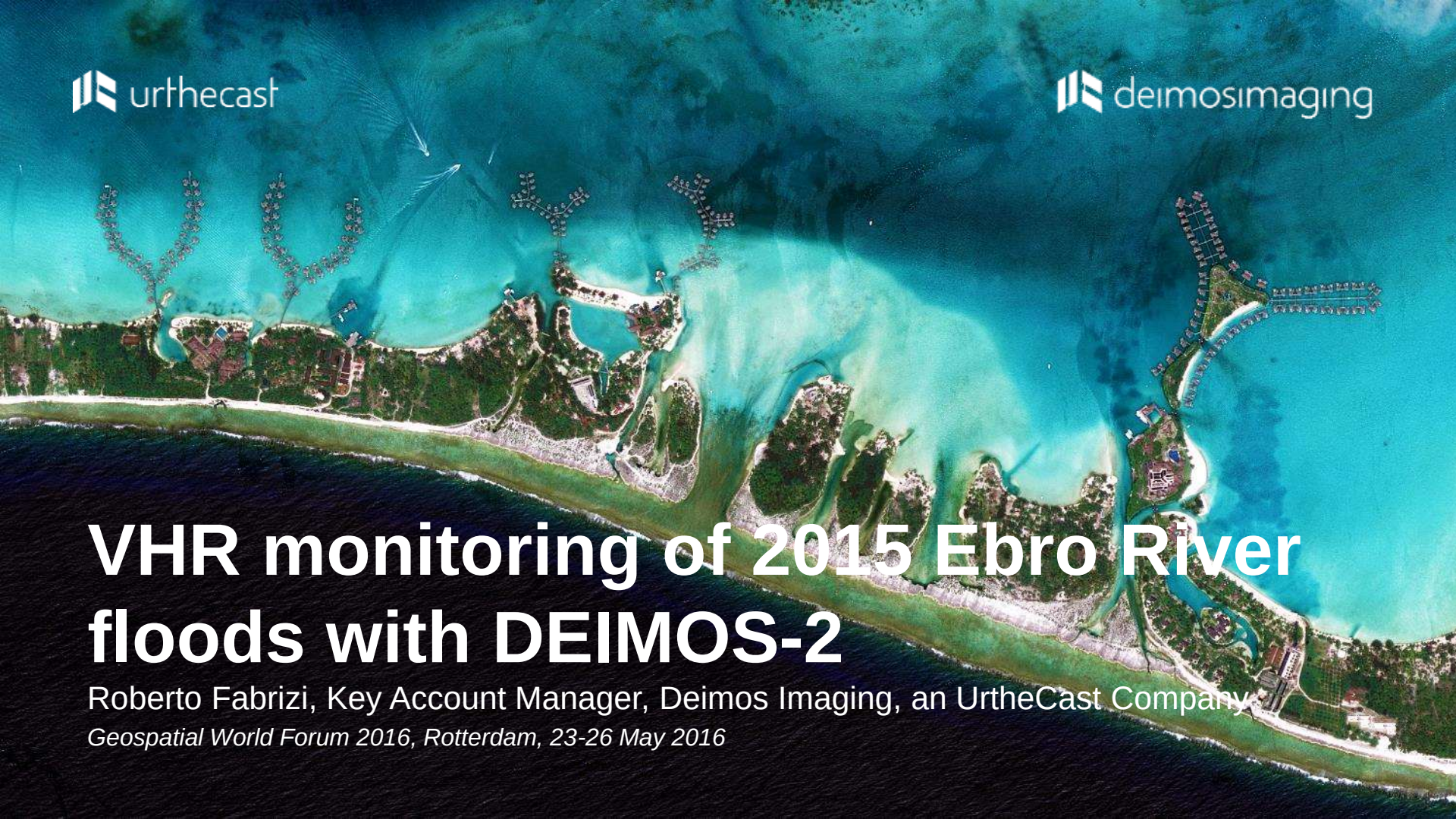

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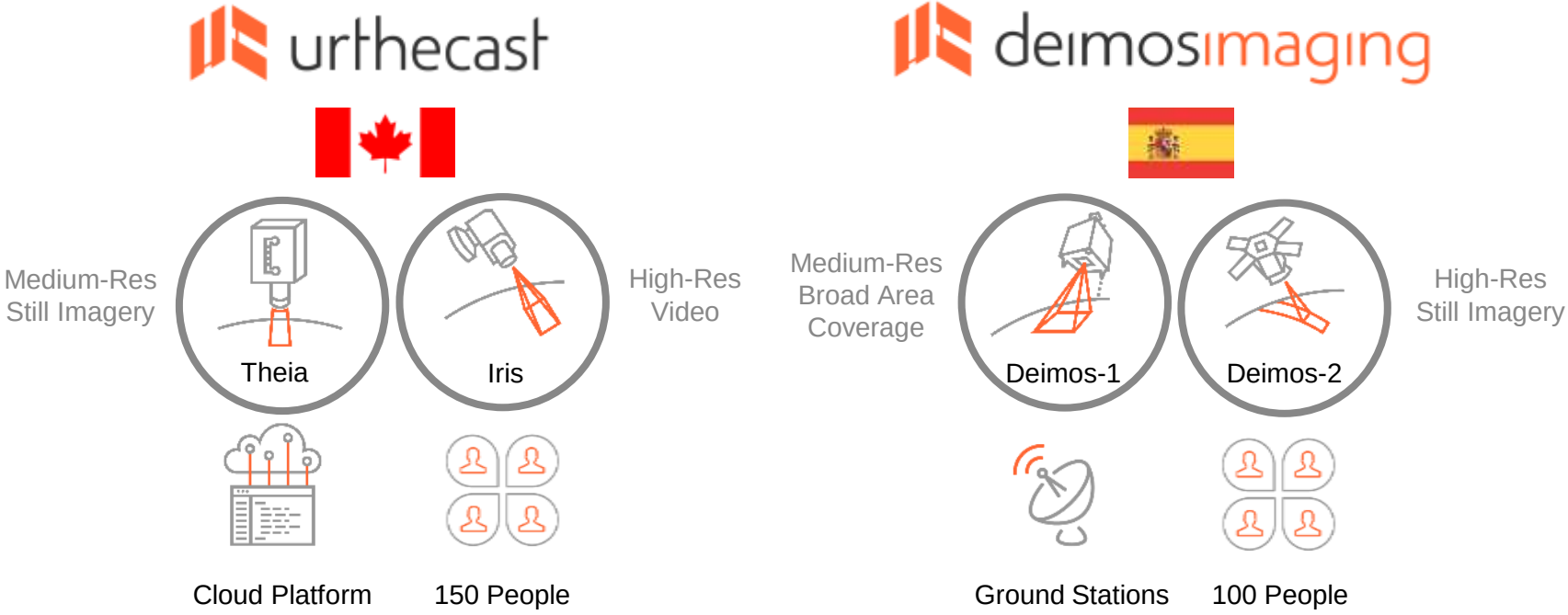
VHR monitoring of 2015 Ebro River floods with DEIMOS-2

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

Geospatial World Forum 2016, Rotterdam, 23-26 May 2016

Deimos Imaging, an UrtheCast Company

UrtheCast acquired Deimos Imaging in 2015



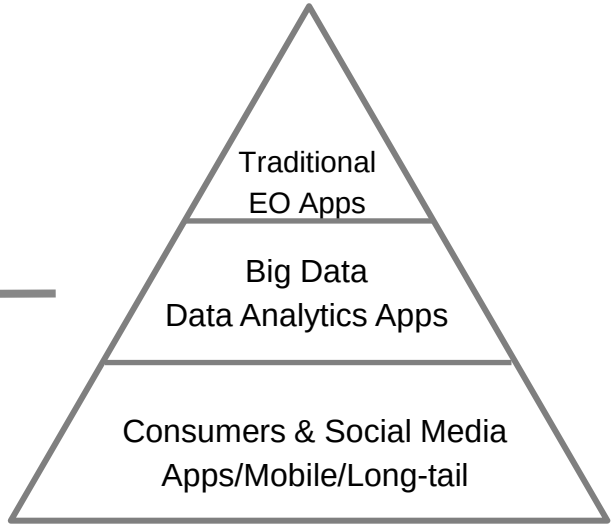
A Vertically-Integrated EO System

We are building one of the world's most advanced, space-based "big data" geospatial collection, processing, and information management systems—completely vertically-integrated

Upstream
Satellites / Constellation

Midstream
UrthePipeline
Ground Segment

Downstream
UrthePlatform



Markets

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Deimos-1

Medium-Resolution Imagery

Pixel size	20 m
Bands	3 (Red, Green, NIR)
Image width	650 km
Revisit time	3 days average, worldwide
Image time	Mid-morning (10:30 AM)

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

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Theia on the ISS

Medium-Resolution Imagery

Pixel size	5 m
Bands	4 (Red, Green, Blue, NIR)
Image width	50 km
Revisit time	Varies with season
Image time	Any hour of the day

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

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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**

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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

