



EyeStar-S3 Satellite Simplex Communications System

End-to-End System, Globalstar Connected,
Max 600 Kbytes/day, Anywhere-Anytime,
Flight Ready, TRL 8, Compliant with new FCC requirements

Features

- Flight Ready (Based on EyeStar-S2 performance)
 - Technical Readiness level 8
 - 5 S2 LEO Flights: TSAT, GEARRS 1 & 2, SHARC, Challenger
 - S2 Orbit tested from 110 to 700 km
 - FCC & Globalstar license compliant
 - Commercial & Research Link
 - Ideal for Beacon, GPS, summary data
- Good link from tumbling satellite (< ~3rpm and 360-degree link)
- Microchip Flight micro-controller included, analog and digital IO
- 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
- Globalstar ~30 satellites at 1414km
- Globalstar Capacity for TT&C for 1000's of satellites
- Ideal for Multi-Satellites: Unified/Time-Ordered Small Sat Database
- Critical Piece for Mission Success
- Fits PocketQube Specifications

Notes and References

- 1) 100% on-orbit success
- 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) AIAA Small Sat Paper: (SSC16-WK-11), Globalstar link results, Voss
- 6) Data Cost Table available
- 7) Simplex and Duplex inventory in Stock

Specifications

Mechanical:

Dimensions: 8.4 X 25.6 X 51 mm
Weight: 11g
I/O Interface: DF13, 14-Pin
Comm Port: DF13, 4-Pin
Antenna: SMA TX ceramic patch
25 mm side square by 7 mm high
Cooling: Thermal radiator shield
Enclosure: Open or Shielded

Electrical:

Input voltage range: 5.5-16 V
Input voltage normal: 7 V
Idle current: 29.6 mA @7.0 V
Tx Current: 392 mA @7.0 V
Supply Power: 2.75 W while Tx

RF:

Aerospace Modem Globalstar STX-3
Tx: 1616.25 MHz downlink
BPSK Modulation
Radio Astronomy freq. exclusion
Passive patch antenna
ERP: 110 mW (+20.43 dBm)

Data I/O

Data input: 38.4 Kbps
Comm Port: Tx, Rx, Bus+, GND
Effective throughput: 9 Bytes/s
TTL serial Interface

Microcontroller

Ck Freq: 20 MHz
10 I/O Lines: User defined, configurable for analog, digital, one wire, counter rate, or comm ports
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

Based on EyeStar-S2 Performance:

Temperature:

Passive heat sink/radiator
Antenna: -50 to +85 C
Radio: -40 to +60 C
Non-Operational: -60 to +100 C

Vibration:

Delta: 30g
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, Thermal testing
Multi-day Burn-in
Final System Testing
Server/Radio Testing
Certification

In-Orbit Reliability

All 7 of 7 EyeStar-S2 Simplex & Processor units worked on 5 satellites (TRL-9)

