



# ERS/ENVISAT ASAR Data Products and Services

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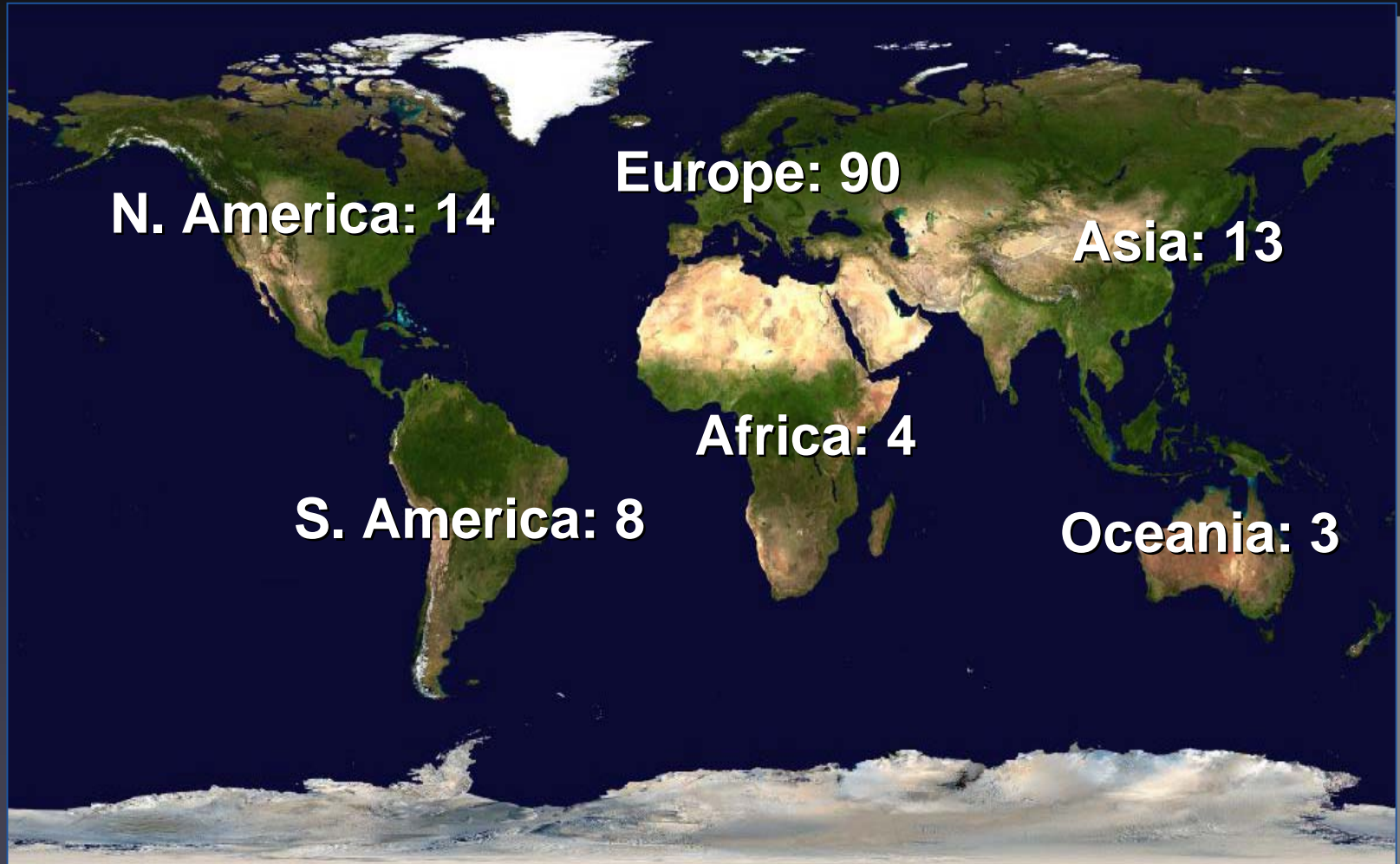
# What is Eurimage ?

- Founded in 1989
- Current shareholders:



- Since 1989 Commercial Partner of the European Space Agency (ESA)
- Premises: Rome
- Staff: approx. 30

# Eurimage Application Provider Network



# Data Distribution Rights

- **QuickBird**
  - Exclusive distributor of QuickBird products in Europe (except Italy) and the Mediterranean Basin
- **Landsat**
  - World-wide exclusive commercial distributor of Landsat data from ESA stations and part of the Business Partner Program with USGS
- **IRS**
  - Distribution rights in Europe for data from Euromap archive
- **Radarsat**
  - Distribution rights for EU countries
- **ASTER**
  - Distribution rights in Europe
- **NOAA / AVHRR**
  - Distribution rights of ESA archive
- **JERS**
  - Distribution rights of European archive
- **Ad-hoc agreements with other missions/centers**

# ERS-ENVISAT Distribution Rights



- **ESA appointed Distributing Entity for global commercialisation and distribution of ERS & ENVISAT data and services**
- **Partners and Roles**
  - Master Distributor: Eurimage
  - Value Adders: ASI, Astrium GmbH, DLR, Infoterra Ltd, QinetiQ, Telespazio
  - Ground Stations: DLR, QinetiQ, Telespazio



# EMMA Roles: Master Distributor

- **Standard Products Distribution, Marketing and Promotion**
- **Contracts for direct reception and access to ERS/ENVISAT satellites**
- **Interface with ESA**
- **Setup & co-ordination of distribution network and Int. Ground Station contracts**
- **Access to Data Archives and Satellite Planning requests collection**
- **Catalogues: Einet and DESCW**

## ERS-1 & 2

- **The first orbiting SAR sensor. Initially for R&D, but has kicked-off many commercial and operational applications**
- **Largest SAR data archive, since 1991**
  - Continuous and routine global acquisitions without the need of specific programming
- **Advantages of SAR for any application**
  - Day/Night Imaging
  - Cloud Cover Penetration
  - Good Data Availability on a global scale

# ERS-1 & 2

**ERS-1 1991-2000**

**ERS-2 April 1995**

## Satellite Orbital Characteristics

<b>Orbit</b>	<b>Sun-synchronous</b>
<b>Altitude</b>	<b>785 Km</b>
<b>Inclination</b>	<b>(98.52°)</b>
<b>Orbit per Day</b>	<b>14.3</b>
<b>Repeat Cycle</b>	<b>35 days</b>
<b>Tandem Mode</b>	<b>ERS-1 24hrs prior to ERS-2</b>

- Subsequent acquisitions since launch of ERS-2, 1995)

