VHR monitoring of 2015 Ebro River floods with DEIMOS-2

Roberto Fabrizi, Key Account Manager, Deimos Imaging, an UrtheCast Company

Deimos Imaging, an UrtheCast Company

UrtheCast acquired Deimos Imaging in 2015

Medium-Res Still Imagery

Theia

Cloud Platform

150 People

High-Res Video

Iris

Medium-Res Broad Area Coverage

Deimos-1

Ground Stations

100 People

High-Res Still Imagery

Deimos-2
A Vertically-Integrated EO System

We are building one of the world’s most advanced, space-based “big data” geospatial collection, processing, and information management systems—completely vertically-integrated.
## Deimos-1

Medium-Resolution Imagery

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pixel size</td>
<td>20 m</td>
</tr>
<tr>
<td>Bands</td>
<td>3 (Red, Green, NIR)</td>
</tr>
<tr>
<td>Image width</td>
<td>650 km</td>
</tr>
<tr>
<td>Revisit time</td>
<td>3 days average, worldwide</td>
</tr>
<tr>
<td>Image time</td>
<td>Mid-morning (10:30 AM)</td>
</tr>
</tbody>
</table>

### Key Features

- Designed for agriculture, forestry and large-scale change detection
- **Unique coverage capacity of entire countries in few days**
- Capable of acquiring up to 8 million sqkm per day, high quality data
- Used by ESA for large-scale monitoring since 2010
- Used by USDA for crop monitoring in the US since 2011
**Theia on the ISS**

Medium-Resolution Imagery

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pixel size</td>
<td>5 m</td>
</tr>
<tr>
<td>Bands</td>
<td>4 (Red, Green, Blue, NIR)</td>
</tr>
<tr>
<td>Image width</td>
<td>50 km</td>
</tr>
<tr>
<td>Revisit time</td>
<td>Varies with season</td>
</tr>
<tr>
<td>Image time</td>
<td>Any hour of the day</td>
</tr>
</tbody>
</table>

**Key Features**

- Suitable for agriculture, forestry and large-scale change detection
- Capable of acquiring up to 2 million sqkm per day, high quality data with a 5m/pixel resolution
Deimos-2
High-Resolution Imagery

Pixel size: 75 cm
Bands: 5 (Red, Green, Blue, NIR, PAN)
Image width: 12 km
Revisit time: 2 days average, worldwide
Image time: Mid-morning (10:30 AM)

Key Features

- **High-quality, high-resolution**
- Designed for defence & intelligence, cartography, frequent monitoring
- Capable of stereo acquisitions for large-scale 3D modelling
- Designed for fast tasking: up to few hours before acquisition
- **Ultra-rapid delivery time: within 1 hour from acquisition, 24/7/365**
Iris on the ISS
High-Resolution, Full-Color Video

Pixel Size 1m
Bands 3 (Red, Green, Blue)
Image width 4 km (UHD video)
Revisit time 3 days average, worldwide
Image time Any hour of the day

Key Features

- The World's First Full-Color HD Videos Of Earth
- High-quality, high-resolution
- Suitable for defence & intelligence
Monitoring of 2015 Ebro floods
DEIMOS-2 monitoring of Ebro floods
Several DEIMOS-2 imagery allowed to delimit the affected area

Complete set of very high resolution imagery covering the extend of the floods along the Ebro riverside

Very accurate digitalization and definition of areas affected by the flood

Wide area of 120 km length from Navarra to Zaragoza covered at 75cm resolution.
DEIMOS-2 monitoring of Ebro floods

BEFORE: Ebro river in Spain from Google Earth – September 4, 2011
DEIMOS-2 monitoring of Ebro floods

AFTER: DEIMOS-2 pan-sharpened images of Ebro river floodings near Zaragoza (Spain) – February 25, 2015
DEIMOS-2 monitoring of Ebro floods

DEIMOS-2 pan-sharpened images of Ebro river floodings near Zaragoza (Spain) – March 2, 2015
DEIMOS-2 monitoring of Ebro floods

DEIMOS-2 false color images of Ebro river floodings near Zaragoza (Spain) – March 2, 2015

flooded areas
DEIMOS monitoring of Ebro floods

Accurate delimitation of areas affected by the floods

DEIMOS-2, Ebro river floods, Spain, Mar 2015
Emergency Activations: Copernicus & UNITAR
Emergencies for Copernicus

DEIMOS-2 images as response to emergency activation after Etna Eruption: Situation as of 12/12/2015

EMSR_0148 [04]

Acquired December 12, 09:52 UTC, GSD 0,75m
Emergencies for Copernicus

DEIMOS-2 images as response to emergency activation after Ecuador Earthquake: Situation as of 02/05/2016 in the area of Quininde (Ecuador)

EMSR_0159 [11]

Acquired May 2, 16:36 UTC, GSD 1m
Emergencies for Copernicus

DEIMOS-2 images as response to emergency activation after Ecuador Earthquake: Situation as of 02/05/2016 in the area of Las Villegas (Ecuador)

EMSR_0159 [14]

Acquired May 2, 16:36 UTC, GSD 1m
Emergency for Humanitarian Crisis

DEIMOS-2 images as response to emergency activation in Rubkan (Jordan-Syria Border)

DEIMOS-2 image of Rubkan – February 3, 2016
Emergency for Humanitarian Crisis

DEIMOS-2 images as response to emergency activation in Rubkan (Jordan-Syria Border)

DEIMOS-2 image of Rubkan – April 24, 2016
Emergency for Humanitarian Crisis

UNITAR report using DEIMOS-2 images
Emergency for Humanitarian Crisis

DEIMOS-2 images as response to emergency activation in Hadalat (Jordan-Syria Border)
Emergency for Humanitarian Crisis

DEIMOS-2 images as response to emergency activation in Hadalat (Jordan-Syria Border)
Emergency for Humanitarian Crisis

UNITAR report using DEIMOS-2 images
To the future and beyond...
We are already developing our Next Generation

Market-driven progression of sensors and infrastructure, based on three synergetic pillars:

Theia
Deimos-1

Iris
Deimos-2

Cloud Platform
In-House Archive

UrtheDaily™ Constellation

OptiSAR™ Constellation

UrthePlatform
The UrtheDaily™ Constellation

All the World, Everyday, at 10:30 AM, at 5m/pixel

8 satellites to produce consistent, reliable, daily delivery of 140 M km² of multispectral imagery

Product: Multispectral, 5m/pixel imagery, with full global daily coverage
Service: Through the cloud, and via APIs, all based on the UrthePlatform

UrtheDaily™ would enable daily, global change detection and analysis at unprecedented scale.

UrtheDaily™ operations could start as early as 2018
The OptiSAR™ Constellation

Highly-advanced imaging capabilities from the World’s first fully-integrated constellation of Optical and SAR satellites.

16 Satellites in two orbit planes

Satellites are arranged in 8 pairs:
- SAR (X+L bands) + Optical (50 cm)

This arrangement allows for:
- Very high assured (day/night, cloudy or not) revisit worldwide
- Imaging of the same location with SAR and Optical
- Optimized multispectral imaging through cloud avoidance

OptiSAR™ operations could start as early as 2020
Thanks for your attention! Questions?