V3.2

EyeStar-D2 Satellite Duplex Communications System

End-to-End System, Globalstar Connected, Global Coverage, Max 30Mbytes/day*, ARM, Flight Ready, TRL 9, Compliant with new FCC requirements

Features

- Flight Ready
  - Technical Readiness Level 9
  - Flights on GEARRS1 & 2, SHARC, …
  - Orbit tested from 300 to 700 km
  - FCC & Globalstar license compliant
  - Commercial & Research comm. link
- Ground Segment Included
  - No Ground Station Required
  - Near Real-time data to your server
  - Mission Console display software
- Fully Operational Globalstar & NSL ground segment for data & display
- Globalstar Capacity for TT&C for 1000's of satellites
- 700 Bytes/sec, data transferred continuously >25% connect time
- Near Real-time data latency
- ARM comm/flight processor
- Globalstar constellation ~30 satellites at 1414km
- Ideal for multi-Satellites (100s): Unified/Time-Ordered Small sat Database
- Critical Piece for Mission Success

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 rate and cost table available
7) EM & FM Simplex/Duplex in stock

*Not fully tested in orbit at this time

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

Specifications

Mechanical:

Dimensions: 6.1 X 11.9 X 2.2 cm
Weight: 138 g (0.30 lbs)
I/O Interface: DF13-12 pin
Antenna: SMA dual RX/TX
6 cm dia. mounting by 1cm high
Cooling: Thermal radiator shield
Enclosure: Open or Shielded

Electrical:

Input voltage range: 6 to 20V
Input voltage nominal: 7V
Power-up current: 121mA@ 7V
Supply Power: 1.2W RX, 2.2W TX

RF:

GSP-1720 Aerospace Modem
Tx: 1610 to 1625 MHz downlink
Rx: 2484-2499 MHz uplink
Channel Access: CDMA Code Division
Radio Astronomy freq. exclusion
Active patch antenna (pts upward)
Max Tx power: +29dBm (800mW)
ERP: +34 dBm (~1W)
Typical Power Transmit: 3.7 W
Link Margin: high, no atmosphere

Data I/O

Data input: 9600 bits/s full duplex
Effective data rates: 7000 bits/s
Handshaking and validated data
SMS Messaging: 35 characters input

ARM9 Processor 1 GHz

Clock Freq: 400 MHz
Debian Operating system
TCP-IP comm. protocols
8 GByte microSD
Custom programing available
Re-programmable in orbit
Data encryption available

NSL: NearSpace Launch
Technology. Service. Education

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Environmental /Flight Testing

Temperature:

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

Vibration:

Atlas Rocket/PPOD: 28g
Orbital/Nanoracks: 20g

Dose Radiation:

Al and Ta spot shielding
60 days in 350 by 700 km orbit
No upsets in SAMA

QA Radio Testing:

Vibration & Vacuum
Temperature testing
Multi-day burn-in
Final System Testing
Server/radio testing
Certification

In-Orbit Reliability

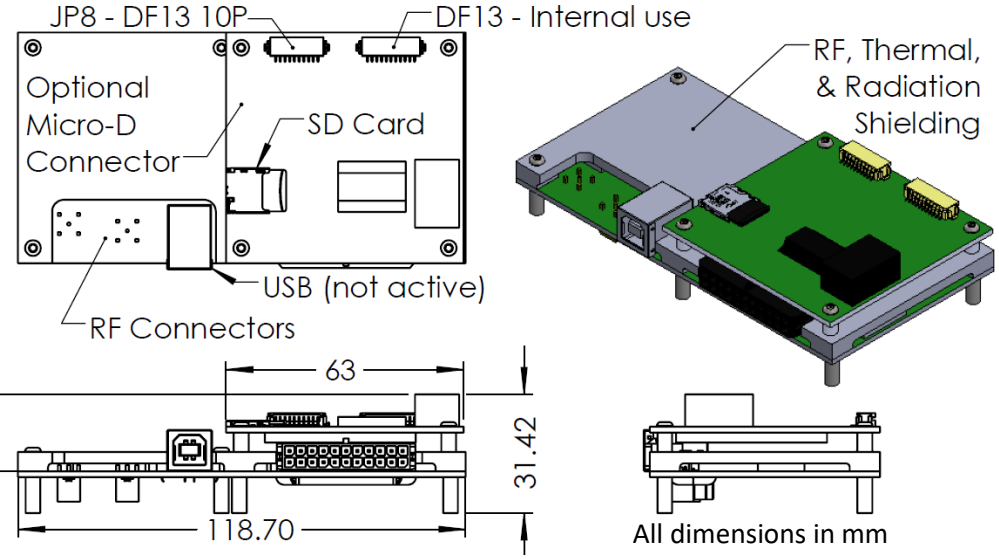
All 10 of 10 Simplex & Processor units worked on 8 satellites (TRL-9)
All 4 of 4 Duplex & Processor units worked on 4 satellites (TRL-9)