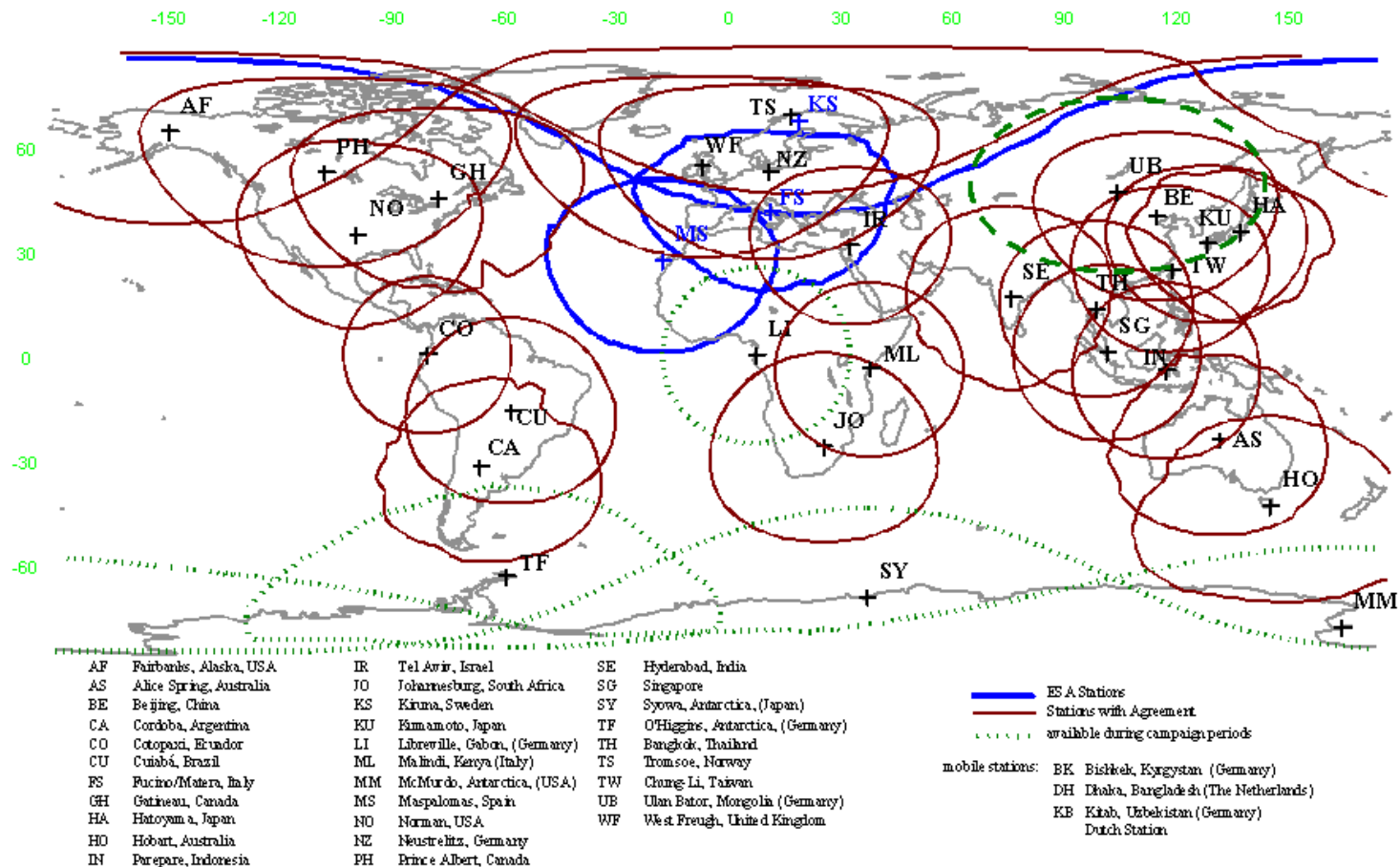


# ERS SAR

- **ERS-1 & 2 SAR**
  - Spatial resolution            25 m
  - Area coverage                10,000 km<sup>2</sup>
  - Frequency                    5.3 GHz (C-band)
  - Polarisation                Linear-Vertical (VV)
- **14 Years Data Archive:**        **ERS-1: 1.8 Mil. Frames (1991-2000)**  
   **ERS-2: 1.0 Mil. Frames (since 1995)**
- **Over 100,000 Products Generated amongst over 10,000 Users**
- **All-weather Data Availability**
- **ERS SAR Standard Products: RAW, SLC, PRI, GEC, GTC**

# ERS Ground Station Network

## ERS SAR RECEIVING STATIONS



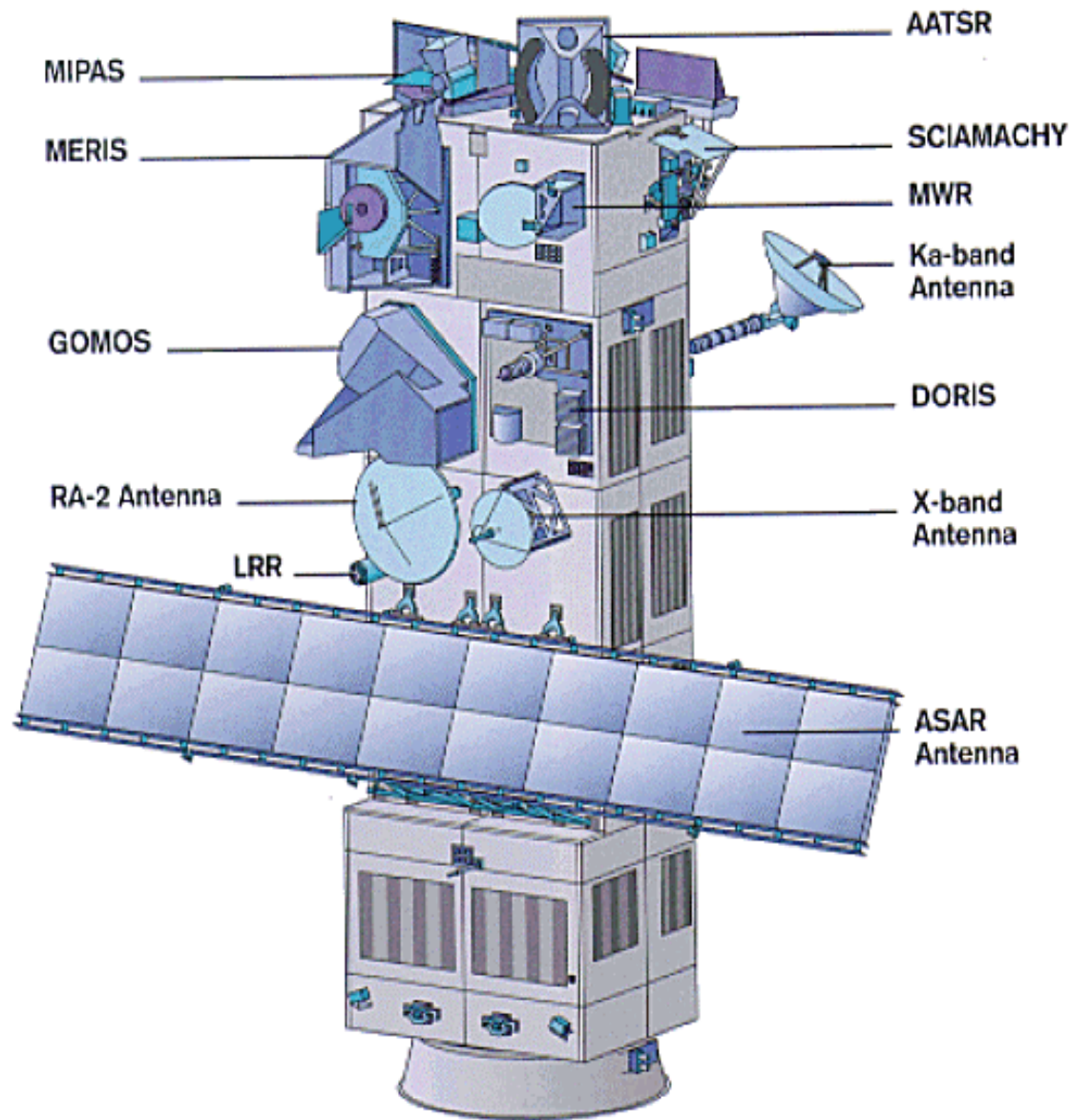


# ENVISAT Mission





# The ENVISAT Mission



**Launch Date: March 2002**

- **Dimensions**

Launch configuration:  
length 10.5 m  
diameter 4.6 m  
In-Orbit configuration:  
**26m x 10m x 5m**

