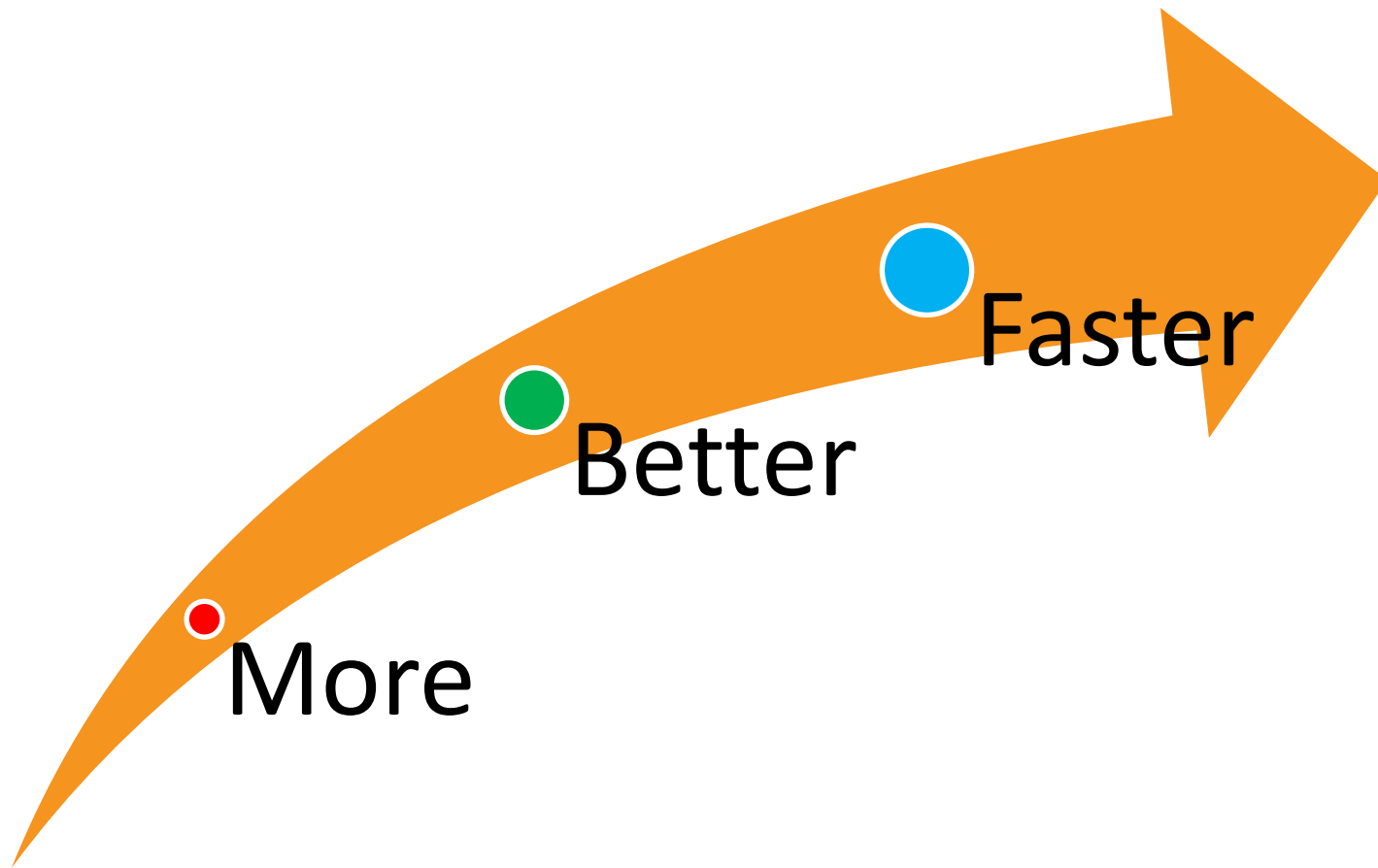


**Δορυφορικά
συστήματα,
Χαρακτηριστικά
δορυφορικών
δεδομένων,
Ψηφιακές
κάμερες
δορυφόρων**

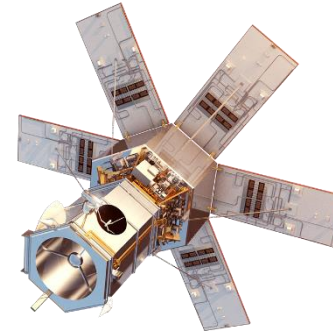




Αριθμός δορυφόρων

Με ανάλυση 30cm

- Δύο οπτικοί δορυφόροι (WorldView-3 & WorldView-4)



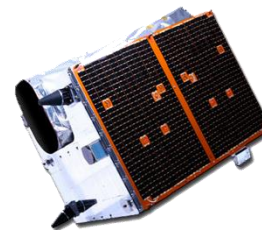
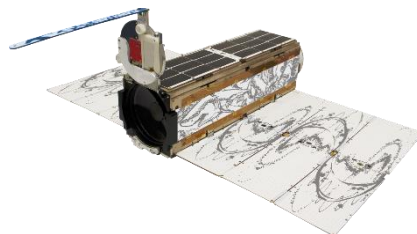
Με ανάλυση 40cm – 1m

