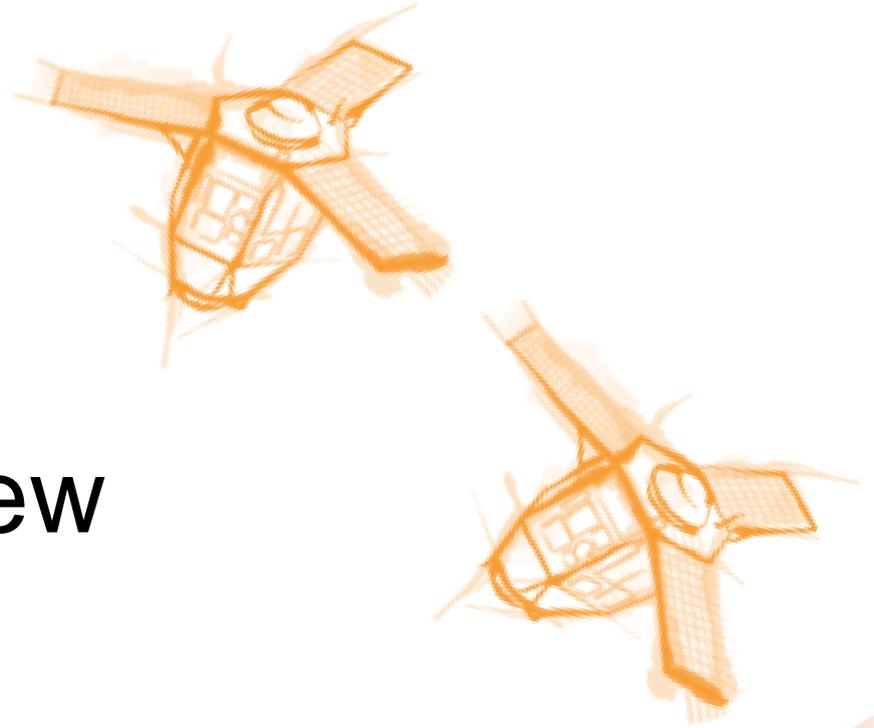


# Pleiades Constellation

## Capability Overview

2011 JACIE Conference  
Boulder, CO

Nicolas Stussi  
Director, Services & Business Development  
Astrium GEO-Information Services – North America



All the space you need





# Spot Image and Infoterra have teamed up!



# ASTRIUM

AN EADS COMPANY

## Astrium GEO-Information Services

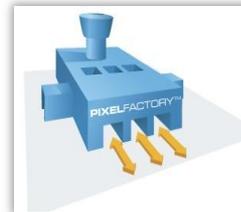
Imagery  
*Optical, SAR  
Satellites and Airborne*

Ground Stations

Services

Navigation

Consulting



# Optical & SAR Imagery



## SPOT 4 & 5

- 2.5m -20m Optical Data
- 60km x 60km Image Swath
- 100+ Billion km<sup>2</sup> Archive



## SPOT 6 & 7

- 1.5m Pan & 6m XI
- Optical Data
- 60km Image Swath
- High Resolution  
Large-scale Mapping



## Pléiades-1 & -2

- 50cm Optical Data Products
- Daily Revisit
- 95% of Resources Dedicated to the Commercial Market