- **Mass**

Total satellite **8140 Kg**  
Payload 2050 Kg

- **Launch vehicle**

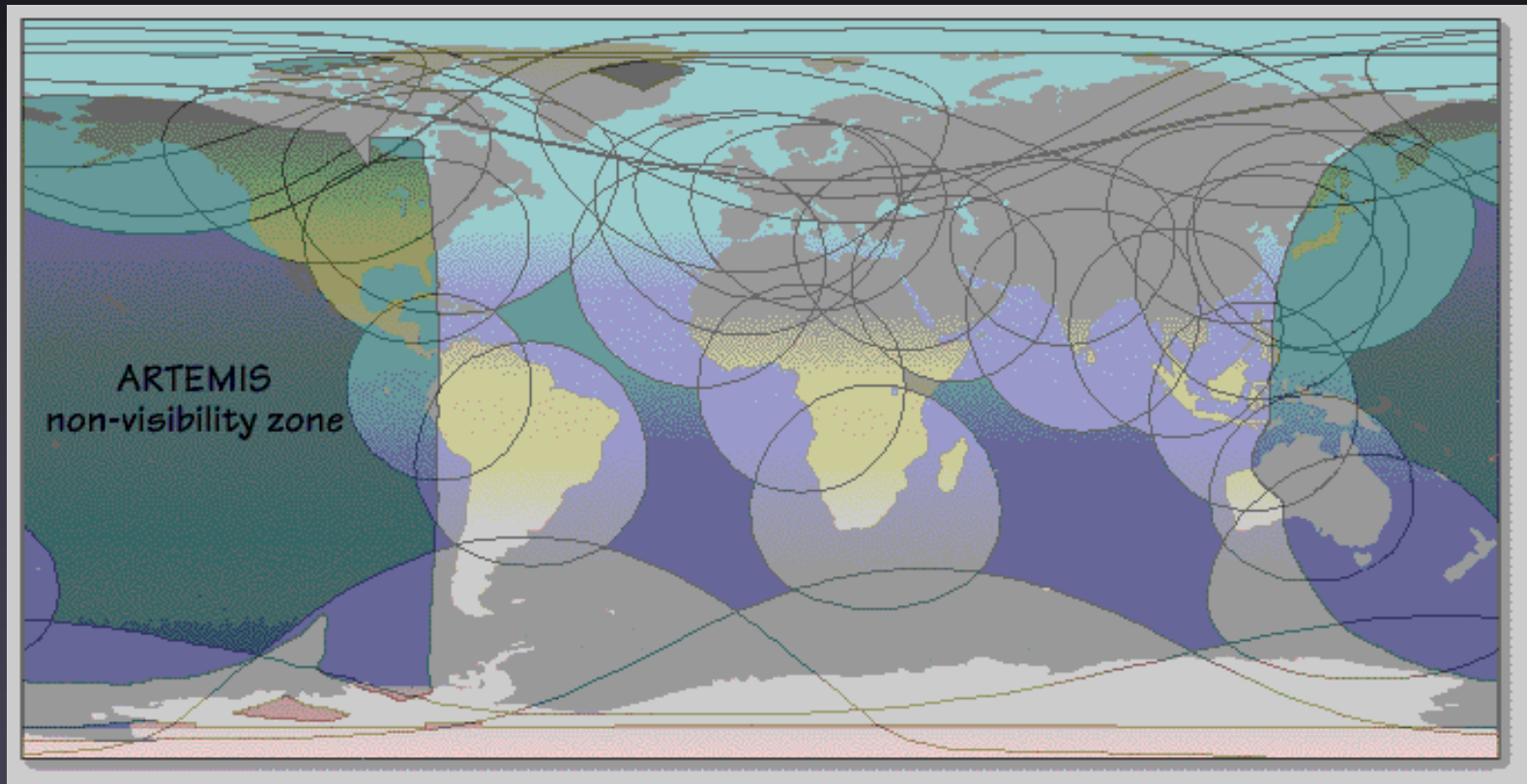
Ariane 5

- **Orbit: 800 km as ERS**

sun-synchronous  
10:00, i.e. 30 min. before ERS-2

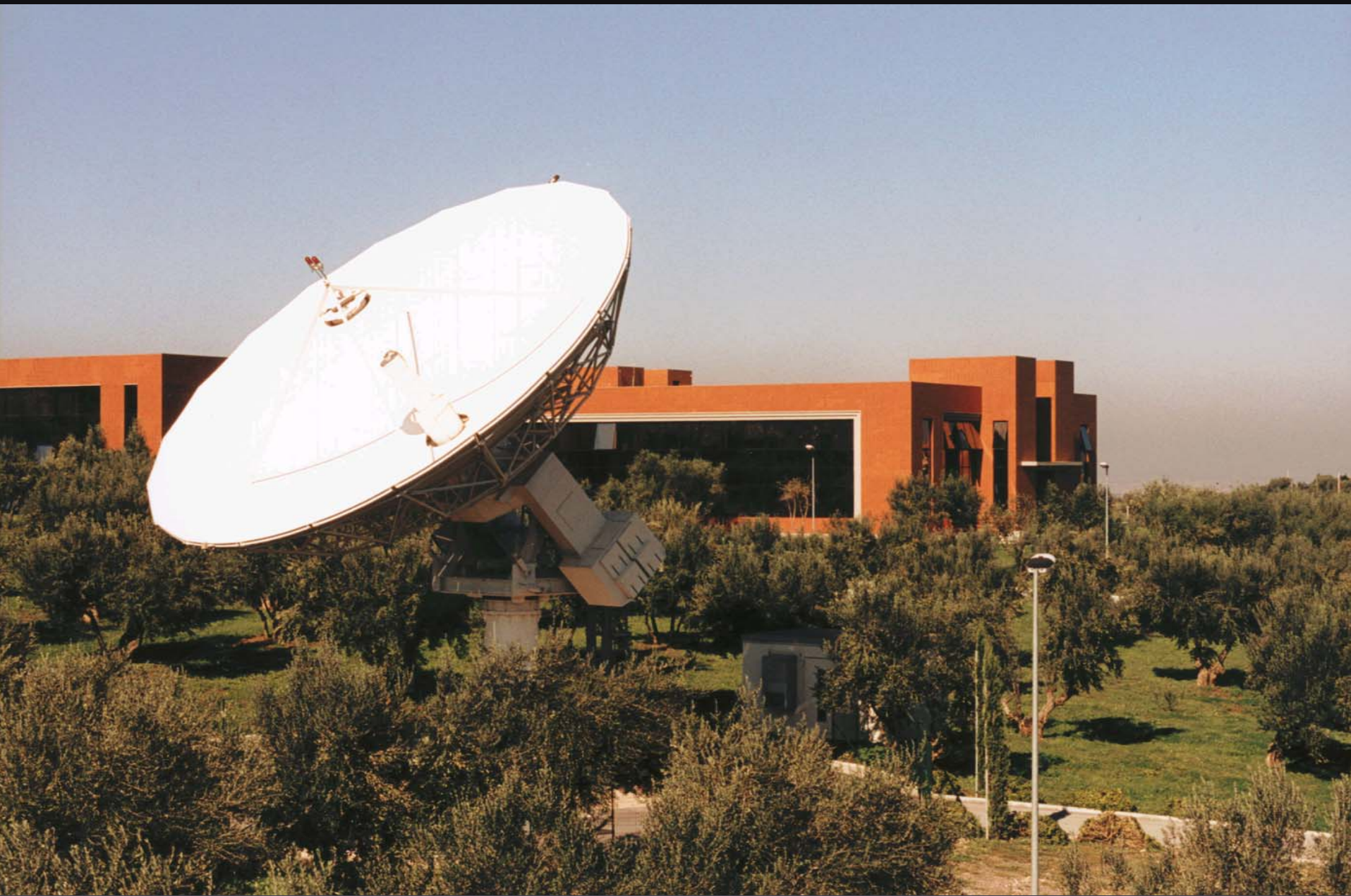
**All sensors performing well**

# ENVISAT Improved Characteristics

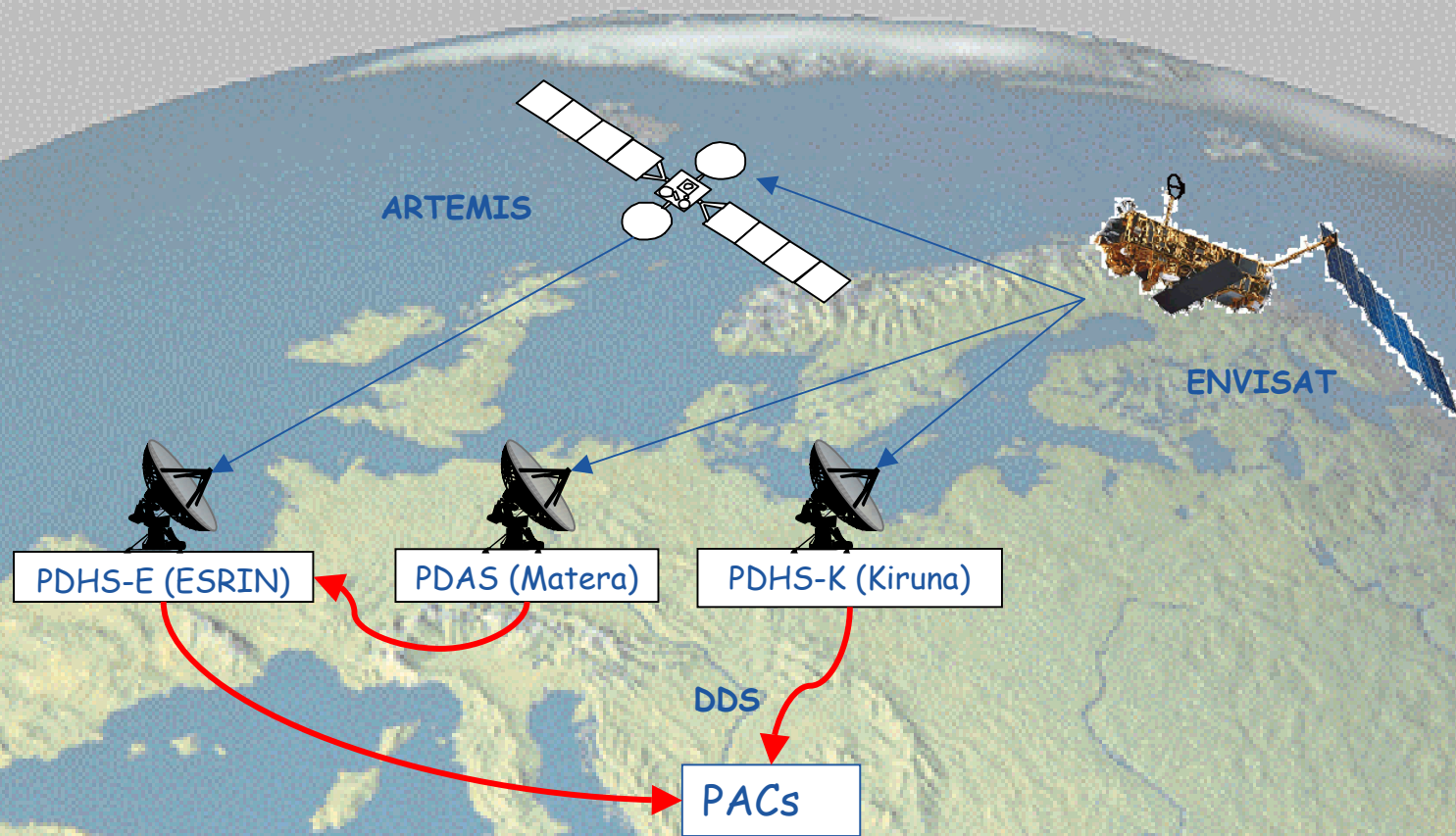




# ENVISAT Ground Segment



# Kiruna-Artemis scenario



- 4/5 orbits are received in Kiruna
- 8 orbits in ESRIN (6 via Artemis)
- Matera receives ASAR HR and MERIS FR in direct visibility, data sent to ESRIN within a week