25th Feb

26th Feb

2nd Mar

5th Mar

7th Mar

- 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.**

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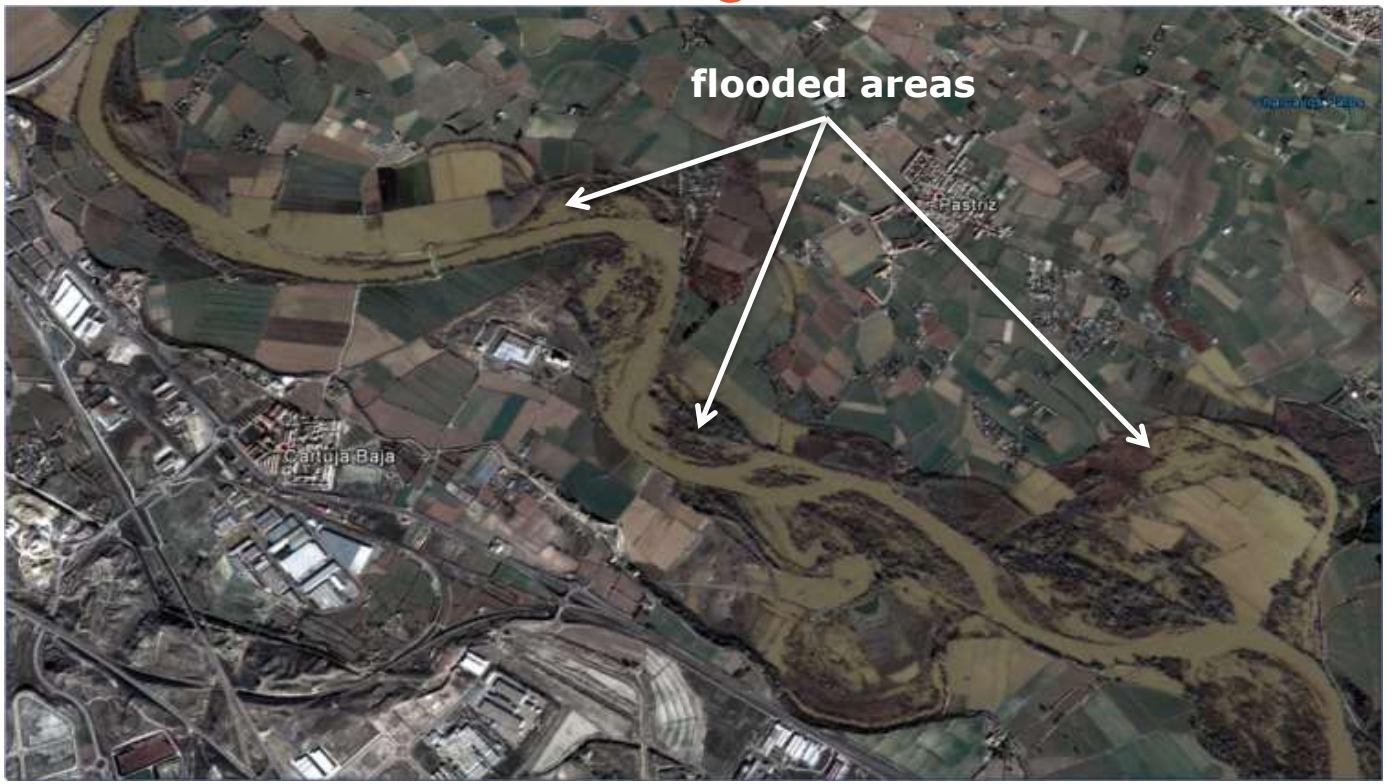
DEIMOS-2 monitoring of Ebro floods

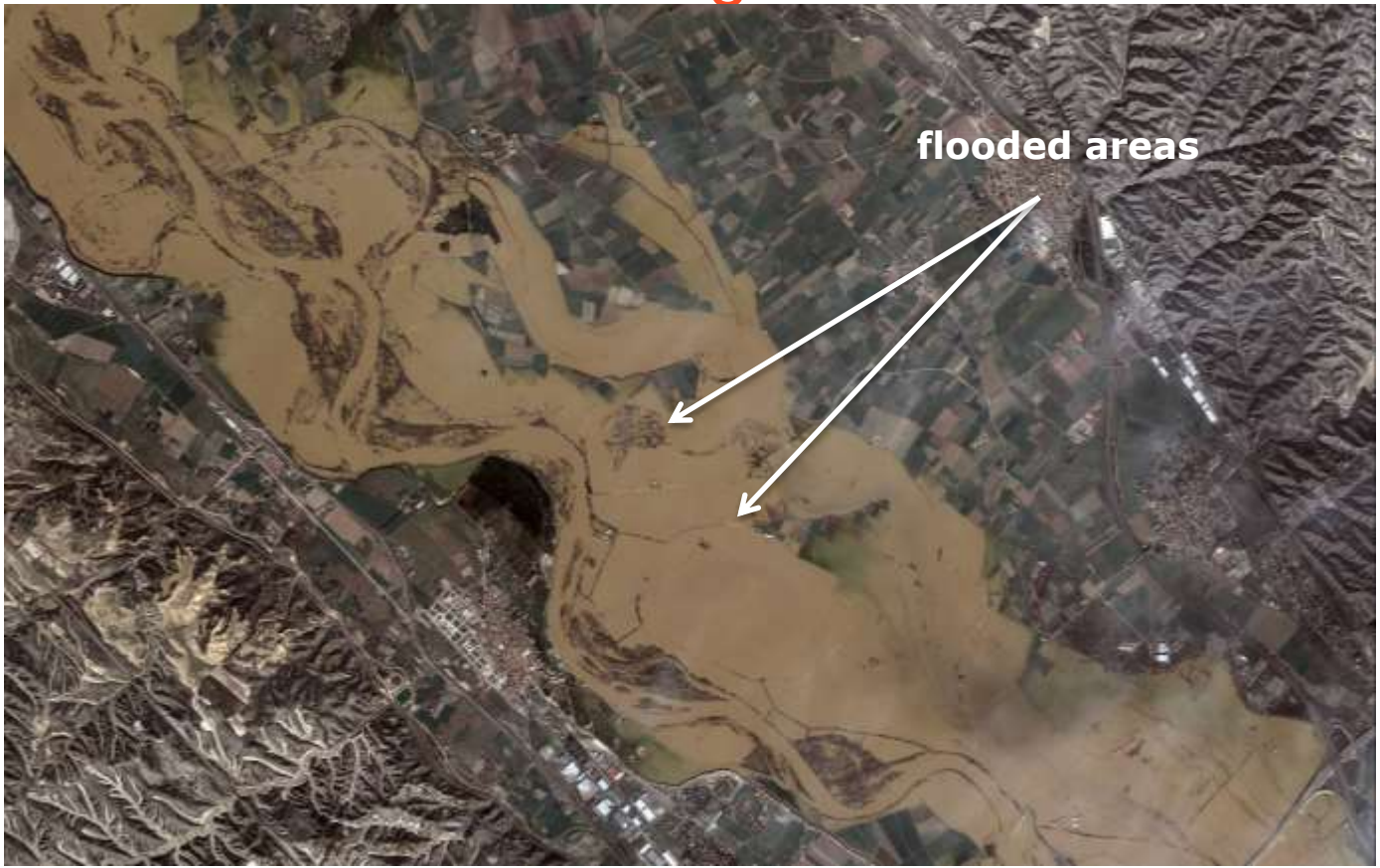
BEFORE: Ebro river in Spain from Google Earth – September 4, 2011