## TerraSAR-X

- SAR Imagery
- Up to 1m Resolution
- Weather-independent
- Unrivalled Access



## FORMOSAT-2

- 2m Optical Data
- Daily Revisit
- Great for Site Monitoring

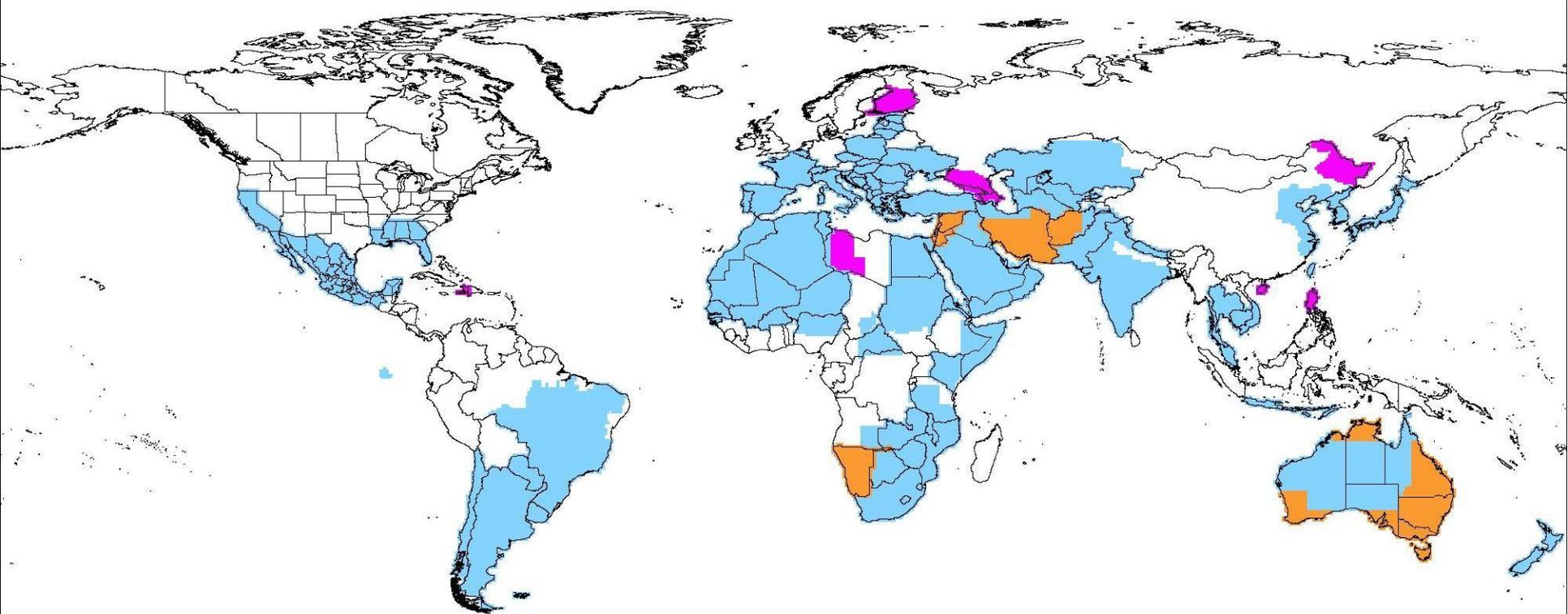


## DEIMOS-1

- 22m Optical Data
- 600km Image Swath
- Daily Revisit

# 2.5m SPOTMaps

Status as of March 01, 2011



■ 2.5m Color Seamless Mosaic

■ 10m CE90

■ Off-the-shelf

■ Refresh

■ In Production

77.7M km<sup>2</sup>

7M km<sup>2</sup>

2.4M km<sup>2</sup>

■ SPOTMaps available

■ SPOTMaps updates

■ SPOTMaps in production

All the space you need

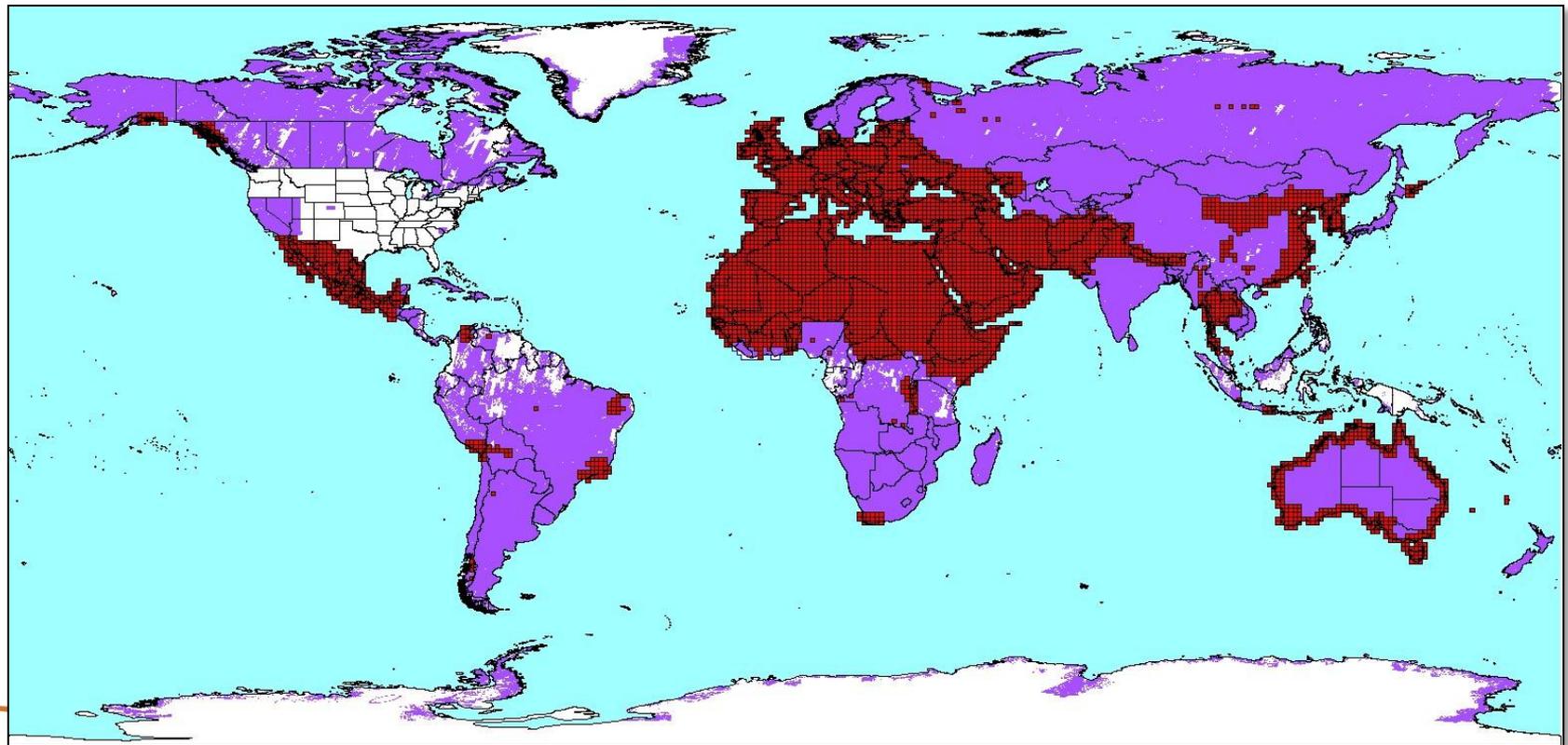
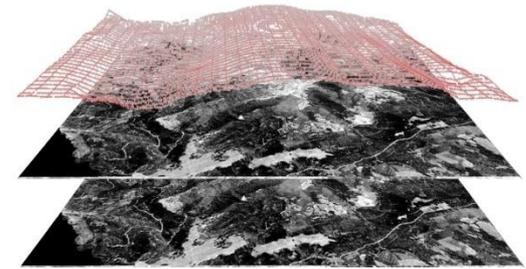


# Reference3D

## DTED Level 2 Global Coverage

- **49 million km<sup>2</sup>** off-the-shelf
- **125 million km<sup>2</sup>** cloud-free stereo pairs available to produce 3D products

Qualified by various government organizations, including the NGA  
Used as part of the NGA SRTM Void Fill Program



 Off-the-shelf  
Reference3D

 Validated HRS Stereo  
Data



A detailed illustration of the Pleiades 1 satellite in orbit above Earth. The satellite is a gold-colored rectangular box with two large blue solar panels extended from its sides. A purple laser beam is shown originating from the satellite and pointing towards the Earth's surface. In the background, another smaller satellite is visible in a higher orbit, with a purple arc representing its path. The Earth's surface shows blue oceans, white clouds, and brownish-green landmasses. The sky is dark with numerous stars.

# Pleiades 1 Launch

**Q4 2011**

# Assured Mission Continuity

**A unique constellation**

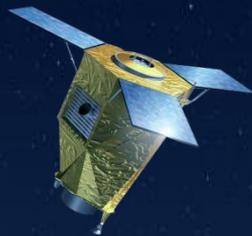
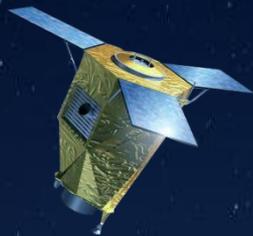
Medium and High Resolution Optical Satellites