# ENVISAT Instruments and Products

- **ASAR** – **A**dvanced **S**ynthetic **A**perture **R**adar

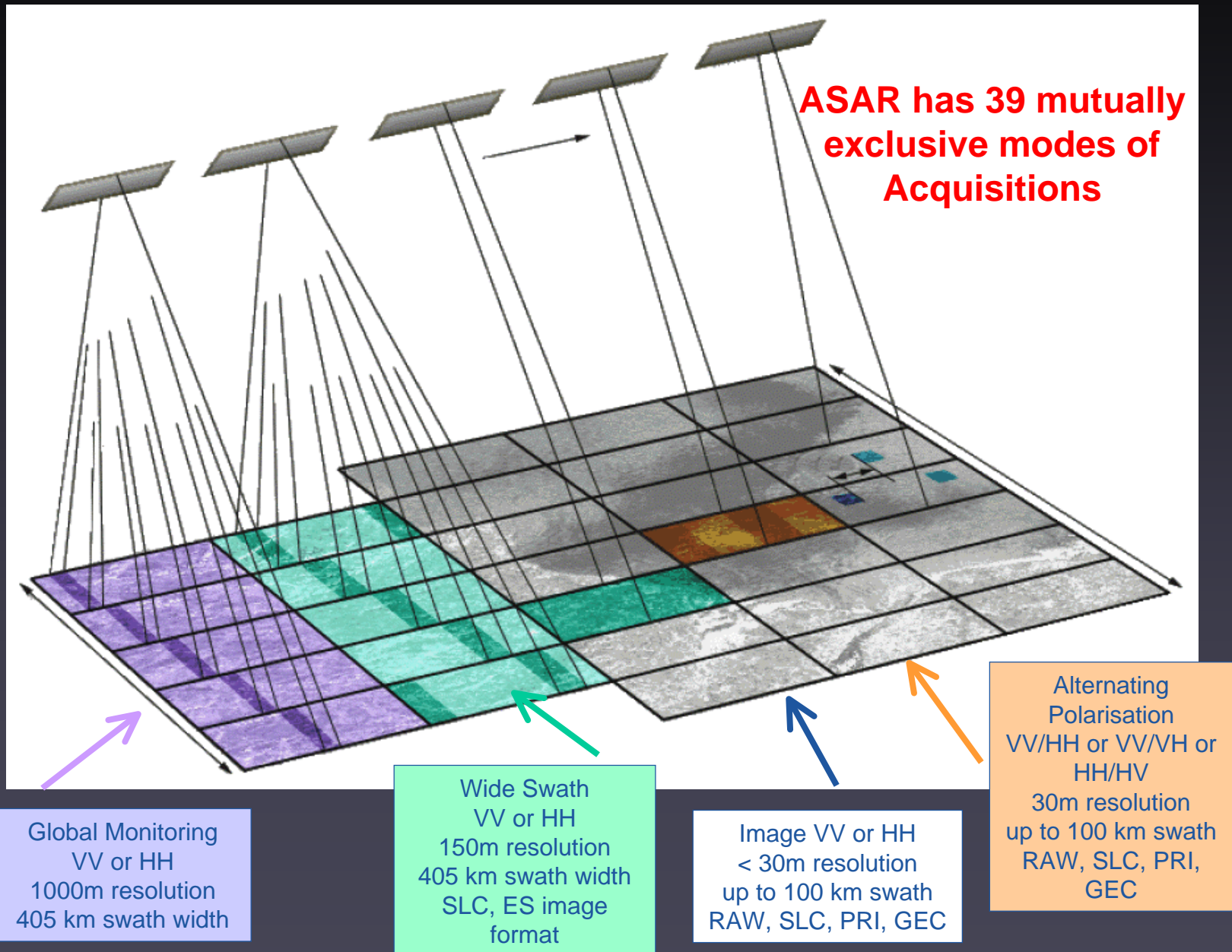




# How ASAR works

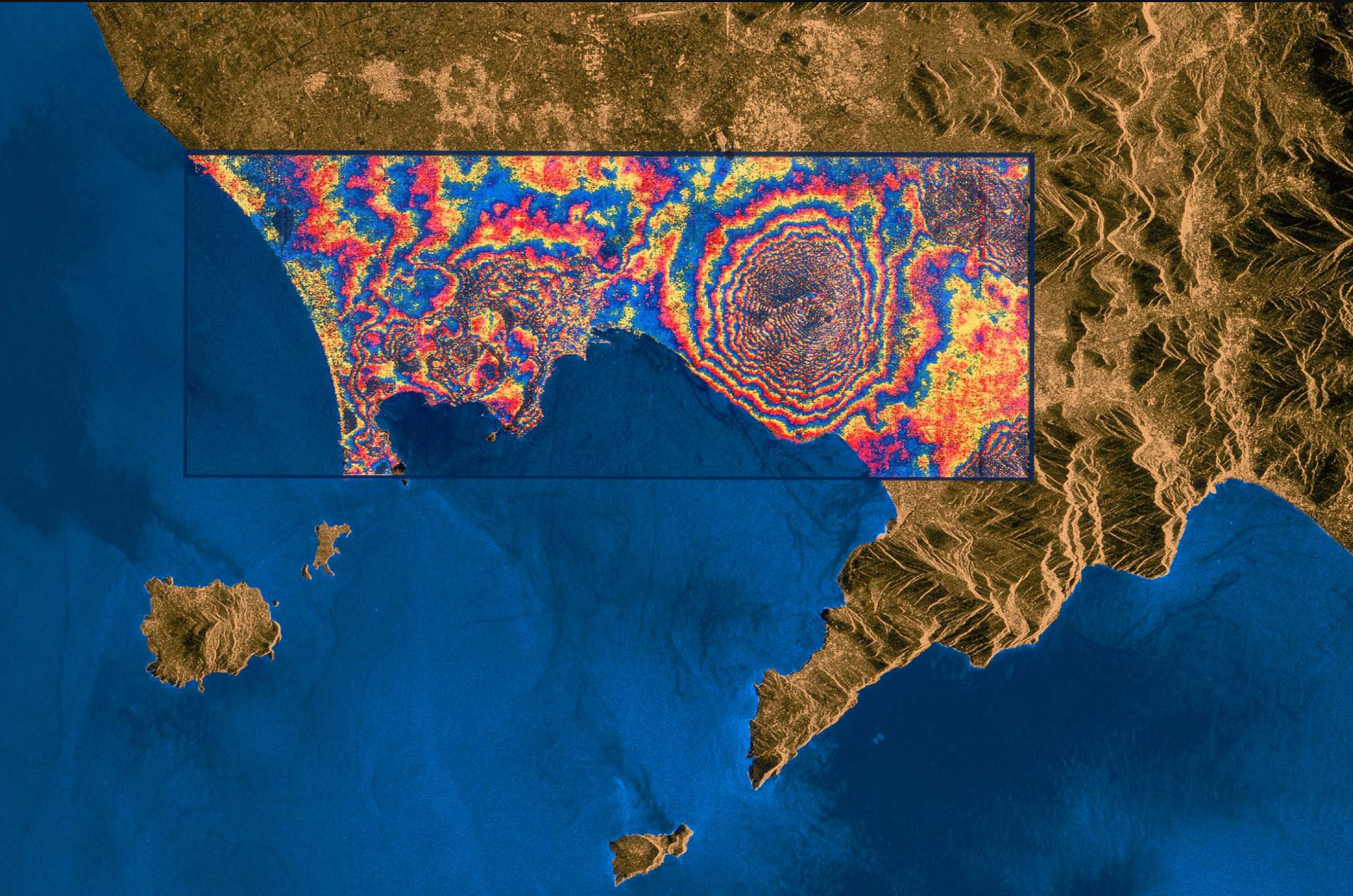
- **ASAR has five mutually exclusive modes of operation:**
  - Image mode
  - Alternate Polarisation
  - Wide Swath
  - Wave
  - Global Monitoring
- **Image Mode, 30 m resolution, similar to ERS SAR.**
  - 7 possible mutual exclusive swaths
  - 2 possible mutual exclusive polarisation (VV or HH)
- **Alternate Pol. Mode, 30 m resolution**
  - 7 possible mutual exclusive swaths
  - 3 possible mutual exclusive polarisation (HH/VV, HH/HV or VV/VH)
- **Wide Swath Mode, 150 m resolution**
  - 1 unique swath (405 km)
  - 2 possible mutual exclusive polarisation (VV or HH)