- Δέκα οπτικοί δορυφόροι
- 9 δορυφόροι SAR



Με ανάλυση 1,1μ – 5μ

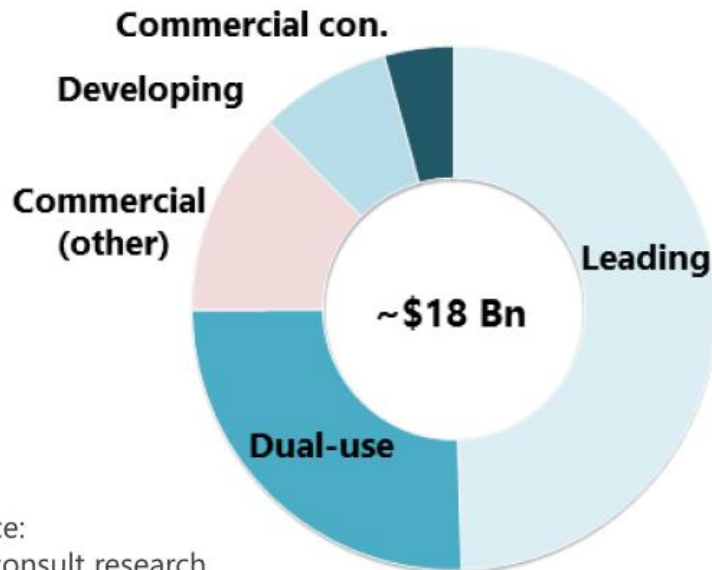
- 172 μικροδορυφόροι



EXPECTED INVESTMENT TREND IN EO SPACE INFRASTRUCTURE

2006-2015

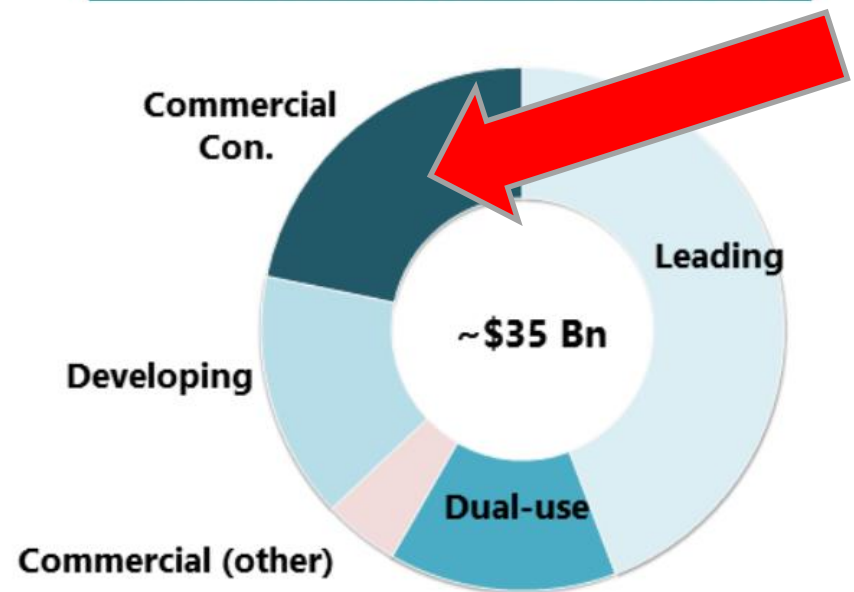
~160 SATS>50KG ;
FEW SMALL SATS



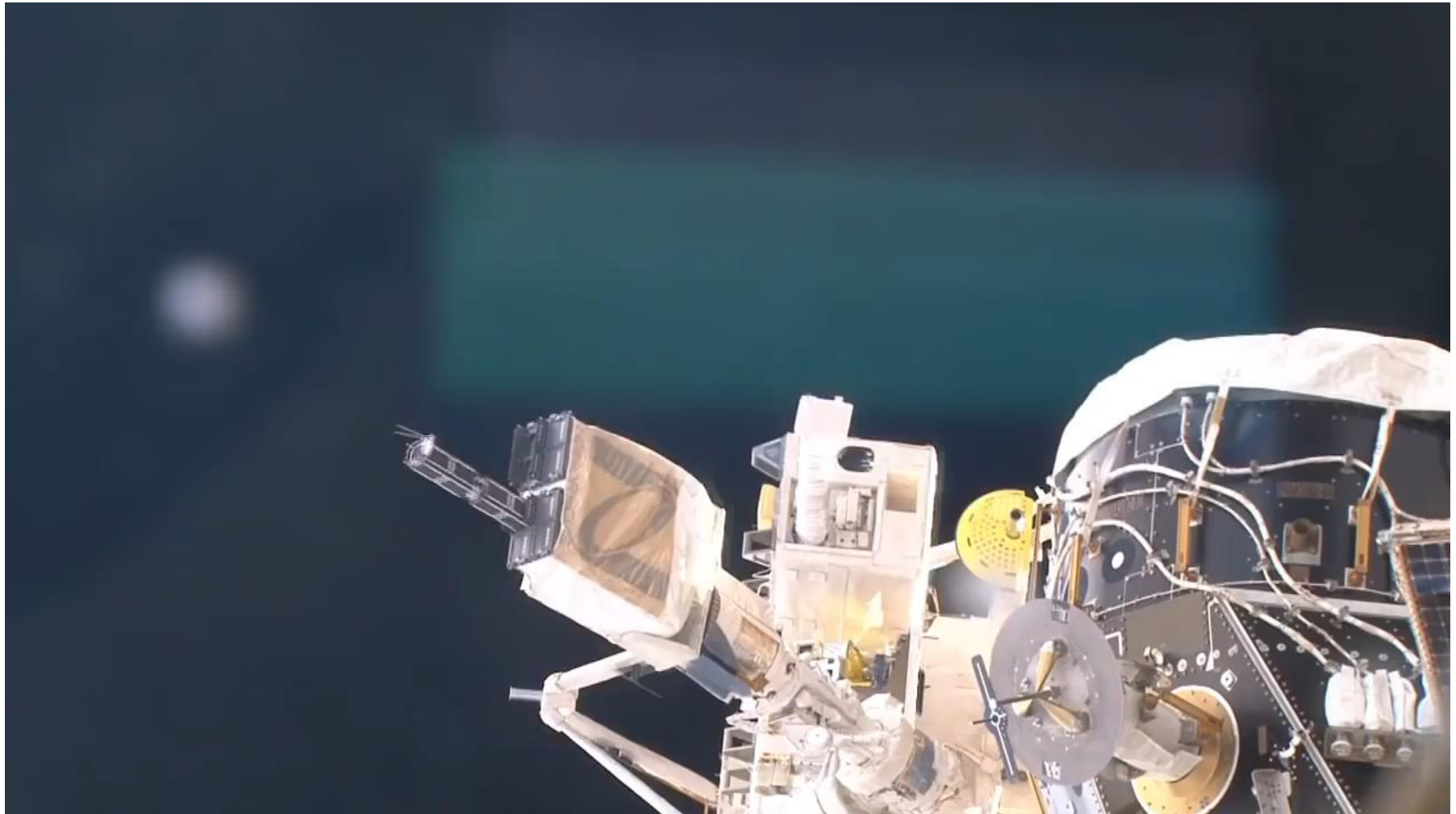
Source:
Euroconsult research

2016-2025

400+ SATS>50KG
+ SMALL SATS CONSTELLATIONS



Εκτόξευση μικροδορυφόρων Planet από τον Διεθνή Διαστημικό Σταθμό



Φασματικά κανάλια που διαθέτουν οι περισσότεροι δορυφόροι

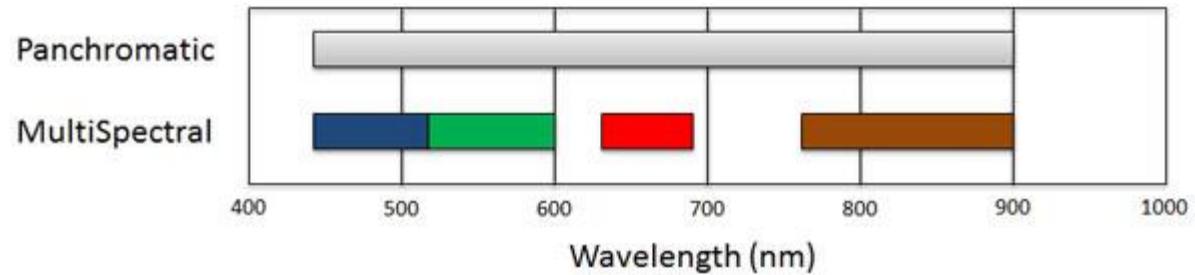
Pan (VHR)

Red

Green

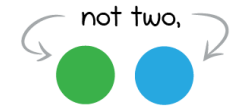
Blue

Near Infrared

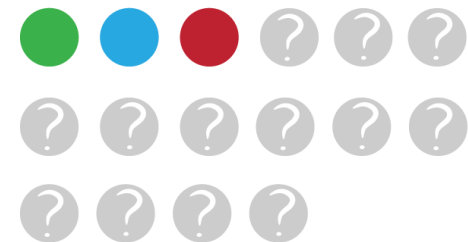




And this marvelous creature has



but **SIXTEEN**
color-receptive cones.