**4 satellites**

Pléiades 1 & 2      50 cm Products  
SPOT 6 & 7      1.5 m Products

**4 launches**

Over the coming 3 Years



**Q4 2011**

**2012**

**2012**

**2013**

**Pléiades 1**  
50cm

**Pléiades 2**  
50cm

**SPOT 6**  
1.5 m

**SPOT 7**  
1.5 m

***A continuity of service guaranteed until 2023***

# Pleiades *Accurate*

## Sensor

<b>One camera</b>	1 panchromatic band 4 multispectral bands
<b>12 bit</b>	Dynamic range per pixel at acquisition
<b>Color Bundle</b>	Standard mode acquisition
<b>4 m CE90</b>	Prelaunch accuracy performance, without GCPs With refined attitude data

## Products

<b>50 cm</b>	Panchromatic Color 3-band (pansharpened) Color 4-band (pansharpened)
<b>2 m</b>	4-band multispectral
<b>Ortho rectified</b>	Standard Product Fully automatic processing
<b>Per sq.km</b>	Pricing model

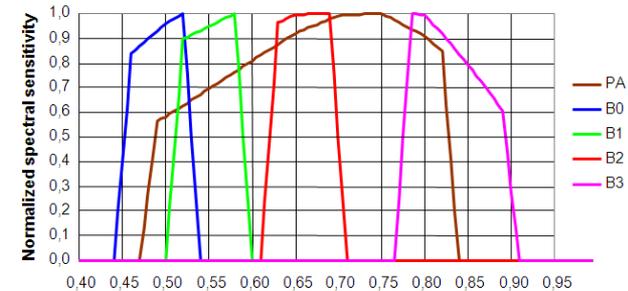


- Panchromatic (50 cm)

- 480 – 830 nm

- Multispectral (2 m)

- Blue: 430 – 550 nm
- Green: 490 – 610 nm
- Red: 600 – 720 nm
- Near infrared: 750 – 950 nm



- Image Quality MTF & SNR

Spectral Band	Panchromatic	Blue	Green	Red	NIR
Design Specification	<ul style="list-style-type: none"> <li>• SNR = 90</li> <li>• MTF = 0.08</li> </ul>	• SNR = 90			
Pre-Launch measurement	<ul style="list-style-type: none"> <li>• SNR = 152</li> <li>• MTF = 0.14</li> </ul>	• SNR = 148	• SNR = 146	• SNR = 149	• SNR = 188

- MTF (Modulation Transfer Function) → image sharpness
- SNR (Signal to Noise Ratio) → radiometric accuracy

- Image quality factor = MTF x SNR

IQF Specification = 7

IQF Measured = 21

# Pleiades

## *Acquisition Capacity & Access*

**95%**

Satellite Resource  
Dedicated to  
Commercial Market

**1 M km<sup>2</sup>**

Daily max capacity  
per satellite

**20 km**

Widest swath on  
the VHR market

It shall not be communicated to third parties without prior written agreement. Its content shall not be disclosed.



# Pleiades *Reactive*

**1 day  
Revisit**

Revisit time with 2 satellites:

- At 45° incidence: Entire World
- At 30° incidence: Above 40° Latitude

**3**

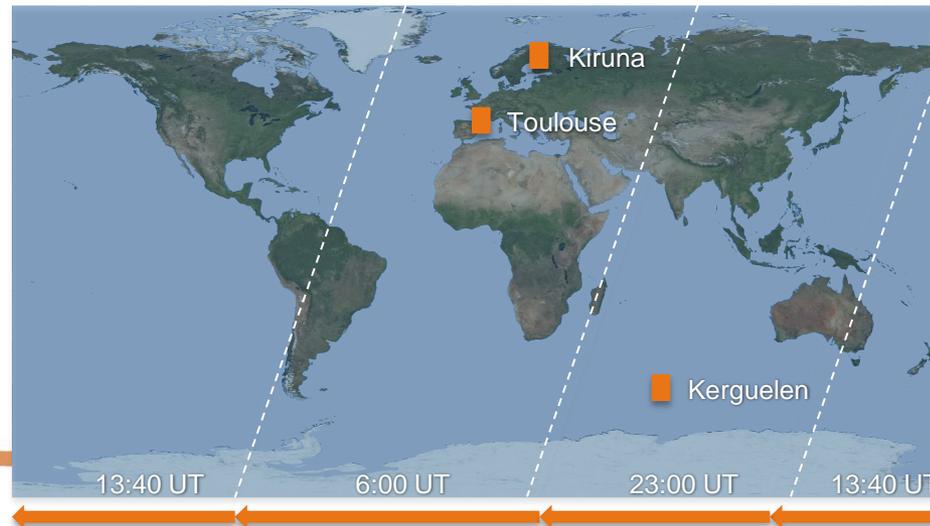
Tasking plans per day  
One tasking plan every 8 hours