DEIMOS-2 monitoring of Ebro floods



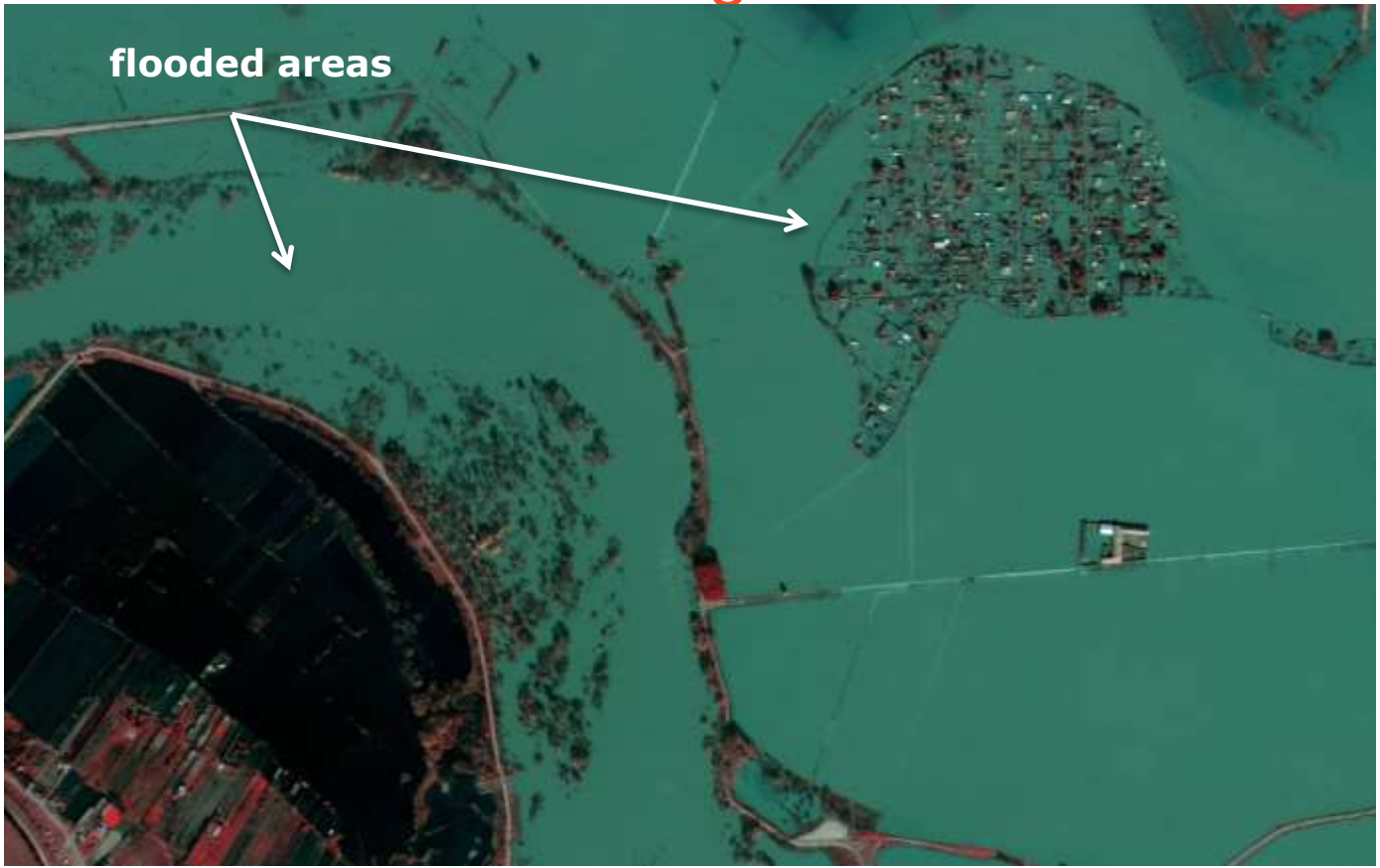
AFTER: DEIMOS-2 pan-sharpened images of Ebro river floodings near Zaragoza (Spain) – February 25, 2015