# ENVISAT ASAR Operation Modes

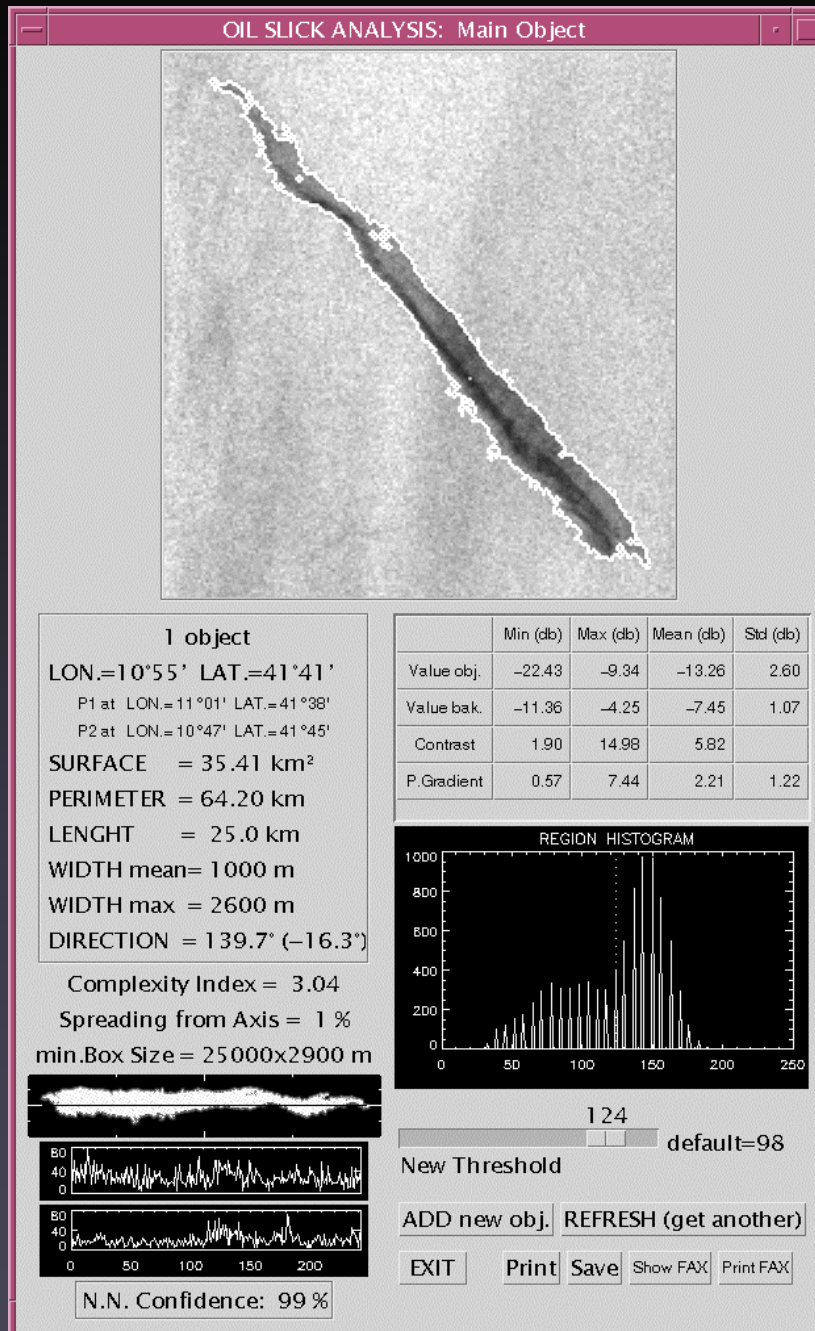




# Applications



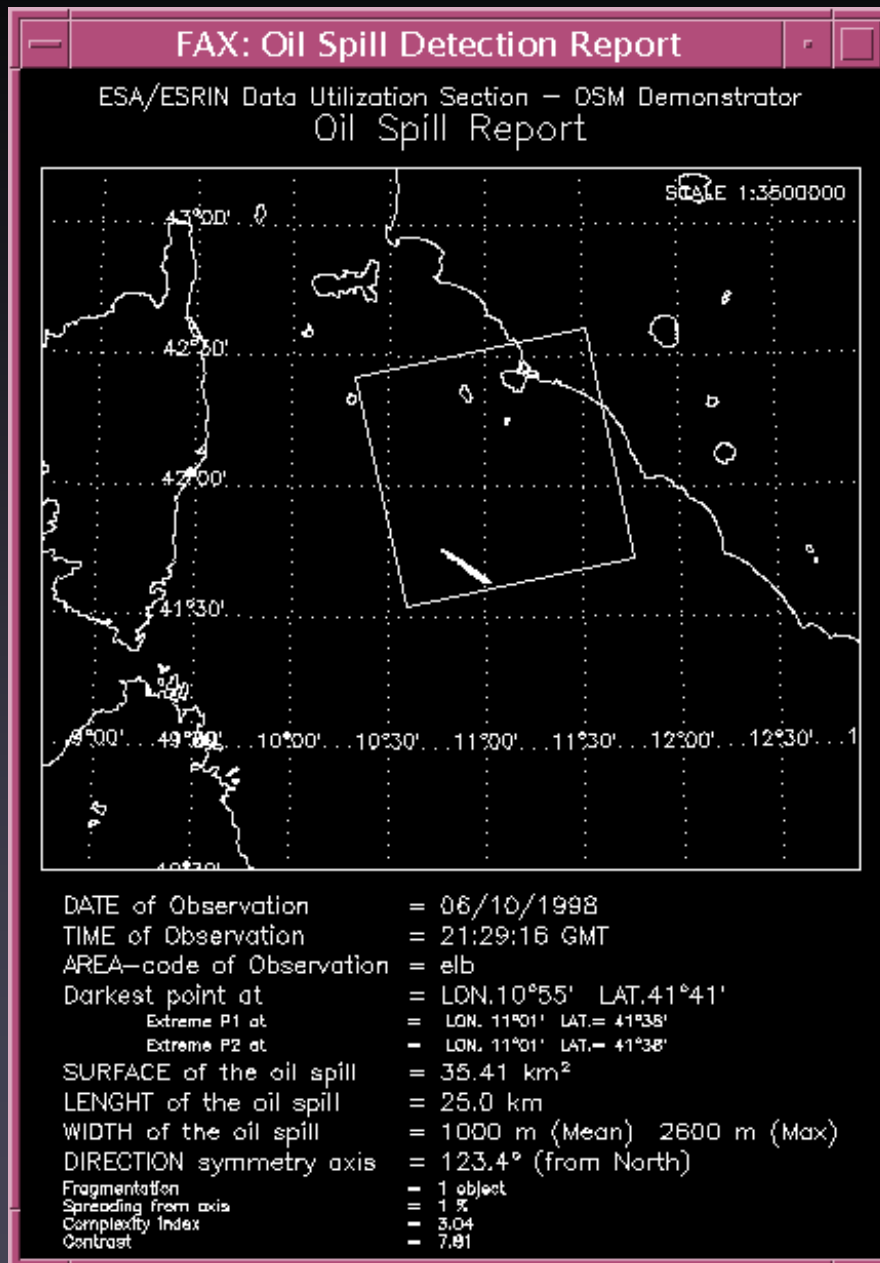




The Oil Spill is analyzed and measured by a dedicated software.

Morphological and Physical parameters are computed.

Multivariate analysis and neural network techniques help the operator in the analysis of the object.



# Oil Spill Report

is sent by FAX to  
Coast Guards

Contains all operative  
information for locate  
and define the pollution.



# Ship Detection and Ship-Wake analysis

An automatic algorithm  
detects ships visible in  
the SAR image.

Ships responsible of the  