**Up to  
2h**

Before the acquisition window to  
Submit a Rush Collection  
Request

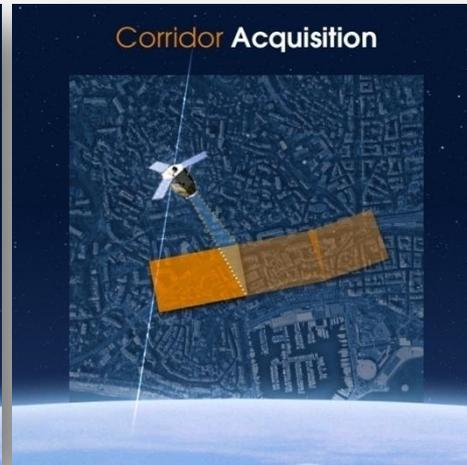
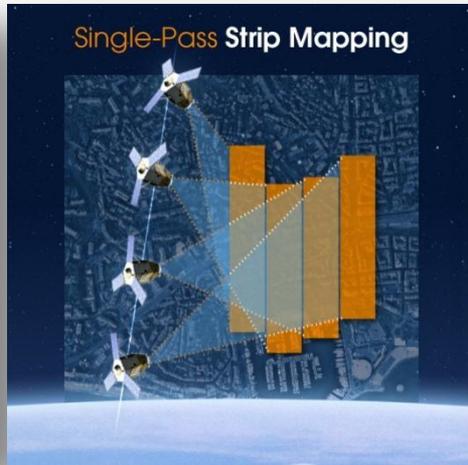
**20 min**

Direct Tasking plan upload  
before actual acquisition



All the space you need

# Pleiades *Collection Modes – Single Pass*



**15 targets**

over 1,000 km within a  
+/-30 deg corridor

**1 square degree**

Automatically  
orthorectified and  
mosaicked

In a single pass, up to  
**6,000 sq.km** pairs  
**2,000 sq.km** triplets

To follow  
**linear targets**  
such as coasts, borders,  
roads, pipelines, rivers

# Pleiades *Persistent surveillance*



- Same-pass Target Revisit
- To detect rapid change on the ground: vehicle, etc ...
- For oblique view in dense, high rise city: Building
- Each image acquired with few seconds of interval
- Up to 15 images on a given pass



### Pleiades Terminal

SPOT Image Turn-key Solution for Pleiades Direct Reception

Task, Receive, Process Pleiades data

### Dedicated Programming Access Unit

Manage your own Collection requirements  
Submit and build collection deck from your receiving station



### Direct Tasking

Task Pleiades 20 min before satellite pass  
Local Tasking Plan Upload to Satellite

### Image Processing Unit

50cm-Ortho Production  
Mosaicking Capability  
30min / Ortho-scene processing time