DEIMOS-2 monitoring of Ebro floods



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

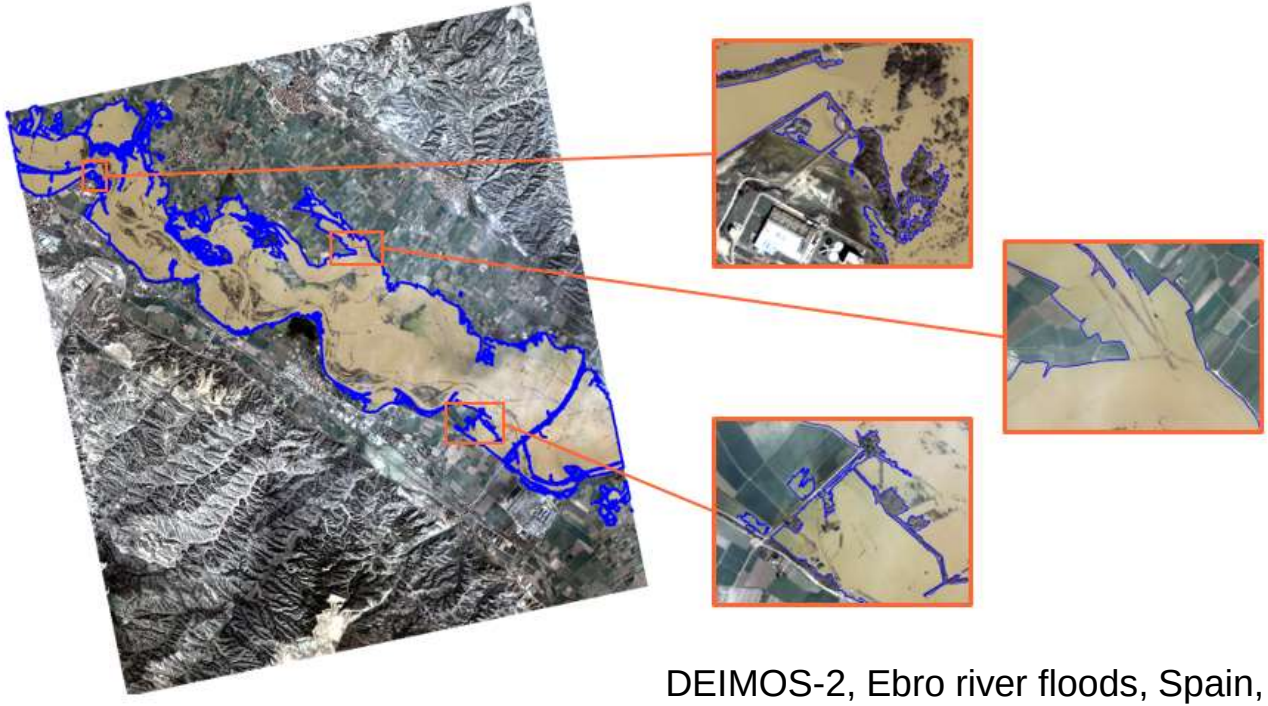
DEIMOS-2 monitoring of Ebro floods



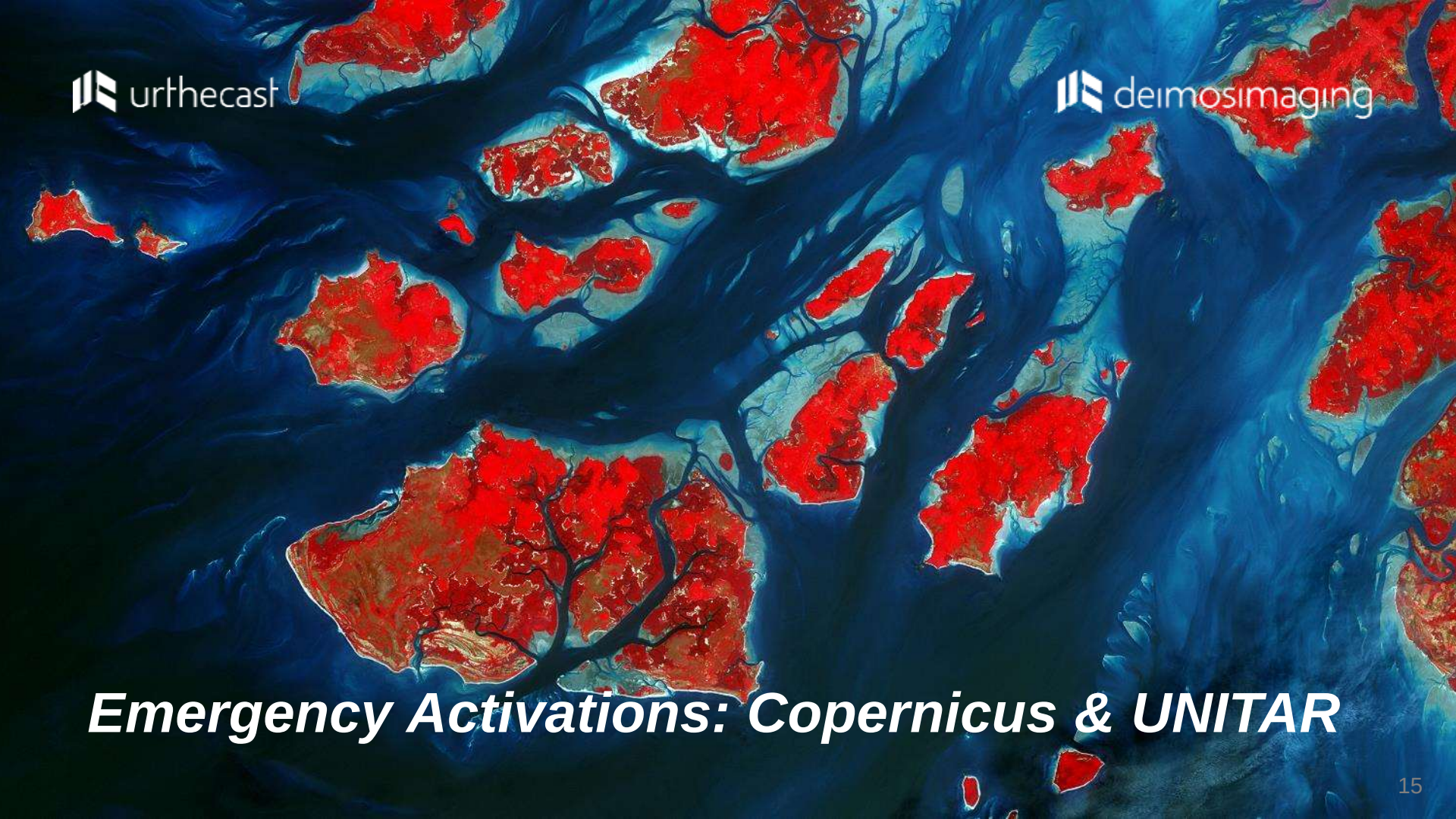
DEIMOS-2 false color images of Ebro river floodings near Zaragoza (Spain) – March 2, 2015