pollution are indicated.



# Off-Shore Exploration

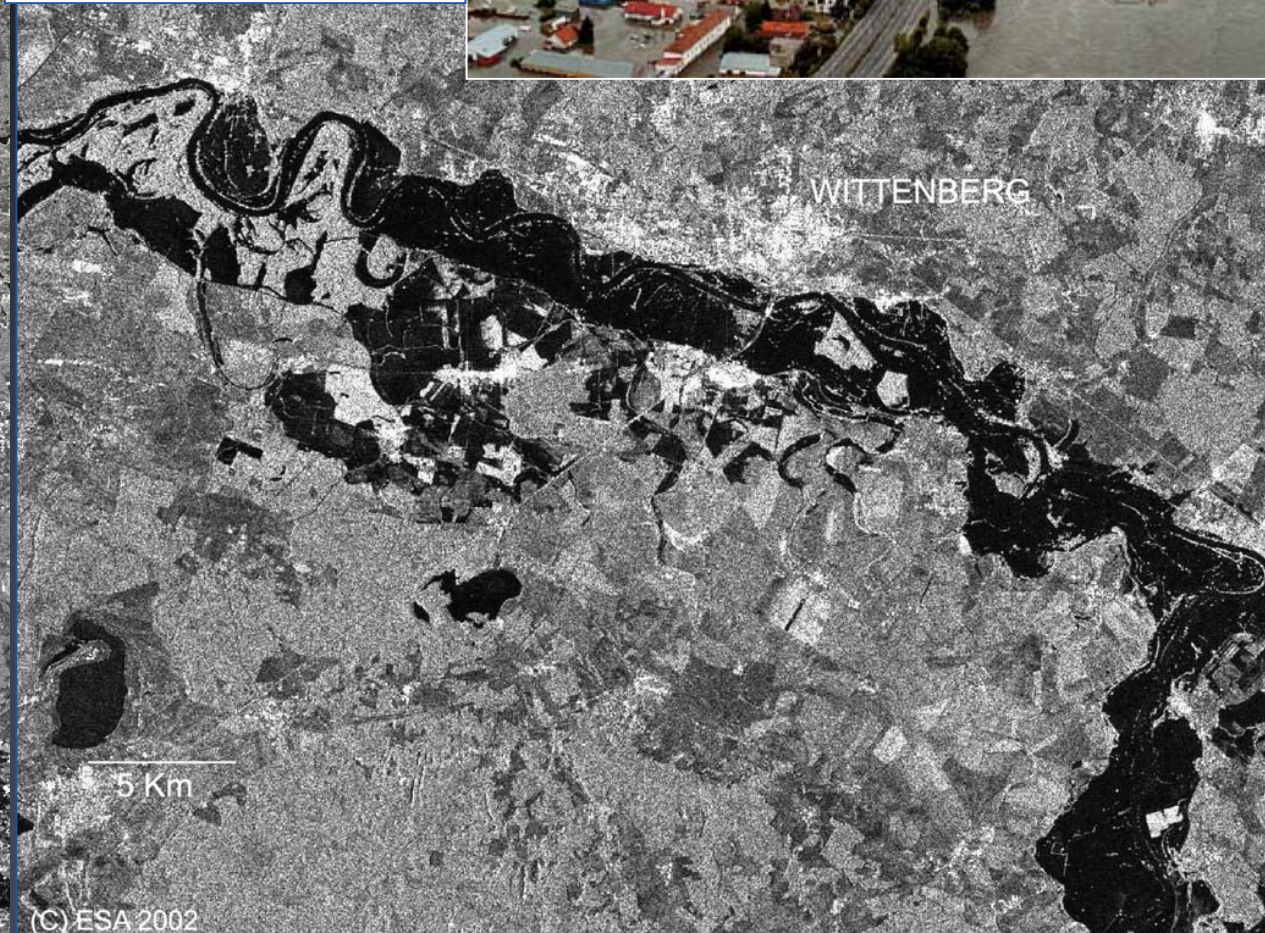
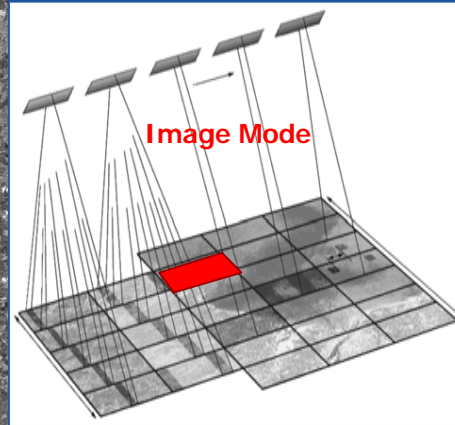
## ENVISAT Improvements

- Greater coverage (Wide Swath and image Mode VV)
- Deep water exploration outside of station mask with SSR and Artemis





# German Flooding 2002





# Subsidence Monitoring

## Seismic Faults in Los Angeles Basin:

1. San Jose Fault
2. Raymond Fault
3. Whittier Fault
4. El Modeno and Peralta Hills Faults
5. Los Alamitos Fault
6. Newport - Inglewood Fault
7. Palos Verdes and Cabrillo Faults

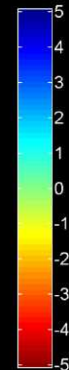
## Subsidence Phenomena:



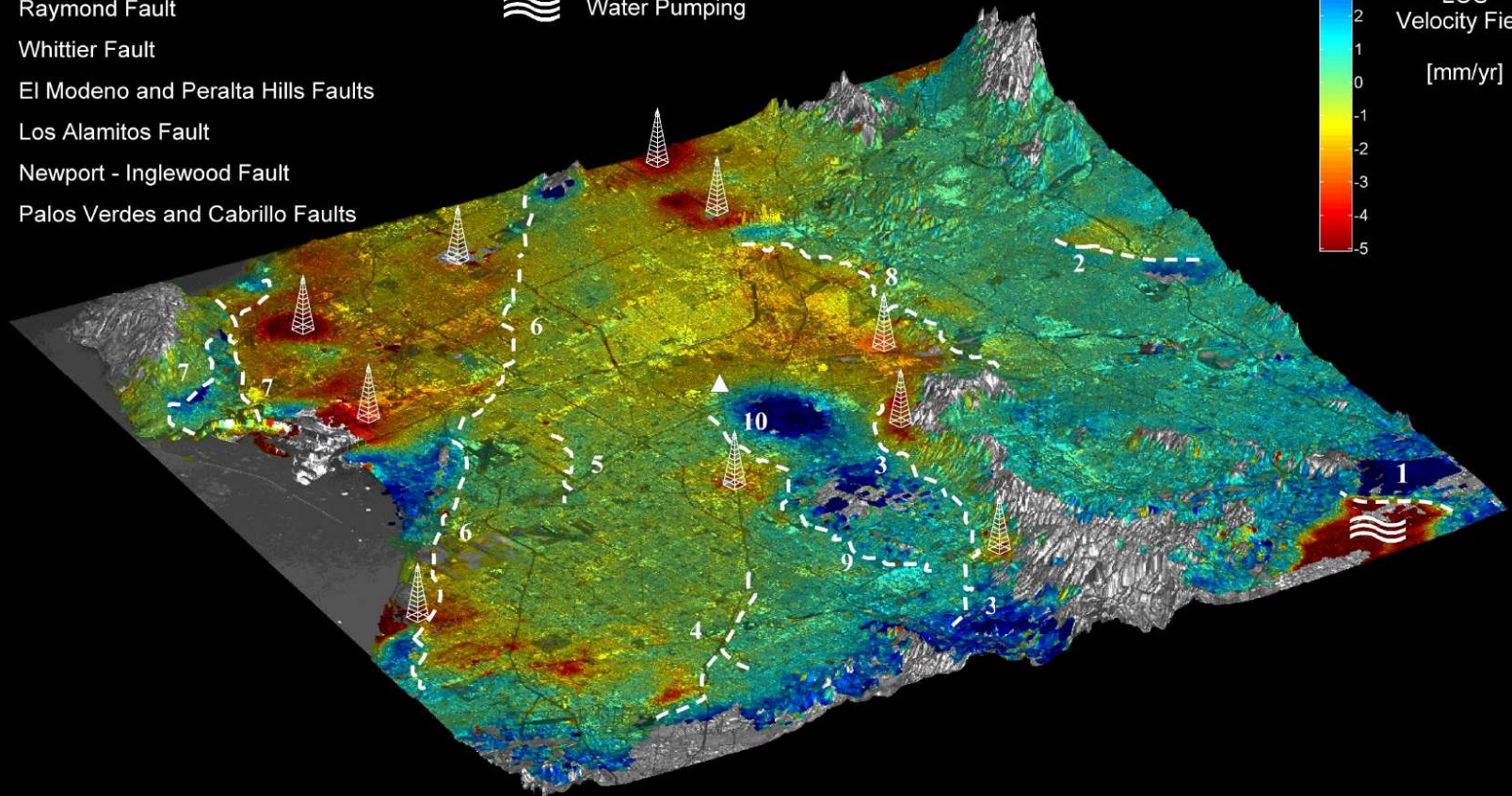
Oil & Gas Fields



Water Pumping



LOS  
Velocity Field  
[mm/yr]

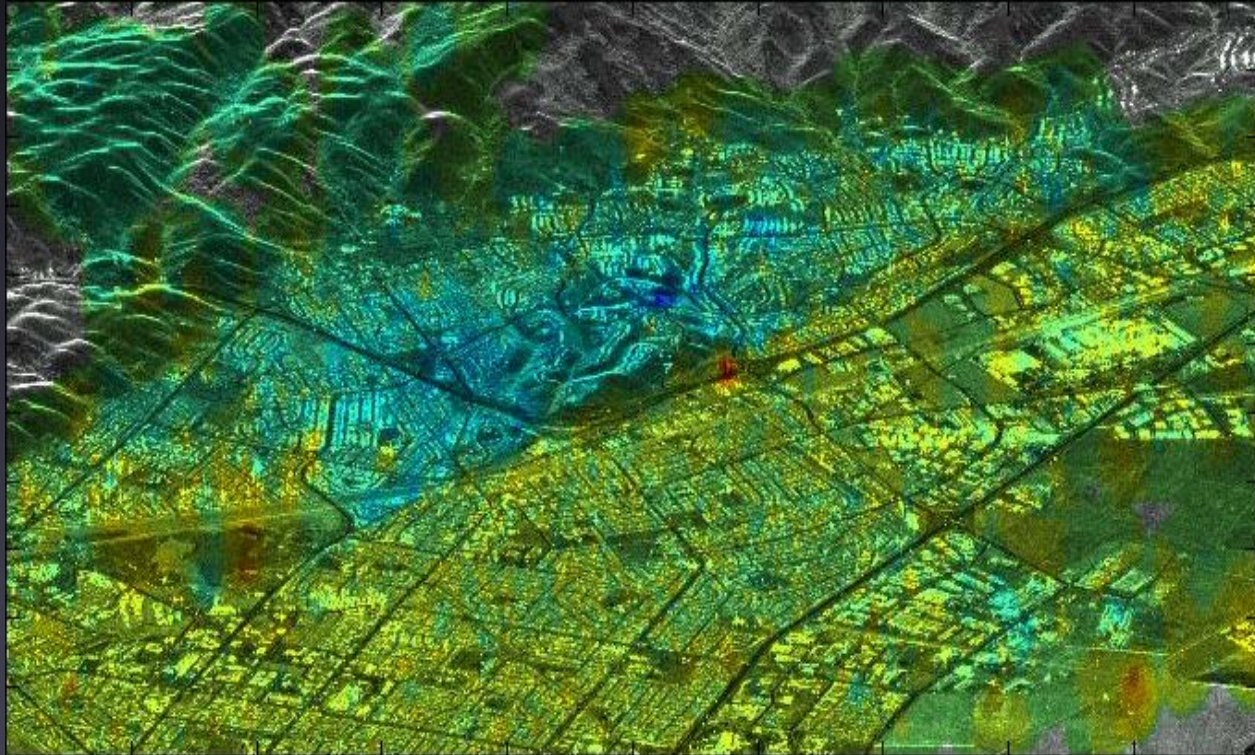


8. Elysian Park Blind Thrust (?)
9. Coyote Hills Blind Thrust (?)
10. Santa Fe Spring Blind Thrust (?)

Puente Hills Blind Thrust (?)