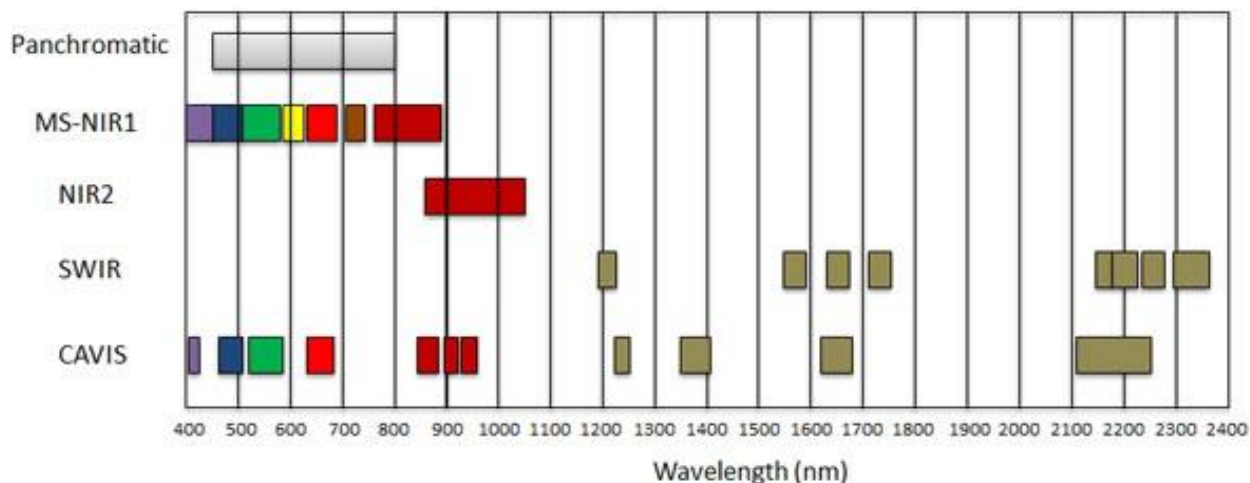


Οι WorldView-2/3 είναι μια ανθρώπινη κατασκευή διαστημικής έκδοσης της γαρίδας Mantis!!

Αριθμός φασματικών καναλιών των δορυφόρων WorldView-2 & WorldView-3

Οκτώ φασματικά κανάλια (Multispectral bands):

- Coastal Blue
- Red
- Green
- Blue
- **Red Edge**
- Near Infrared 1
- Near Infrared 2
- Yellow



Οκτώ κανάλια Shortwave bands (SWIR):

- Δυνατότητα παρατήρησης μέσα από τους καπνούς της πυρκαγιάς και εντοπισμός της εστίας της

Δώδεκα κανάλια CAVIS:

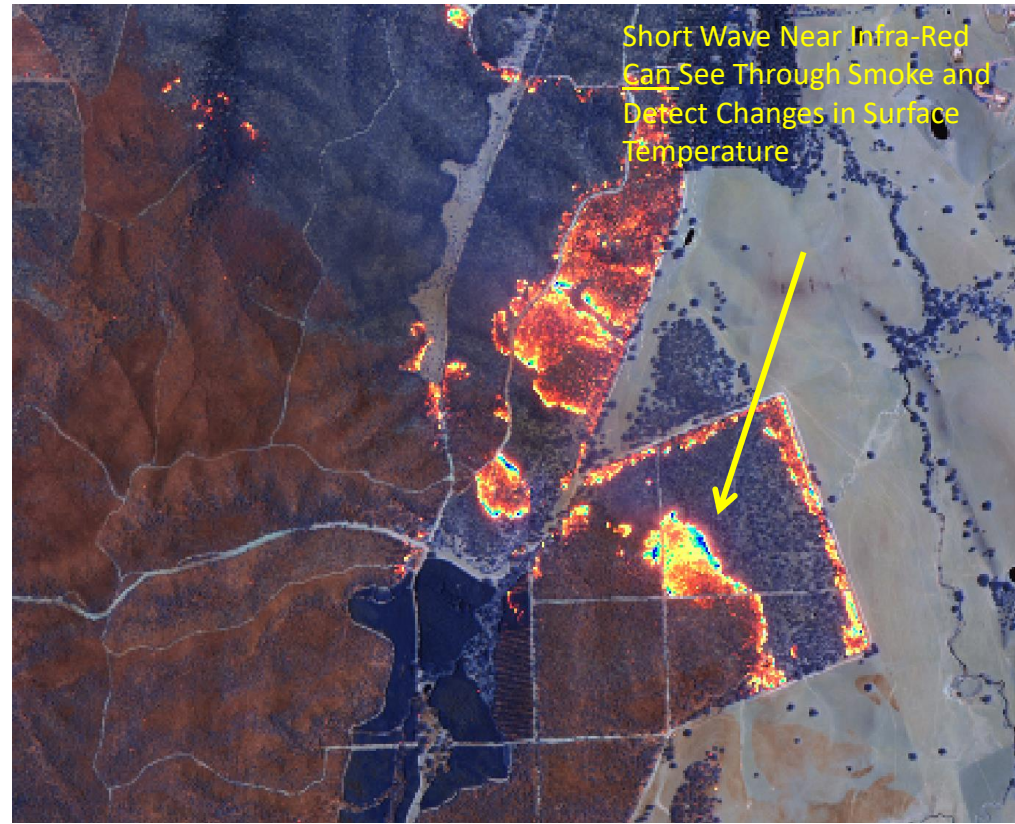
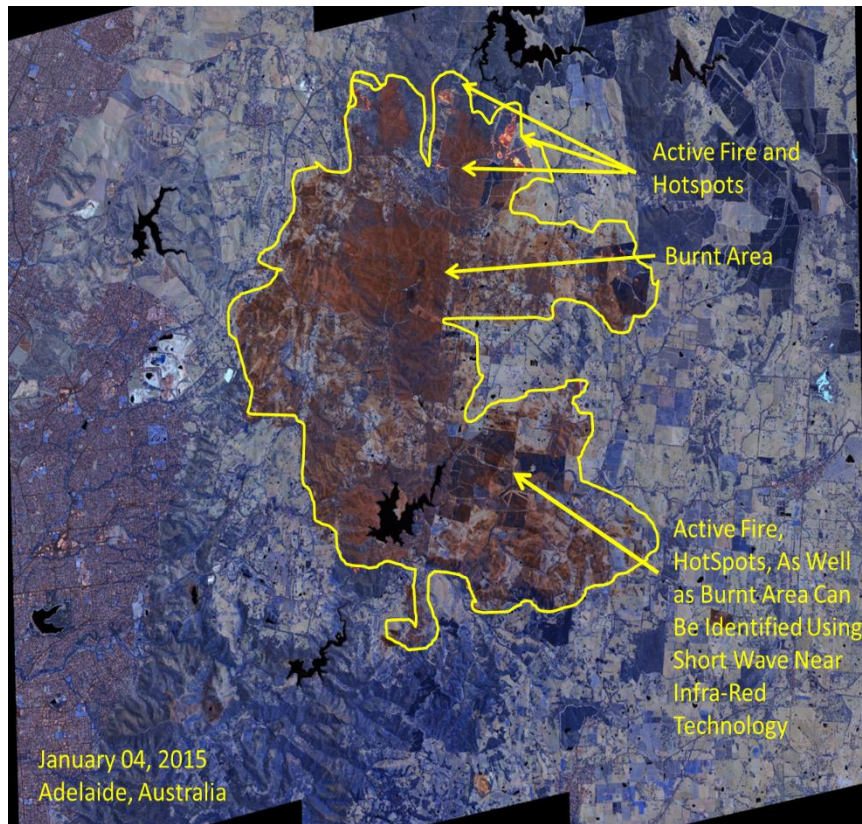
- Cloud, Aerosol, Water-Vapor, Ice, Snow, Atmospheric Calibration Instrument
- Δυνατότητα αφαίρεσης ομίχλης και υγρασίας από την δορυφορική εικόνα