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

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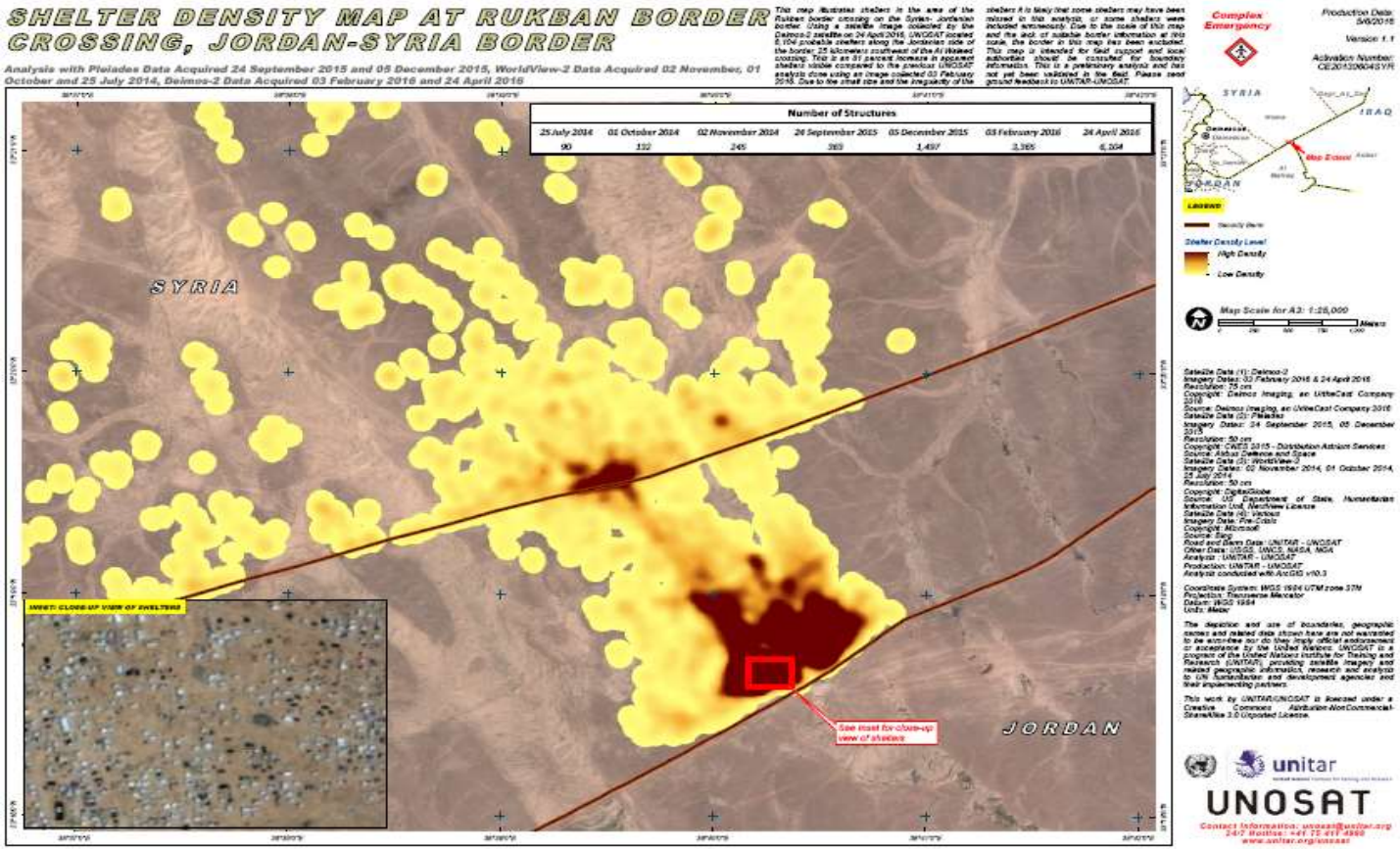
Emergency for Humanitarian Crisis

UNITAR report using DEIMOS-2 images



Geospatial World Forum 2016, Rott

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Emergency for Humanitarian Crisis

