Sat Paper: SSC14-WK-6, 2014 First results TSAT/Globalstar, Voss
- 5) Data Cost Table available
- 6) Simplex and Duplex inventory in Stock

*Not fully tested at this rate in orbit

Specifications

Mechanical:

Dimensions: 6.1 X 11.9 X 11.9 cm

Weight: 45g

I/O Interface: microD-9pin IO connector

Antenna: SMA TX ceramic patch

25 mm side square by 4mm high

Cooling: Thermal radiator shield

Enclosure: Open or Shielded

Electrical:

Input voltage range: 7-20 V

Input voltage nominal: 10 V

Power-up current: 20mA@ 10 V

Tx Current: 200mA @10 V

Supply Power: 1.5W while Tx

RF:

Aerospace Modem STX-2

Tx: 1616.25 MHz downlink

BPSK Modulation

Radio Astronomy freq. exclusion

Passive patch antenna

Max Tx power: +29dBm (800mW)

ERP: ~200mW

Input Power Transmit: 1 W

Data I/O

Data input: 38,400 bits/s

Effective data rates: 72 bits/s

TTL serial Interface

Microcontroller

Ck Freq: 20 MHz

6 analogs and 4 digital inputs

Include Temp and Bus Voltage

Flight Beacon controller

Custom Software

Note: Specifications subject to change without notice (please check with us for updated information)

Environmental /Flight Testing

Temperature:

Passive heat sink/radiator

Antenna: -50 to +85 C

Radio: -40 to +85 C

Non Operational: -60 to - 100 C

Vibration:

Atlas Rocket/PPOD: 28g

Orbital/Nanoracks: 20g

SpaceX/PDOD: 20g

Dose Radiation:

Spot Shielding

Now 5 months in 350 by 700 km orbit

No dose problems or upsets in SAMA

QA Radio Testing:

Vibration & Vacuum test

Temperature testing

Multi-day Burn-in

Final System Testing

Server/Radio Testing

Certification

In-Orbit Reliability

All 5 of 5 Simplex & Processor units worked on 3 satellites (TRL-9)

Customers

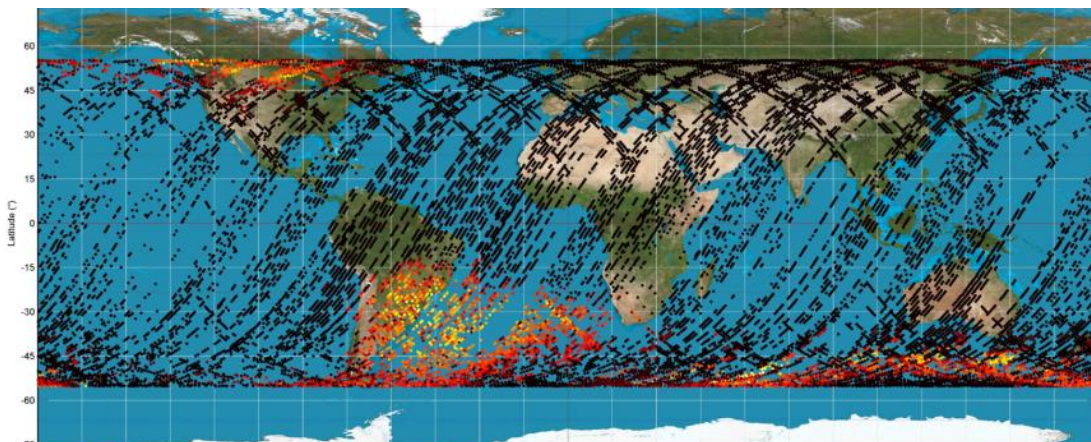
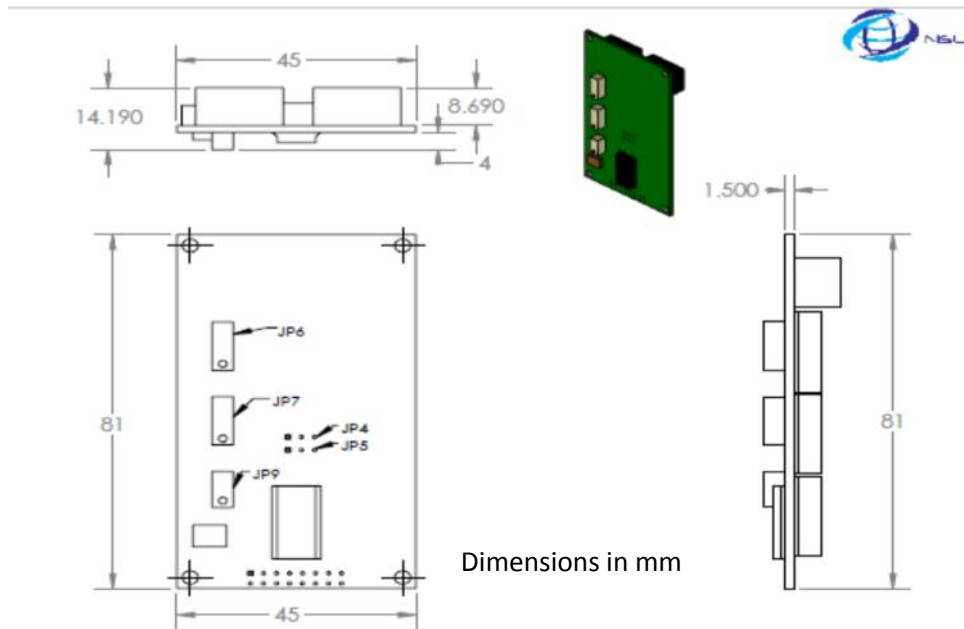
AFRL, NASA Langley, NASA GSFC, Pumpkin Inc., many Universities