ly/hccphotos

From Space (SWIR)

“Γεωχωρικές Προσεγγίσεις και Εξελίξεις στη Γεωργία και στο Περιβάλλον”, 16/05/2018





Sensor : WorldView-3
Resolution : 30cm



30m GSD of Rakaia River, New Zealand





1 hectare

Why so much
variability in the
fields?

Dark Spot?

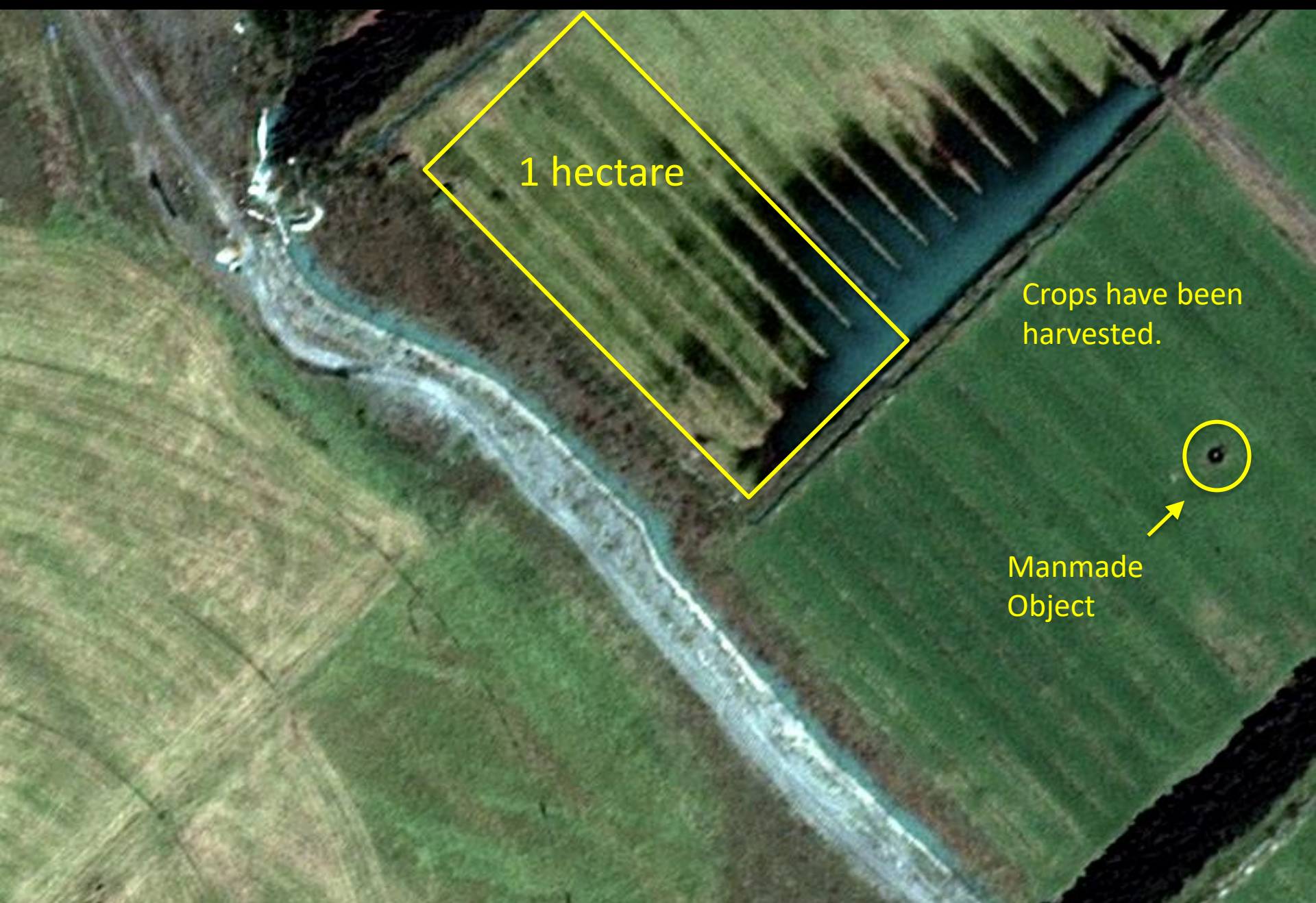
2m GSD



1 hectare

Why so much
variability in the
fields?

Dark Spot?



1 hectare

Crops have been harvested.

Manmade Object

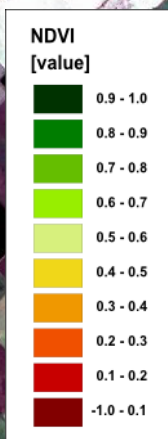




NDVI

La Pampa, Argentina

December 09, 2015



CASE STUDY

Ο δείκτης βλάστησης NDVI- είναι ίσως ο ευρύτερα χρησιμοποιούμενος δείκτης.

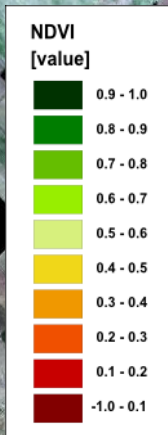
... αλλά η διαχείριση των καλλιεργειών με μεγάλη ακρίβεια σε επίπεδο αγροτεμαχίου γίνεται με τη χρήση πιο προηγμένων δεικτών βλάστησης οι οποίοι είναι εφικτό να παρατηρηθούν με περισσότερα φασματικά κανάλια εκείνων των R-G-B-NIR.