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

DEIMOS-2 image of Hadalat – January 29, 2016

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Emergency for Humanitarian Crisis

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

DEIMOS-2 image of Hadalat – April 29, 2016

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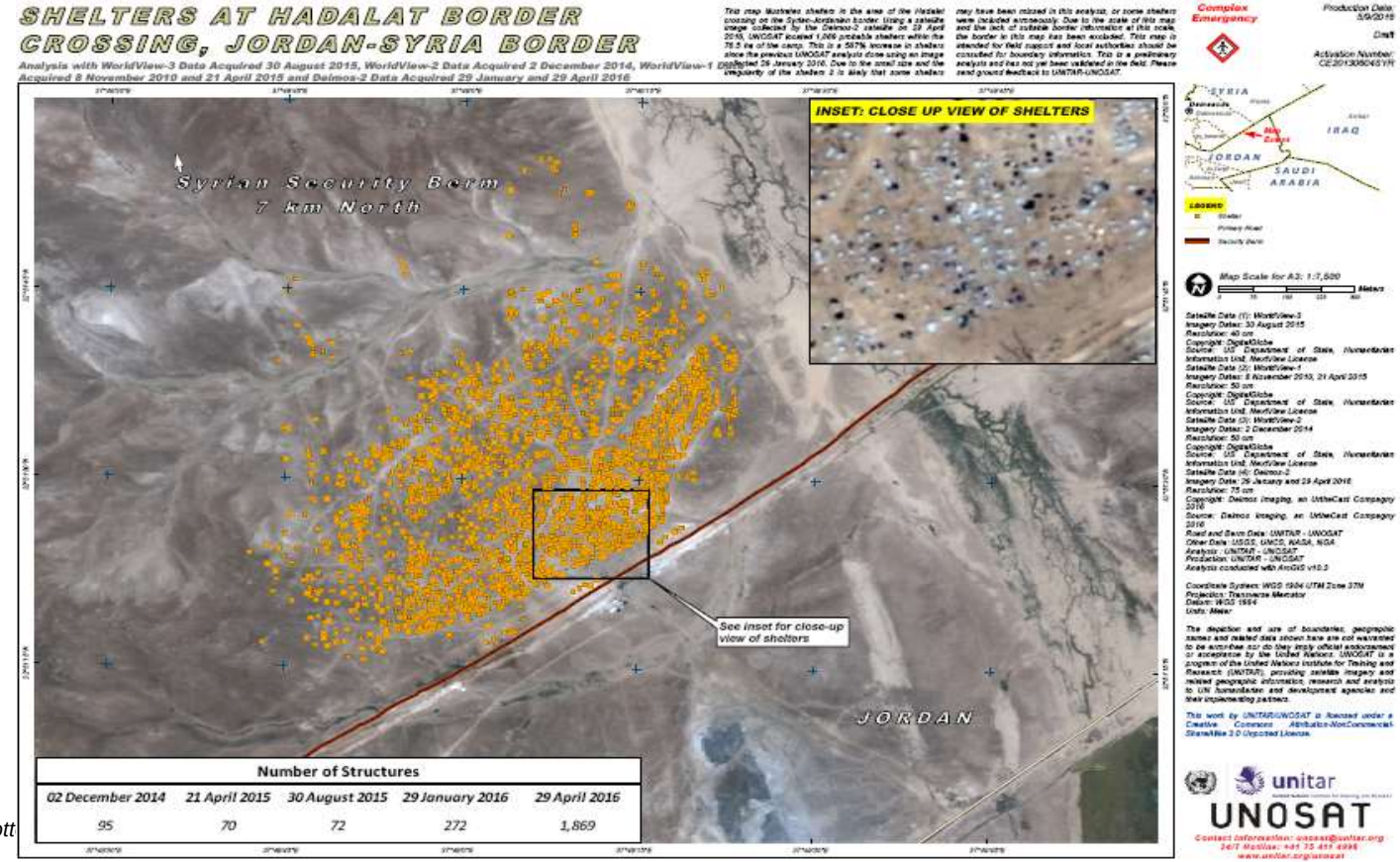
Emergency for Humanitarian Crisis

UNITAR report using DEIMOS-2 images



Number of Structures				
02 December 2014	21 April 2015	30 August 2015	29 January 2016	29 April 2016
95	70	72	272	1,869

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

urthecast

deimosimaging

The UrtheDaily™ Constellation

BEST COVERAGE

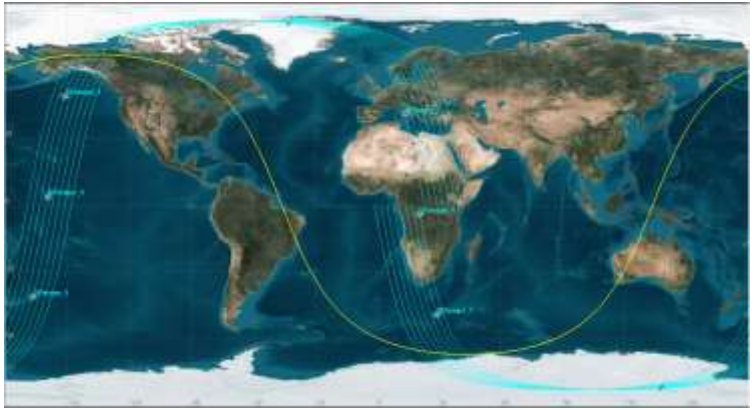
All the World, Everyday, at 10:30 AM, at 5m/pixel

