Rich Data, Cheap Satellites

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SSC17-XI-06
31st Annual AIAA/USU Conference on Small Satellites

10th August 2017
The growth in performance of small satellites has driven a step change in the availability of EO data.

But a divergence is developing between spatial resolution and temporal resolution.

The pursuit of ever higher resolutions is not solving the needs of some of the largest EO data users.
How to generate timely, high quality data for daily monitoring of Earth?
UrtheDaily: global daily coverage at true 5m, providing high radiometric and geometric quality data

- **Constellation Design**: 8 satellites equally spaced by 45° in a single plane
- **Orbit**: 600 km SSO, LTAN of 10:30
- **Data Downlink**: Two X-band transmitters per satellite, 500 Mbps per X-band transmitter
- **Mass Memory**: Two 1.5 TeraByte Payload Data Handling Units
- **Propulsion Type**: Xenon
- **Delta-V**: 56 m/s
- **OAP**: 230 W
- **Mass (wet)**: 372 kg
- **Lifetime**: 10 years
- **Spectral bands**: 6
- **Ground Sample Distance (native)**: 5 m (@600 km altitude)
- **Swath**: 360 km (@600 km altitude)
Great data, still R,G,B,NIR images... how to improve the value of data to the users?
Driving towards rich, multidimensional data sets.
OptiSAR: co-temporal acquisition of still images, video and SAR using 8 pairs of Optical and SAR satellites in two orbital planes.

The SAR satellite can cue image acquisition of optical satellite.
Based on the SSTL300 platform the OptiSAR satellite design is driven by the size of the instruments, propulsion requirements (to fly below 500km altitude) and power requirements.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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<tbody>
<tr>
<td>Aperture</td>
<td>0.56 m</td>
</tr>
<tr>
<td>Swath width</td>
<td>12.28 km (pushbroom)</td>
</tr>
<tr>
<td></td>
<td>1.9 x 2.5 km (video)</td>
</tr>
<tr>
<td>Ground sampling distance</td>
<td>0.5 m PAN, 1.0 m MS</td>
</tr>
<tr>
<td>(Native)</td>
<td>0.5 m Video</td>
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<tr>
<td>Spectral Bands - Pushbroom</td>
<td>Panchromatic</td>
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<tr>
<td>Spectral Bands - Video</td>
<td>Blue, Green, Red, NIR,</td>
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<tr>
<td></td>
<td>Red-Edge, Yellow</td>
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<tr>
<td>Video frame rate</td>
<td>30 fps</td>
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SAR Modes

Note: all modes are available left or right looking

Note: when resolutions vary with incidence angle, the minimum and maximum are noted.

- L-Band ScanSAR 30m
- Dual-Band Multi-Ap StripMap 1m - 3.5m
- X-Band StripMap 1m - 3.5m
- L-Band StripMap 7.5m Multi Pol
- L-Band Quad StripMap L: 7.5m - 20m
- Dual-Band Multi-Ap StripMap X: 1m - 3.5m L: 7.5m Multi Pol
- Dual-Band Multi-Ap StripMap X: 1m - 2m L: 7.5m - 20m
- X-Band Spotlight X: 1.1m - 2m
- Spot Pol mode
- Quad Pol mode
- Sub-Satellite Ground Track (Nadir)
- Satellite Velocity Vector