CASE STUDY

NDVI

La Pampa, Argentina



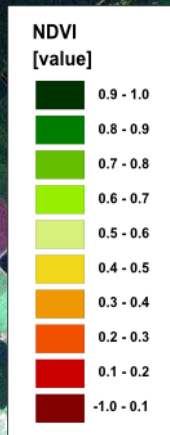
December 18, 2015



CASE STUDY

NDVI

La Pampa, Argentina



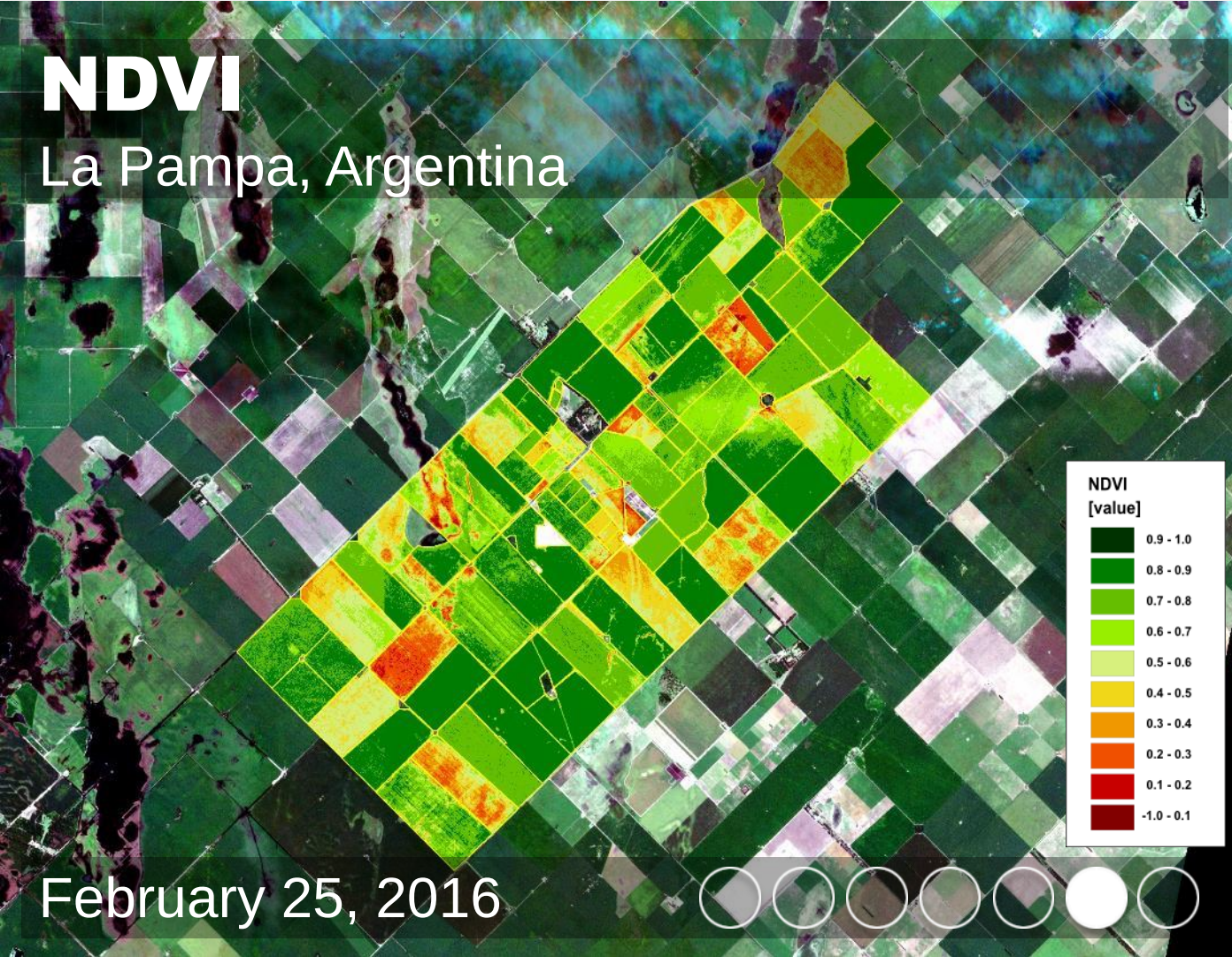
February 17, 2016

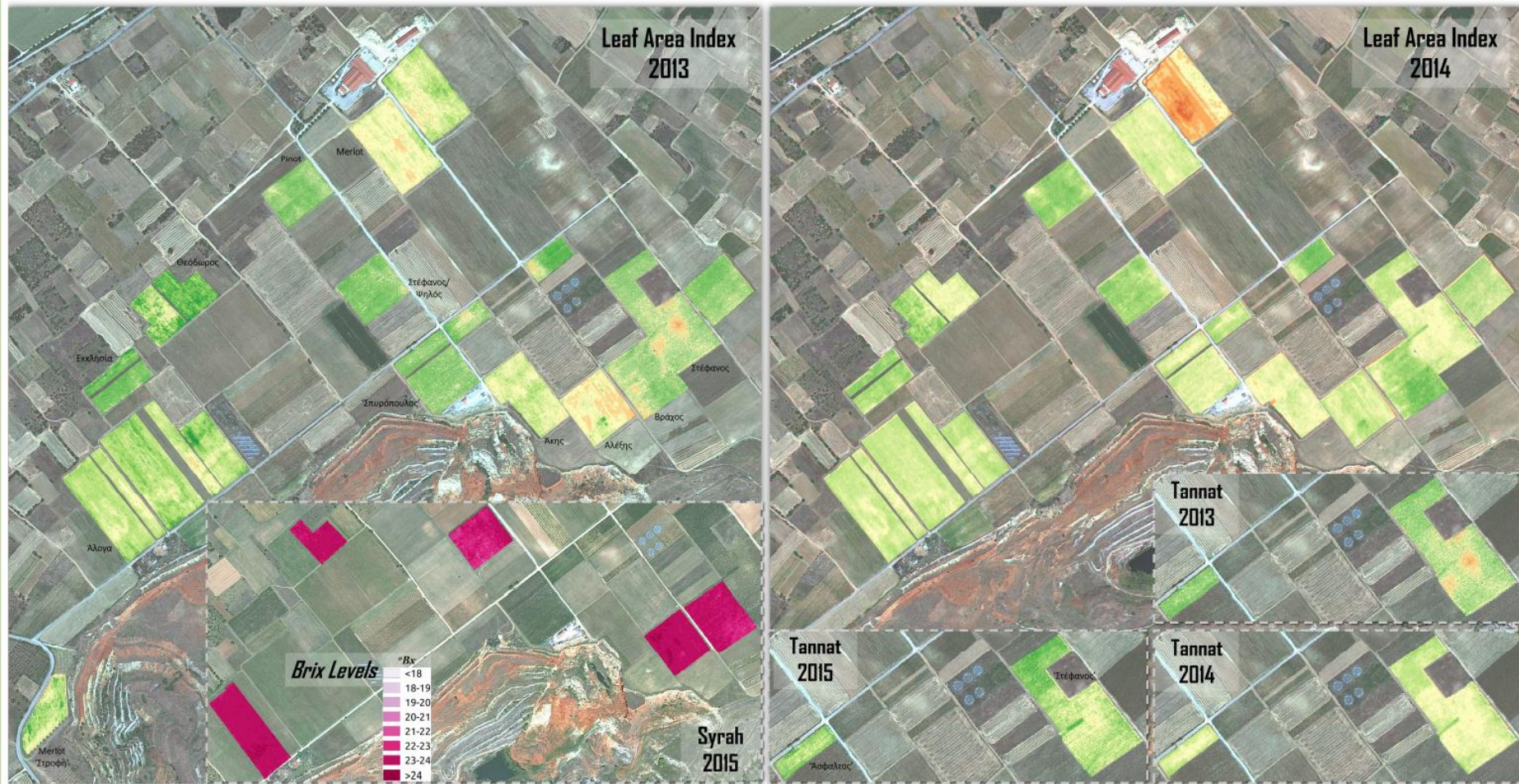


CASE STUDY

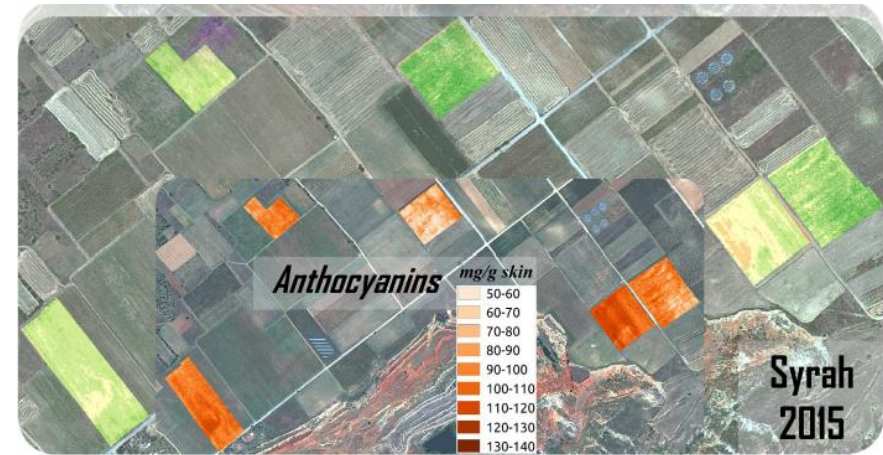
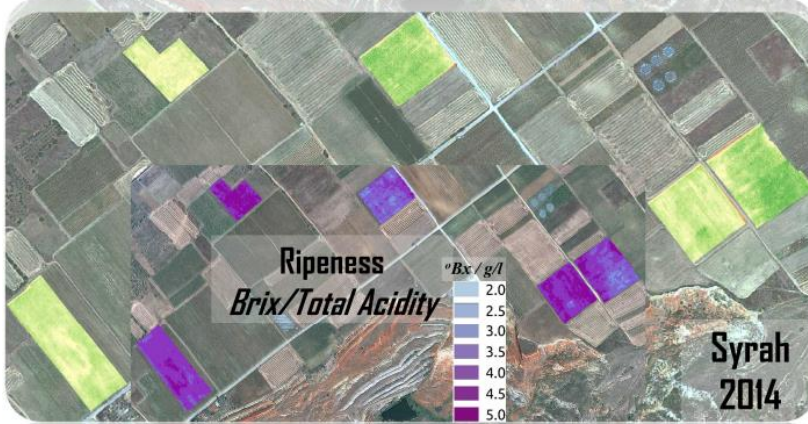
NDVI