Options

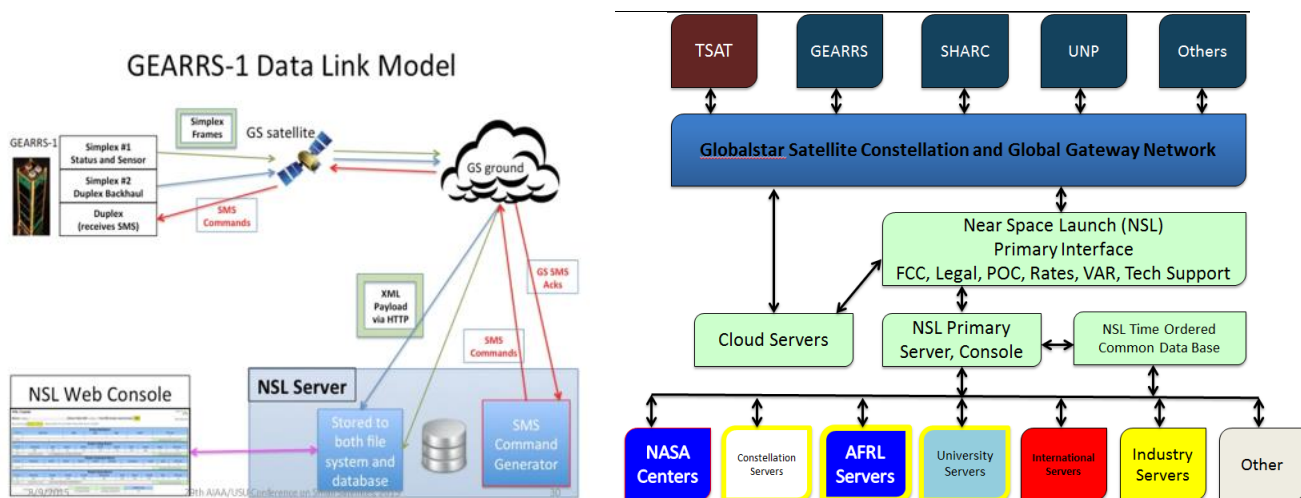
- Flight Model (FM): S2F
- Engineering Model (EM): S2E
- STX-3 ½ Size, 20g (TRL=7) S3E,S3F
- FCC License
- Custom modification support
- Academic rate available



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Example of STX-2 Simplex energetic particle data from several orbits of GEARRS2. Small gaps in track show duty cycle of transmitter and long gaps due to sun sync of 78 packets of data sequence to save system power . Note the South Atlantic Magnetic Anomaly (SAMA) and the Aurora Oval. GEARRS simplex coverage maps (Ref. 4) are very uniform over the entire earth with a weaker coverage area in the Pacific Ocean. The 53 deg. latitude cutoff is due to the GEARRS Sat. inclination and not due to the Globalstar link.



- NSL Inc. is a certified Value Added Reseller (VAR) of Globalstar Satellite radios with its approved FCC, EMI, & Globalstar EyeStar products (<http://www.globalstar.com/en/index.php?cid=2560>).