Customers

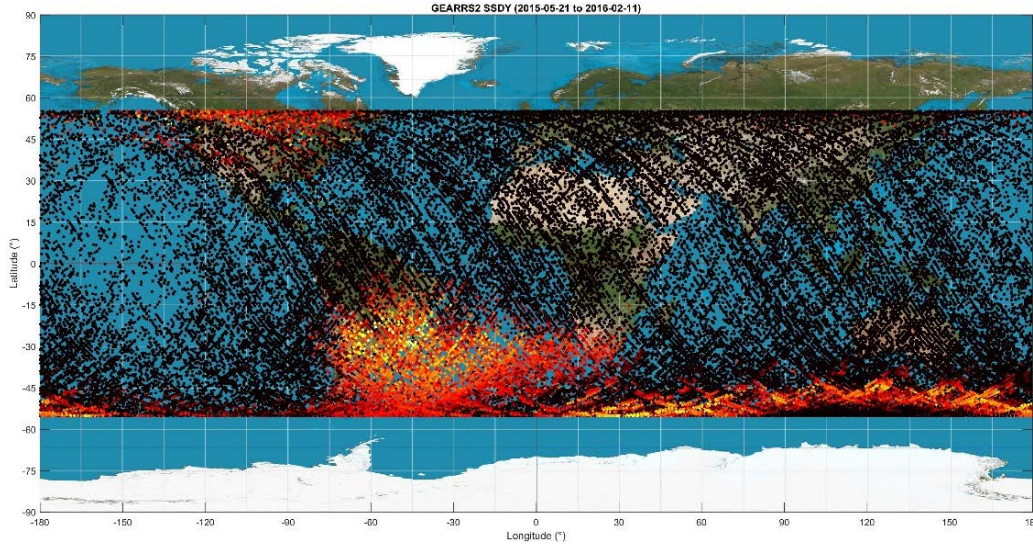
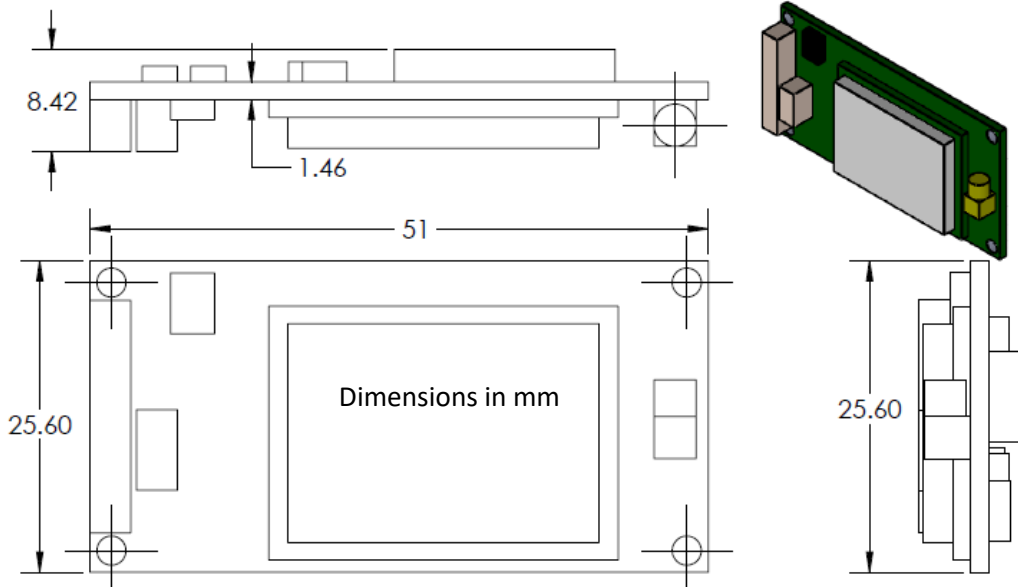
AFRL, NASA Langley, NASA GSFC, Pumpkin Inc., Nanoracks, many Universities

Options

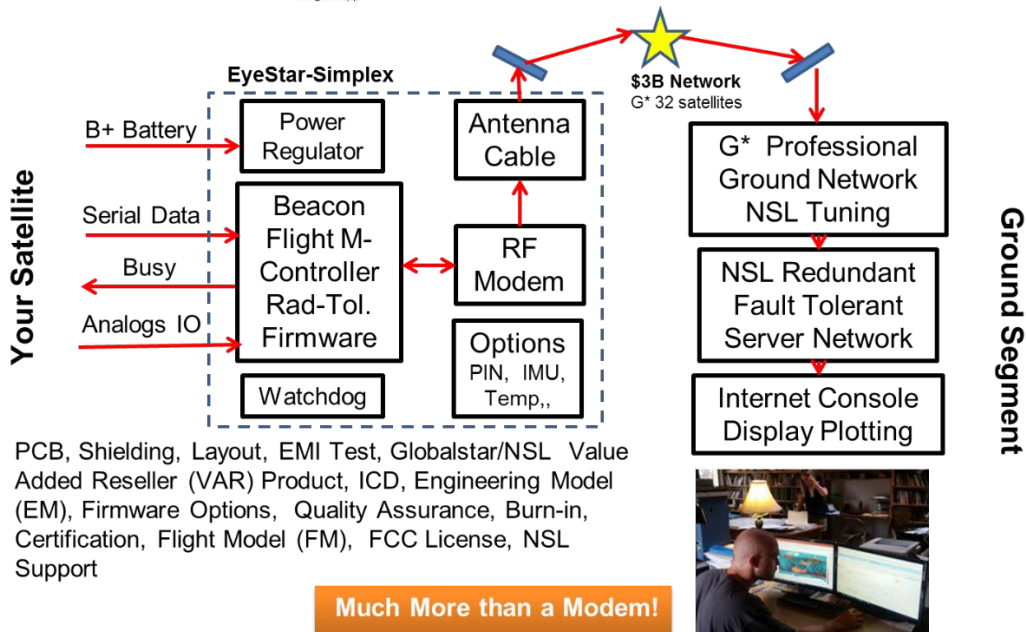
- Flight Model (FM): S3F
- Engineering Model (EM): S3E
- Custom modification support
- Pumpkin/PC104 Standard form factor
- Academic rate available



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Example of EyeStar-S2 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. 4,5) 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 GEARRS2 Sat. inclination and not due to the Globalstar link.



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