8 satellites to produce consistent, reliable, daily delivery of 140 M km^2 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



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The OptiSAR™ Constellation

BEST REVISIT

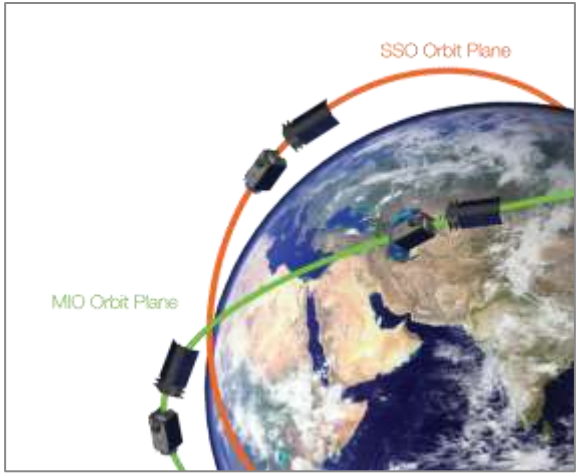
Highly-advanced imaging capabilities from the World's first fully-integrated constellation of Optical and SAR satellites.

16 Satellites in two orbit planes

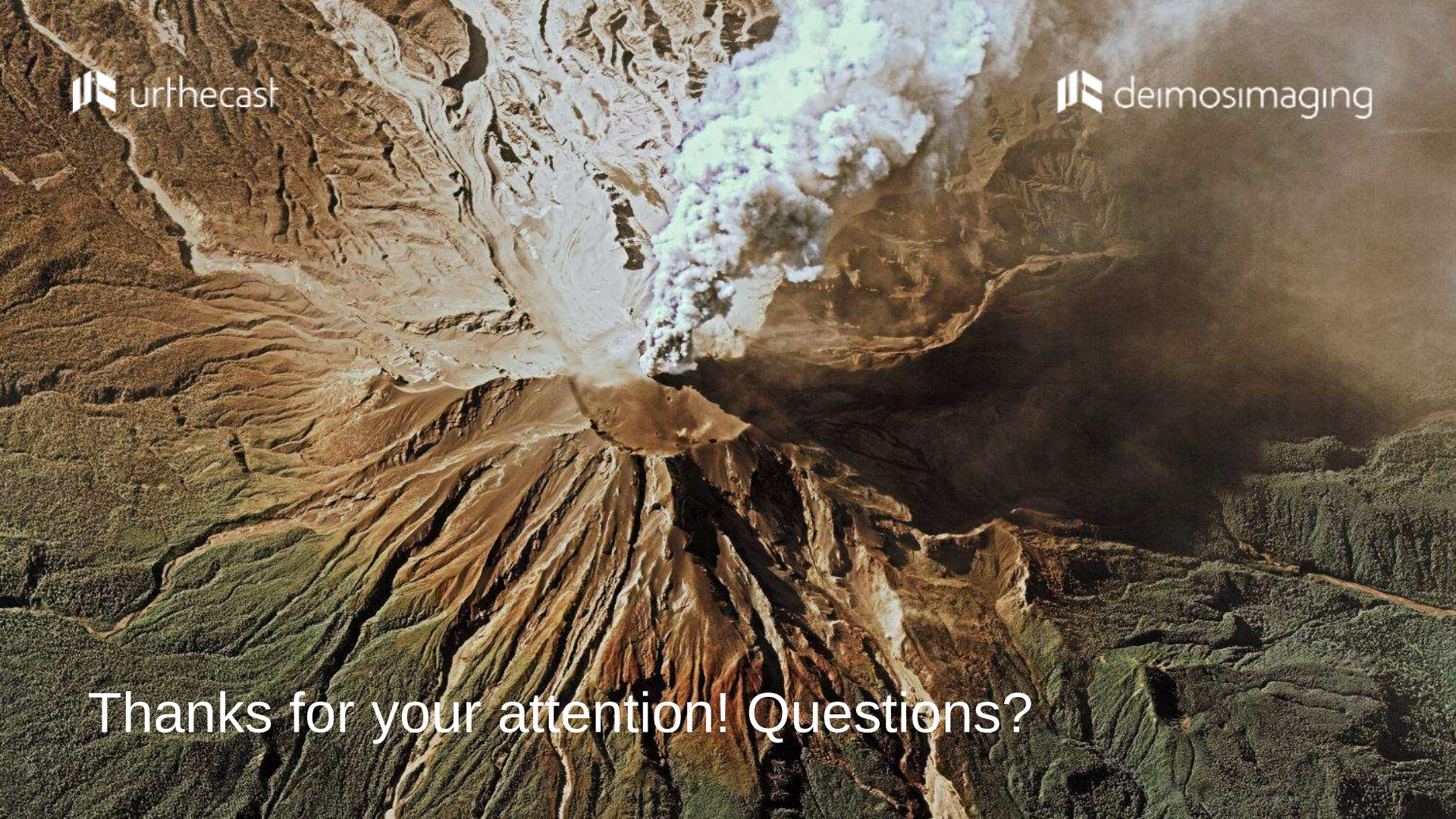
Satellites are arranged in 8 pairs:
SAR (X+L bands) + Optical (50 cm)

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?