Impact of Spot 6 and 7 in the Constitution and Update of Spatial Data Infrastructures over Africa

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Summary

- Balancing Continuity & Innovation for African SDI
- Spot 6 & 7 characteristics
- Tasking capabilities in complex situations
- Geometric performances
- Spatial resolution fitted for most African landscapes
- Feature extraction capabilities
Balancing Continuity and Innovation

- Spatial Data Infrastructures (SDI) are an essential asset for socioeconomic development.
- For 10 years, Spot 5 has been the cornerstone of African SDIs (both in defense and civilian domains). Those SDIs must be updated and improved.
- Requirements are evolving from base maps to value added geospatial products and must adjust to new technological frameworks (like Galileo) and user experiences (like the Geoweb).

Image providers like Astrium must offer Continuity and Innovation.
### SPOT 6 & 7: leveraging over SPOT 5

<table>
<thead>
<tr>
<th></th>
<th>SPOT 5</th>
<th>SPOT 6</th>
<th>SPOT 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>3 000 kg</td>
<td>712 kg</td>
<td></td>
</tr>
<tr>
<td>Design Lifetime</td>
<td>5 years</td>
<td>10 years</td>
<td></td>
</tr>
<tr>
<td>Product resolution / swath</td>
<td>2.5 m / 2 x 60 km</td>
<td>1.5 m / 60 km + multi-strip in single pass</td>
<td></td>
</tr>
<tr>
<td>Image geometry</td>
<td>25-30m rms native (w/out GCP)</td>
<td>50m rms native (w/out GCP)</td>
<td></td>
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<tr>
<td></td>
<td>HRS sensor to build Reference3D</td>
<td>5-10m CE90 with Reference3D</td>
<td></td>
</tr>
<tr>
<td>Daily acquisition capability</td>
<td>Average 2 Mkm² / day</td>
<td>Average 2.2 Mkm² / day / sat</td>
<td></td>
</tr>
<tr>
<td>Agility</td>
<td>Roll only (mirrors)</td>
<td>All axes, 30° in 14 s</td>
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<tr>
<td>Single pass stereo capability</td>
<td>Stereo through HRS (5m P)</td>
<td>Stereo and tri-stereo (1.5m PXS)</td>
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<tr>
<td>System tasking reactivity</td>
<td>1 mission plan / day</td>
<td>6 missions plans / day / satellite</td>
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</tbody>
</table>
SPOT 6 Beijing (China)
SPOT 6
extract over Dar es Salam (Tanzania)
SPOT 6 | SPOT 7 acquisition modes

- **Long band**
- **Target**
- **Multi bands**
- **Corridor**
- **Stereo – Tri-stereo**
SPOT 6 in action

Coverage of Mali
1.250 M km²
100% cloud free

5 Months only
October 17th - March 15th
SPOT 6 in action over Gabon (2/3)

Spot 5 in 9 years
10% cloud

Spot 6 in 4 months
10% cloud
As an average, SPOT 6 collected 50 M km²/month since Jan. 2013.
Horizontal & vertical accuracy of SPOT 6

- Monitored on various sites, SPOT 6 horiz. accuracy without GCP is < 20m CE90 @30° (vs 50m before-launch specification)

- SPOT 6 horizontal accuracy using perfect GCPs and DEM:
  - specified before launch « better than 1 pixel CE90 »
  - assessed on the Ste Victoire test site (100+ GCPs) : 1.20m CE90

- A real-life SPOT 6 block over Mali (5 long images, multiple land covers and dates and incidence angles, DTED 2 DEM…) provided SPOT 6 orthoimages qualified (vs. 950+ points) with a < 5 m rms horizontal error.

- DEM extracted from SPOT 6 stereodata showed a vertical accuracy <2m LE90 (vs.100+ GCPs)

→ SPOT 6 geometry/ accuracy qualifies for 10 – 20 k scale mapping
Spatial Resolution matching the requirements of African landscapes interpretation

- Areas really requiring VHR imagery: < 1-3%
- SPOT 6 HR imagery = homogeneous and adequate coverage over the remaining 97-99%
SPOT 6 feature extraction capabilities (1/4)

Improved performances over Spot 5 and MR satellites

Edge resolution capacities on SPOT 5 imagery

Better resolution capacities on SPOT 6 imagery
SPOT 6 feature extraction capabilities (2/4)

Improved performances over Spot 5 and MR satellites

SPOT 6 1.5m-resolution Pan-sharp image

Urban

Floodplain

Mine

Mixed
SPOT 6 feature extraction capabilities (3/4)
Possible ID of objects which, before, required VHR imagery

SPOT 6 1.5m-resolution Pan-sharp image

VHR image
Credits Google Earth/DigitalGlobe

pylon
**SPOT 6 feature extraction capabilities (4/4)**

Possible ID of objects which, before, required VHR imagery

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**SPOT 6 1.5m-resolution Pan-sharp image**

**Water tower**

**VHR image**

*Credits Google Earth/DigitalGlobe*
SPOT 6 - Germany
Conclusion
SPOT 6 data available for freeeeeeeeeee

Any exciting project in mind? www.astrium-geo.com/MyGIC

Get free SPOT 6 imagery and rock it out!

Apply to the GEO Innovation Community NOW!

www.astrium-geo.com/MyGIC
Thank you!

Contact: marc.bernard@astrium.eads.net