# Pleiades *Ground Station – Local Presence, Worldwide Access*

**Worldwide Reach**

Acquisition Worldwide or Theater of Operations

**Confidentiality**

Collection Management, Data Tasking & Downlink at Ground Station Site

**Store & Forward**

Collection Outside Circle of Visibility, for Local Downlink

**Reactive**

Near Real Time Data Exploitation



Ground Station  
Fixed or Mobile

All the space you need

## Target Focused

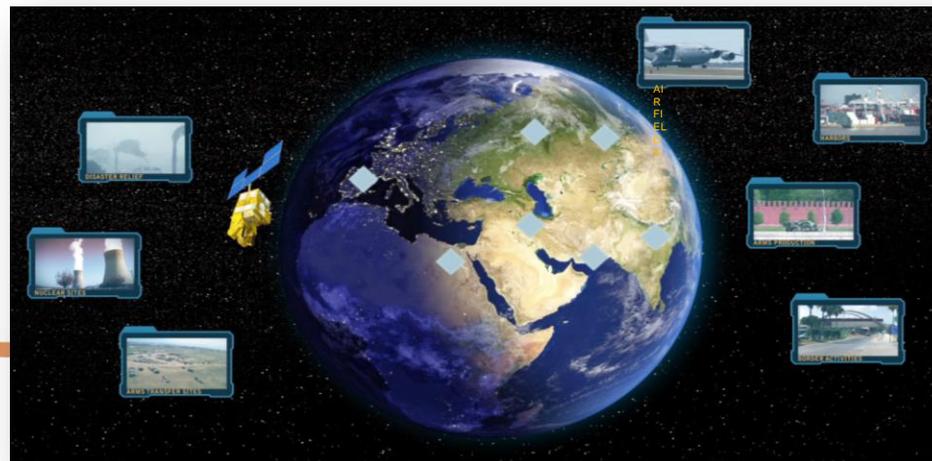
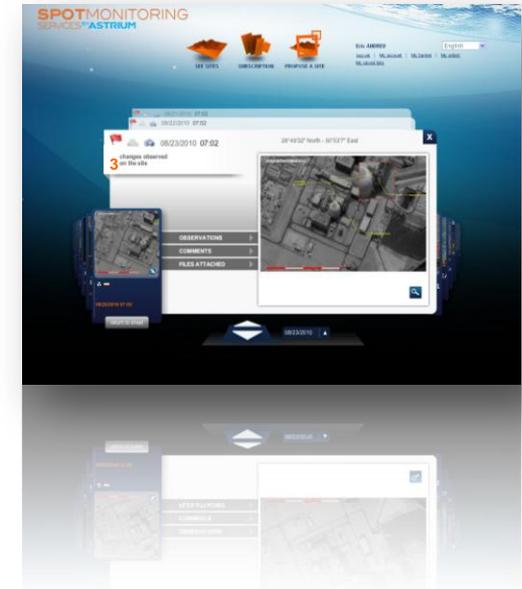
Daily, Weekly, Monthly Revisit

## Persistent Surveillance

Using the full suite of Satellites  
Optical and SAR  
Medium and High Resolution  
Including Pleiades data

## Dedicated Services

Change Detection Analysis  
Customized Reporting  
Email Notification

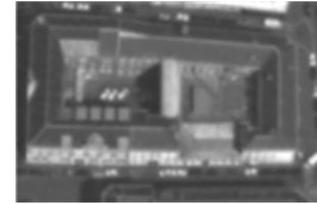


All the space you need

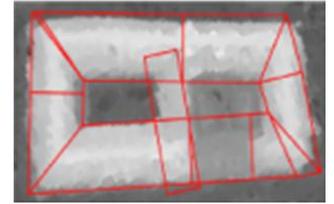
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# Pleiades - 3D Building Database

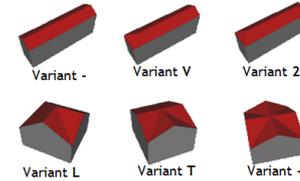
- From 50cm Tri-stereo Imagery
- Automatic Extraction
  - Digital Surface Model Generation
  - 2D Extraction
  - 3D Reconstruction: library of building models



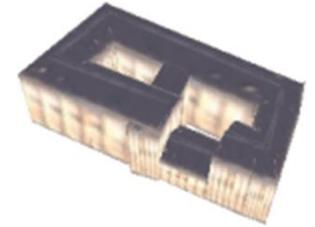
50cm Imagery



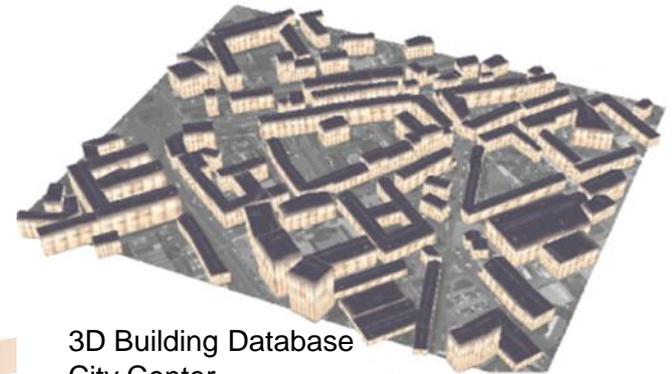
Building Extraction



Building Model Library



3D Building Extraction



3D Building Database  
City Center

# Pleiades

**2 Satellites**

A Unique Constellation

**50cm Color**

Data Consistency

**95%**

Capacity available for Commercial Market

**1M km<sup>2</sup> / day**

Acquisition capacity per Satellite

**20 km**

Largest Image Swath

**Daily**

Target Revisit using both satellites, worldwide

**Q4 2011**

Pleiades 1 Launch





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