La Pampa, Argentina



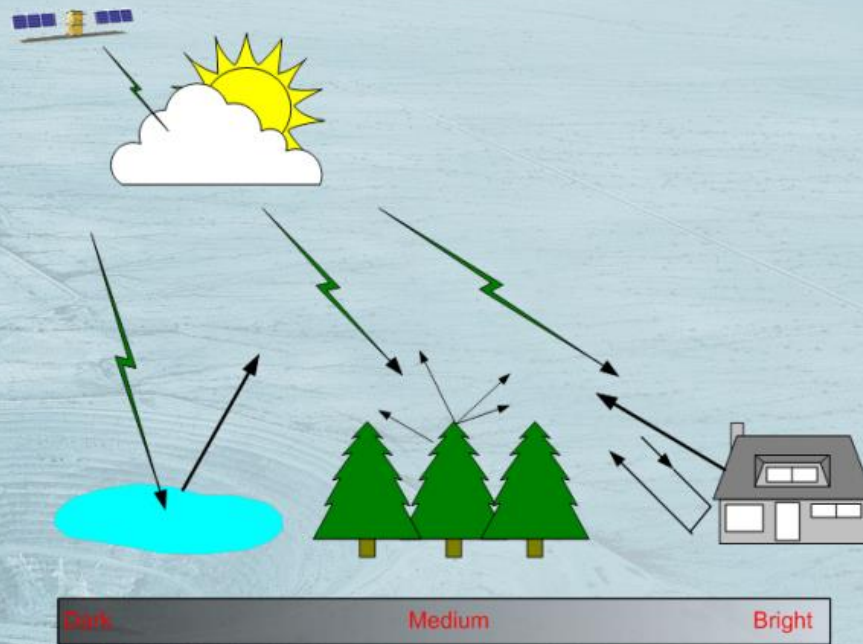


Remote Sensing Laboratory, National Technical University of Athens



Remote Sensing Laboratory, National Technical University of Athens

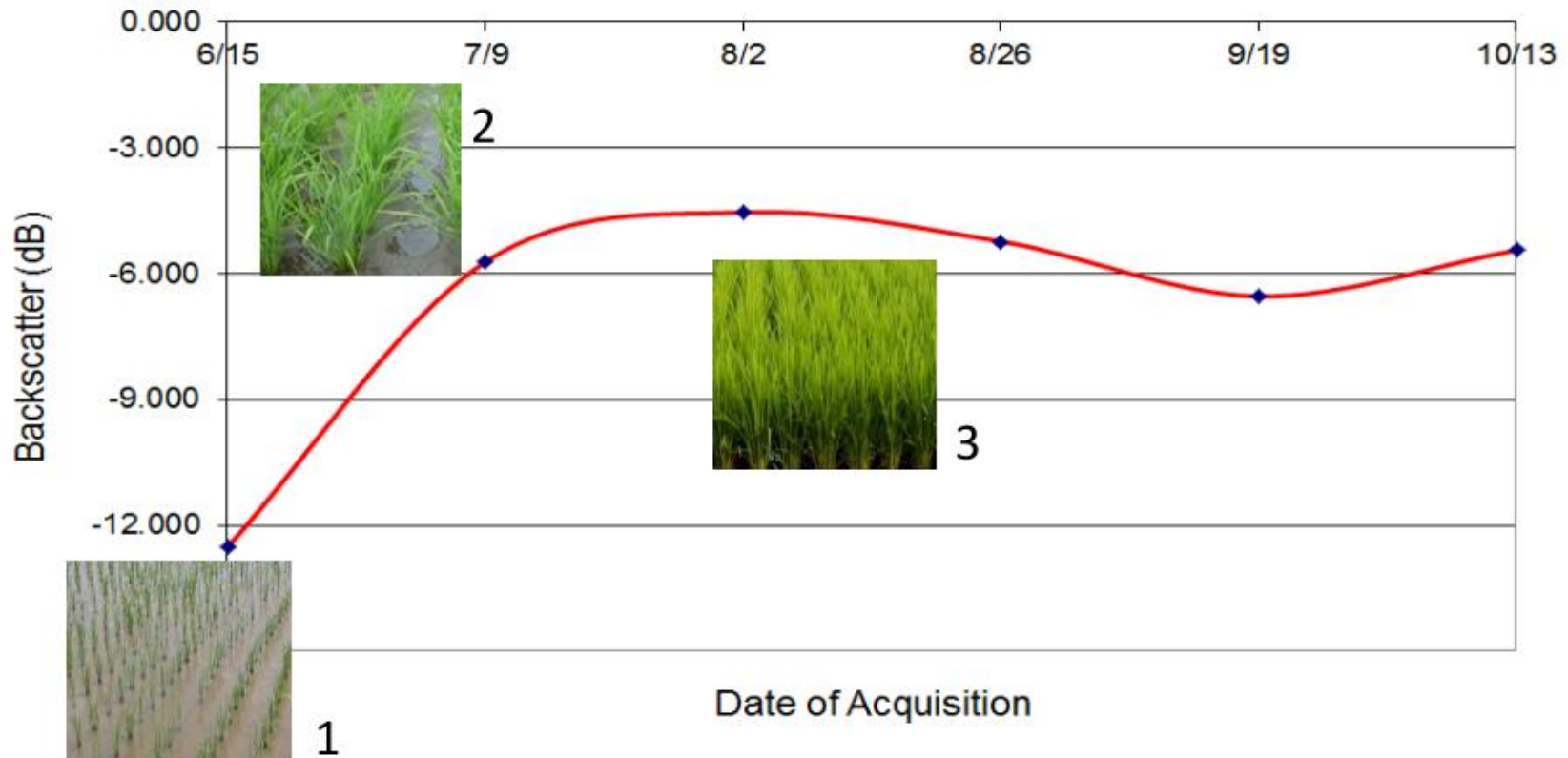
What does a SAR Sensor see?



για την παρακολούθηση του αναποφλοίου ρυζιού

- Η δυνατότητα συλλογής δεδομένων ανεξαρτήτου μέρας / νύχτας ή καιρικών συνθηκών
- Τα δεδομένα παρέχουν πληροφόρηση για τις καλλιέργειες ρυζιού:
 - ❖ Διαχωρισμός των καλλιεργειών ρυζιού από άλλες καλλιέργειες (Quad-polarized data),
 - ❖ Παρακολούθηση καλλιεργειών ρυζιού (λόγω της υψηλής ανάλυσης – 1μ)
- Αποδεδειγμένη επιχειρησιακή ικανότητα:
 - ❖ Περίπου 2200 εικόνες RADARSAT-1 (από το 1998) και RADARSAT-2 (από το 2007) έχουν χρησιμοποιηθεί στην Ινδία για την παρακολούθηση καλλιεργειών ρυζιού

Παράδειγμα παρακολούθησης ανάπτυξης του αναποφλοιώτου ρυζιού



- (1) Χαμηλό σήμα απόκρισης λόγω μικρών φυτών
- (2) Καθώς αναπτύσσεται το φυτό αυξάνεται και το σήμα απόκρισης
- (3) Φτάνει στο μέγιστο λίγο πριν τη συγκομιδή

Revisit time

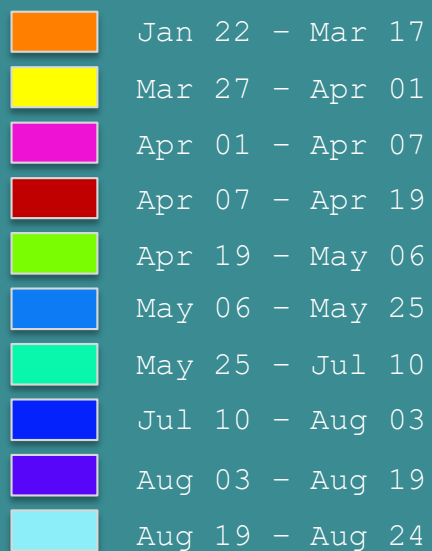
Καθημερινή λήψη της Γης σε ανάλυση 1μ

*Συνδρομητικές λύσεις και όχι αγορά
μεμονωμένων εικόνων*

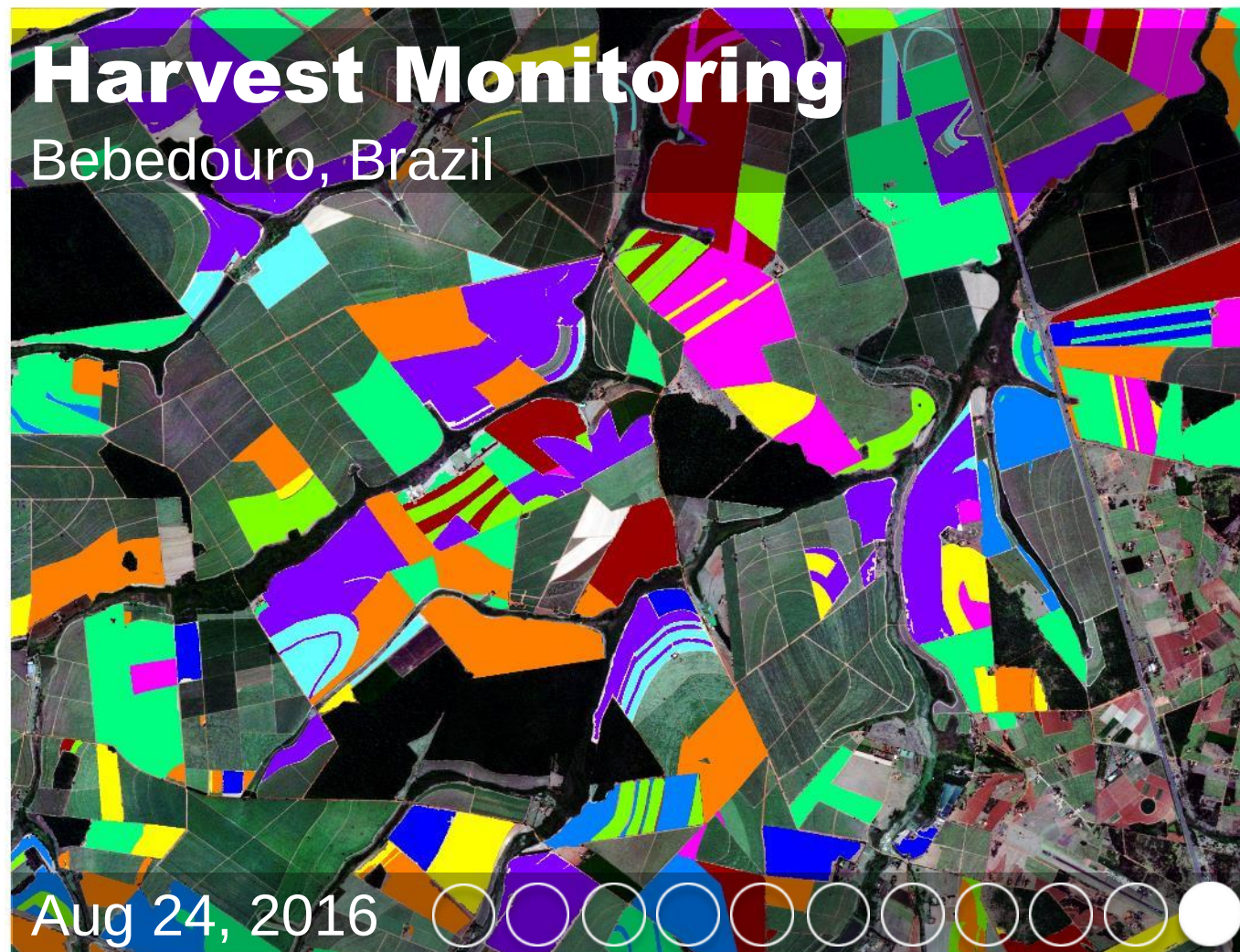
*Χρήση δικών μας αλγορίθμων σε
πλατφόρμες δορυφορικών εικόνων (Planet,
DigitalGlobe)*