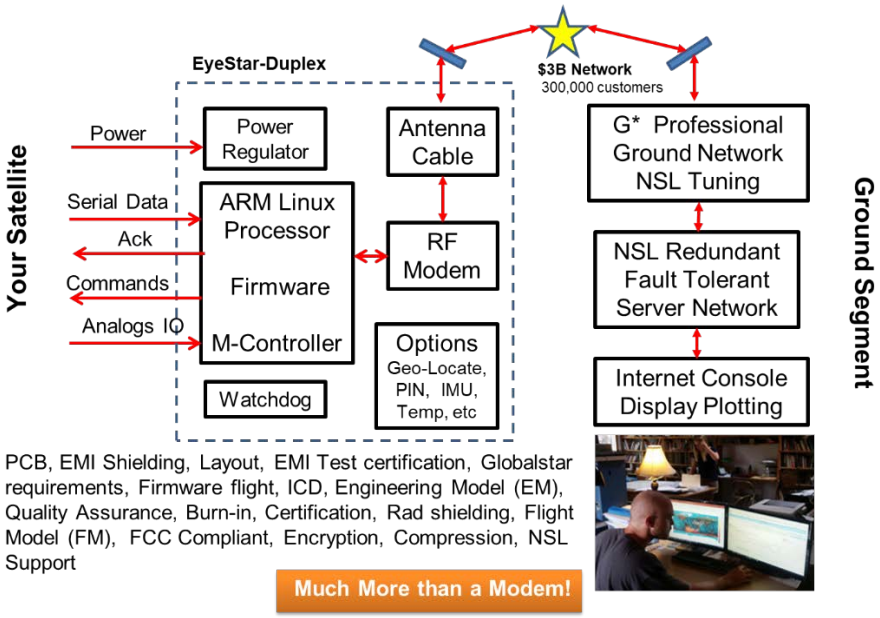
Customers

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

Options

- Engineering Model (EM): D2E
- Flight Model (FM): D2F
- No ARM processor, use desired processor
- Duplex SMS Command Only: D2CE, D2CF (No ARM processor)
- Geolocation Software Resolution 300 m to 100 km*
- microD-9pin IO connector
- Custom modification support
- Helical High-Gain antenna recommended for ground testing
- Academic rates available

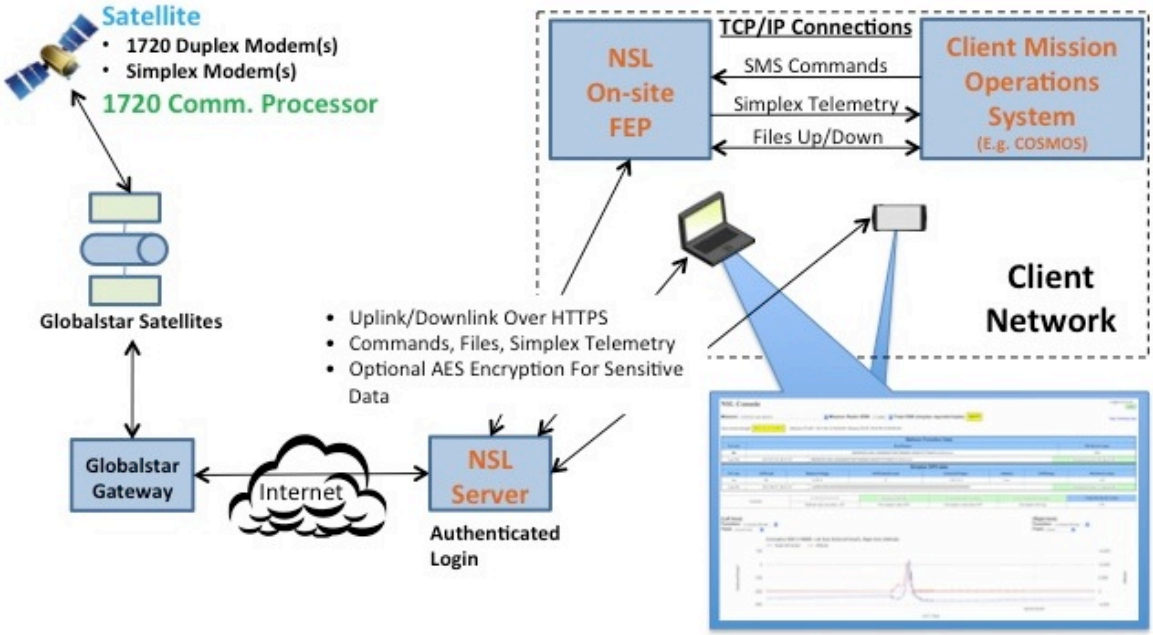




2-way commanding,
30 MB/day, 25-50%
Anywhere/Anytime data, ARM processor, Geolocation, Handshaking,
4 of 4 Validated in LEO Orbit!
3 week available NSL Stock

PCB, EMI Shielding, Layout, EMI Test certification, Globalstar requirements, Firmware flight, ICD, Engineering Model (EM), Quality Assurance, Burn-in, Certification, Rad shielding, Flight Model (FM), FCC Compliant, Encryption, Compression, NSL Support

Much More than a Modem!



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