How do we do the same as the big boys?
Enabling Systems and Technologies
for Advanced Small Satellite Engineering

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SSTL-300 Platforms

- The first SSTL-300 spacecraft is to be launched later this year – NigeriaSat-2.
- S1 variant incorporates a larger payload with 0.75m GSD,
NigeriaSat-2 Flight Model
NigeriaSat-2 Flight Model
EO Requirements

• SSTL has had many EO customers and some themes are common:
  – Range of products
  – Capacity
  – Timeliness
  – Image quality

• All of these are achieved by the SSTL-300 platforms by using the technologies described here.
Range of Imaging Products

- **SSTL-300** incorporates two payloads:
  - **VHRI**: 2.5m GSD (PAN)
    5m GSD (R, G, B, NIR)
  - **MRI**: Multispectral 32m GSD or 22m GSD

- **SSTL-300 S1** incorporates enhanced payload:
  - 0.75m GSD (PAN), 3m GSD (R, G, B, NIR)

- Agile imaging modes supported by both platforms
Agile Mode Example: Mosaic
Capacity: SSTL-300

- 16Gbyte High Speed Data recorder
- X-Band downlink at 210Mbps
  - 400Mbps upgrade under development
- Antenna Pointing Mechanism to track GSN during spacecraft slews & imaging
Timeliness: Near Real Time
Timeliness

- Agile targeting capability operates over a wide +/-45deg slew range
- Global access every 2 days
Constellations

- Constellations improve timeliness and past experience has demonstrated this:
  - Disaster Monitoring Constellation (DMC)
  - RapidEye Constellation
Image Quality: Payload Isolation

- Geolocation without GCPs
  - < 35m CE90
- Thermo-elastic relief:
  - Compliant mounts for bench
  - 7x 1DoF compliant links
- High-freq attenuation
  - Removes mechanical noise
- Launch lock
  - Low-shock release system

Payload Optical Bench Assembly
Micro-vibration Testing

- Testing of fully assembled spacecraft
- Isolated from environmental noise
- Payload used to measure induced mirror motion
- Illumination centroid monitored while Microwheels and Antenna Pointing Mechanisms are running
Conclusions

• Requirements for competitive Earth Observation platforms are wide-ranging:
  – Full Range of products
  – High Capacity
  – Excellent temporal resolution
  – Exceptional Image quality

• SSTL-300 platforms provide all of this in a Small Satellite solution.
Changing the economics of space