CASE STUDY

Harvest Time 2016



Harvest Monitoring Bebedouro, Brazil







TotalView/Greek Ministry of Environment

DigitalGlobe Imagery Helps Enforce Property Rights in Greece

Known widely as the cradle of Cradle of Civilization and the Birthplace of Democracy, the history and legacy of Greece is unrivaled. From Thessaloniki in the north, to the sprawling capital city of Athens, to the historic island of Santorini, the country is filled with some of the world's most familiar ancient architecture and landmarks, treasures that need to be protected.

Protecting the natural environment and resources

The Greek Ministry of Environment, Energy and Climate Change is charged with protecting the country's natural environment and resources, improving quality of life, mitigating climate change, and enhancing mechanisms and institutions for environmental governance. Adhering to building codes and regulations is also part of their responsibility.

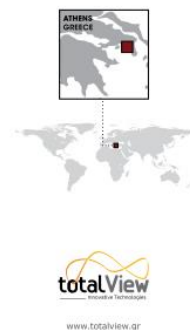
Tracking Illegal Structures

Home to 17 UNESCO World Heritage Sites, Greece is a treasure trove of history. As such, the country takes building codes seriously, but monitoring illegal structures as well as structures that do not conform to previously-issued building permits is no easy task. The Ministry of Environment turned to WorldView Global Alliance reseller TotalView for help. Athens-based TotalView is a geo-information company. TotalView's clients include the country's largest network of utilities, public authorities, academic institutions, and construction and archeological firms that depend on TotalView for photogrammetry projects, remote sensing, and GIS solutions.

"Preserving the country's architectural integrity, and not just in the historic areas, is a high priority for the Ministry of Environment," says Vana Giavi, TotalView's Managing Director. "We began the project about one year ago in a pilot program on the islands of Mykonos, Santorini, Paros and Antiparos, and we are now expanding into Athens and beyond."

Company Information

Athens-based TotalView, a WorldView Global Alliance authorized reseller for three years, combines leading technologies with deep field experience and significant scientific training to provide a large network of utilities, public authorities, academic institutions, and construction and archeological firms with expert photogrammetry projects, remote sensing, and GIS solutions.



www.digitalglobe.com

Corporate (U.S.): +1.303.684.4561 or +1.800.496.1225 | London +44.20.8899.6801 | Singapore +65.6389.4851

CASE STUDY 15

TotalView / Viticulture Project



ts Crop Management in Vineyards

Technical University of Athens, Greece, successfully correlated multispectral WorldView-2 data with ground-based measurements in Greece. This correlation confirmed that satellite imagery is optimizing the management and harvesting of wine grapes.

grapes vary across a region and or the grapes throughout the additional water should be ap-
propos makers examine grapes for
time for picking. Vines are
tic barrels/tanks in anticipation



monitor crop health and fruit
rs, grape and other analyzers.
the 350-1050nm range was
and derive numerous vegeta-
content and other indicators

cedure, is a time-consuming
tzalos, Assistant Professor at



strasse 199, 80634 Munich, Germany | T: +49 89 1301420

umbrella Project



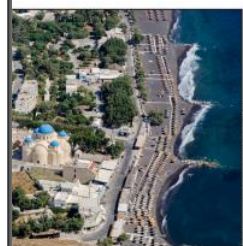
Greek Cities to Monitor Beach Permit Compliance

coastline in Europe, and its beaches are the property of all citizens. Each sum-
mit permits for hotels and cafes to utilize specific areas of the beach for their
was inaccurate and time consuming until a geospatial solutions provider in
al corporation to develop a cost-effective and unbiased method of monitoring
Santorini with very high resolution WorldView-2 satellite imagery.

o Beaches

and recreational resources for Greece, drawing
summer season. With an eye toward maintain-
ing, the Greek government has given local munic-
ipal areas by carefully granting use contracts to
cafes, and watersports operators.

ific space where the holder may set up umbrel-
is usually bounded by the edges of the building
is the beach for several meters toward the water.
umbrellas or chairs beyond their assigned areas,
eking public access", said Vana Giavi, Managing



ing.com | Arnulfstrasse 199, 80634 Munich, Germany | T: +49 89 1301420

... και ο νικητής είναι ...



Table 5. Comparative platform characteristics for different remote sensing platforms.
(++ optimal, + good, o average, - poor).

		UAV	Aircraft	Satellite
Mission	Range	-	+	++
	Flexibility	++	+	-
	Endurance	-	++	++
	Cloud cover dependency	++	+	-
	Reliability	o	+	++
Processing	Payload	o	+	++
	Resolution	++	+	o
	Precision	++	+	o
	Mosaicking and geocoding effort	-	o	++
	Processing time	o	+	+



1. Οι δορυφορικές εικόνες αποτελούν ένα από τα σημαντικότερα εργαλεία στην χωρική ανάλυση.
2. Ο κλάδος αναπτύσσεται συνεχώς σε όγκο, ποιότητα και εργαλεία.
3. Η βέλτιστη λύση χρειάζεται μελέτη, γνώση, εμπειρία και συνεργάτες.



Ευχαριστώ πολύ!

Βάνα Γιαβή
vgiavi@totalview.gr