# Monitoring Over Time

1992 1993 1995 1996 1997 1998 1999 2000



Forward in time from May 1992 to September 2000

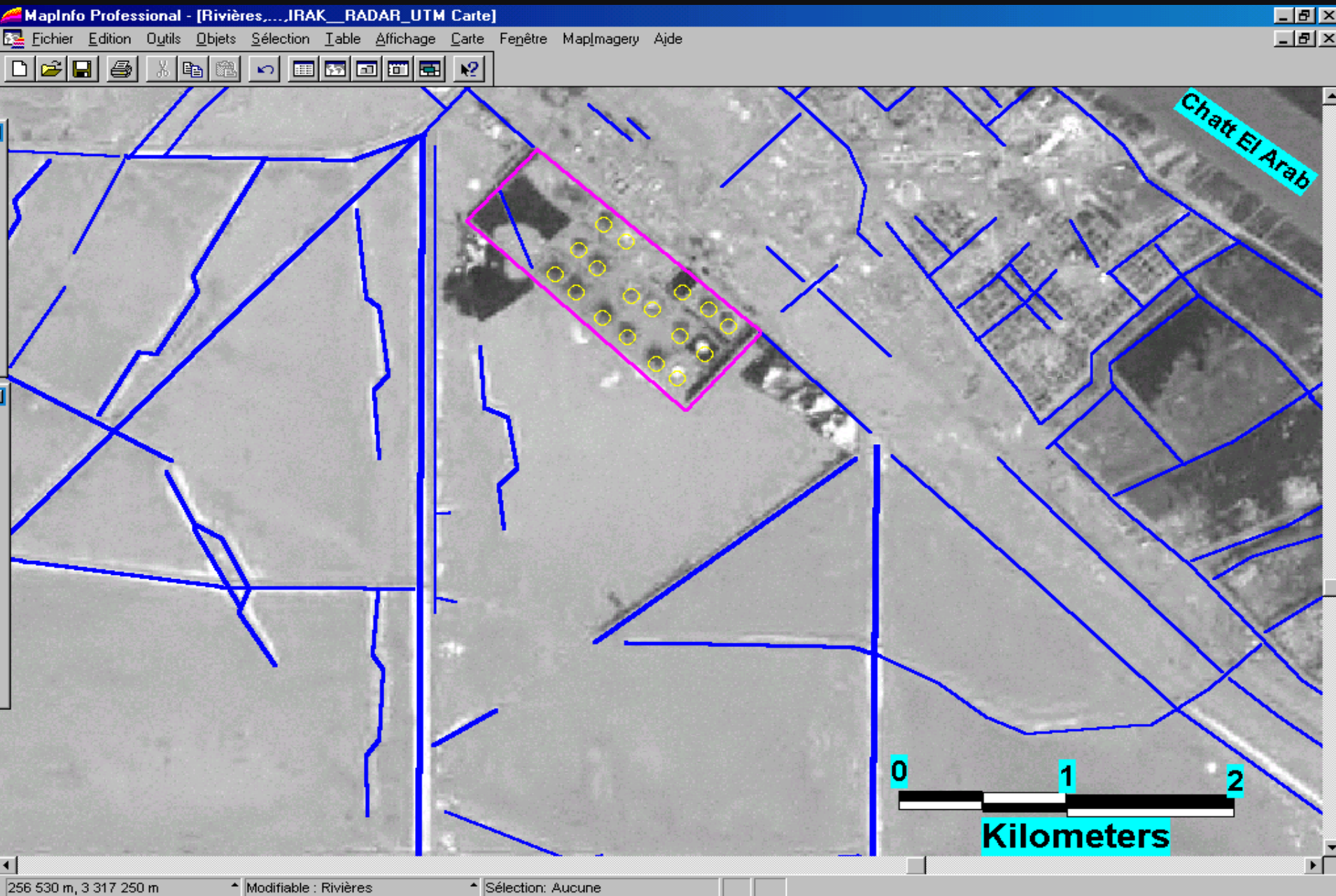


# Lineaments and feature Mapping



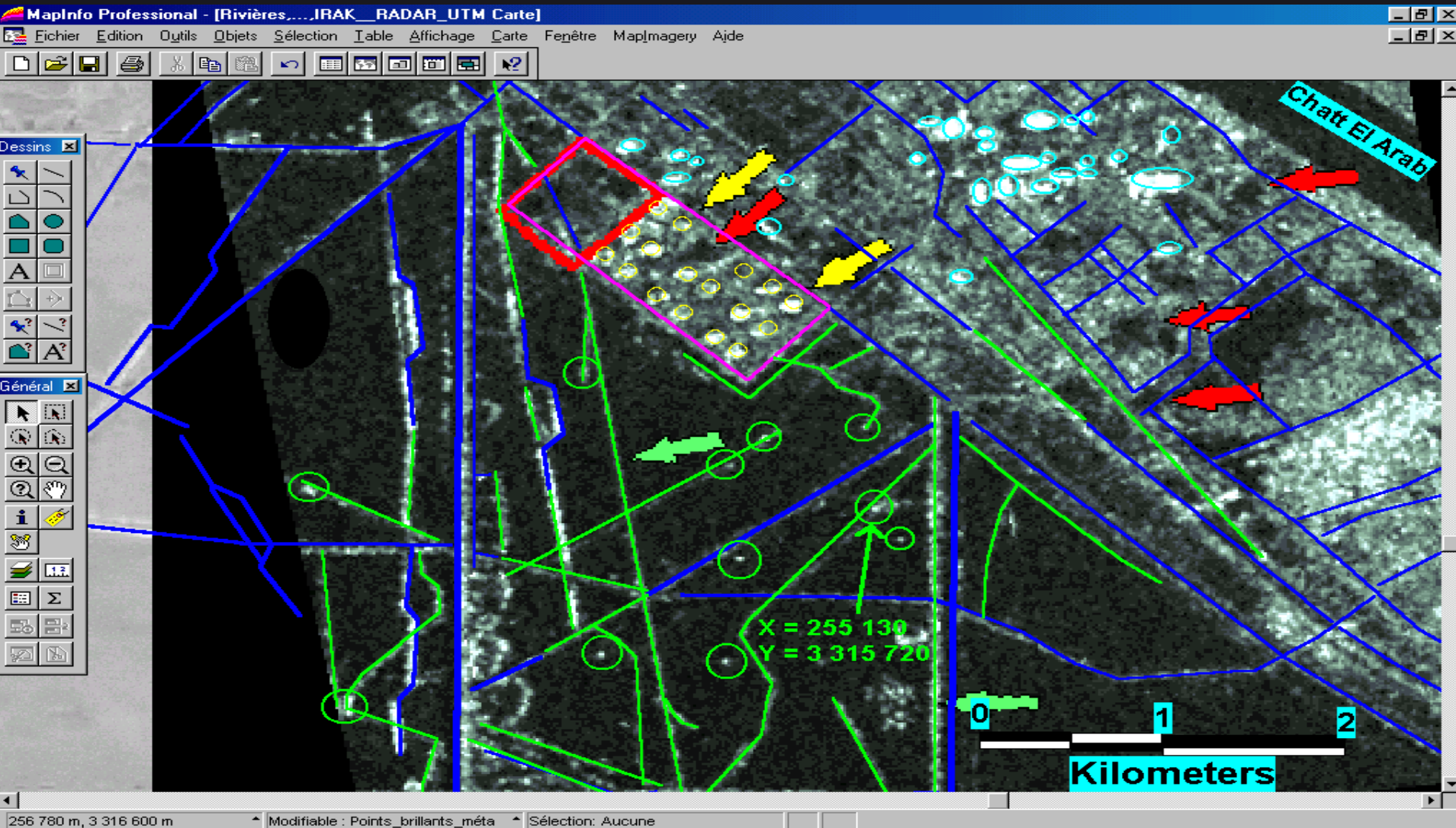


# Optical data : mapping of visible lineaments.



# Radar allows the accurate mapping of all lineaments

- Accurate mapping of residual
- Identification of buried objects





# Geological Structure Mapping

## Data Fusion with optical imagery




# Commercial and Operational Overview

# Eurimage Public Commercial Documentation

Indirizzo <http://www.eurimage.com/products/products.html>

Google  Search 1129 blocked Check AutoLink AutoFill Options



## Products and Services; Prices

| quickbird | landsat | envisat | ers | irs | radarsat | noaa |

[ home ]

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[ applications ]

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Catalogues:

[ EiNet ]

[ DESCW ]

**Eurimage Missions**

**QuickBird** - the world's highest resolution commercial remote sensing satellite

**Landsat** - the longest running commercial mission provides decades of data at medium resolution

**Envisat** - continuity with ERS, with new, advanced sensors for environmental monitoring

**ERS -1 & 2** - all -weather synthetic aperture radar and other advanced sensors from these European Space Agency missions

**IRS** - flexibility in medium-resolution optical data

**Radarsat** - synthetic aperture radar data from Canadian satellite

**NOAA** - low-resolution data since 1978

**ASTER** - medium resolution data

**Eurimage documentation (pdf)**

Complete **Eurimage Products and Services Guide** (4.1 MByte) Chapters for single missions are available through the mission pages at left

**Eurimage Price List**

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**Order Forms:**

**QuickBird Order Forms\***  
**QuickBird Order Guide**

**Landsat\***  
**Envisat/ERS-1 & 2\***  
**ASTER\***  
**Other Missions** (IRS, NOAA, RADARSAT, J-ERS)

\*interactive forms - may be completed on screen



# Products and Prices – Archive Data

ERS-1/2; Envisat

SAR; ASAR

## Products

- SAR and ASAR Narrow Swath products are available as either Full Resolution Imagery or Medium Resolution Imagery (MRI)
- Scenes may be shifted along track at no extra cost
- For data from non-ESA facilities, product availability, prices, formats and media may vary
- Production / processing time from International Ground Stations may be longer than from ESA facilities
- For Envisat data only, acquisitions outside ESA station coverage are available through the on-board recorder and the ARTEMIS data relay satellite
- ASAR Beam and Sensing Modes are mutually exclusive
- ASAR Narrow Swath products are available as IS1 to IS7 (56–100x100 Km swath)
- ASAR Narrow Swath and Wide Swath products are available as either H/H or V/V polarization
- ASAR Narrow Swath Alternating Polarization products are available as either HH/VV or VV/VH or HH/HV
- ERS Images are available as V/V polarization
- MRI available from Archive for Envisat ASAR only. MRI new acquisitions available for global Envisat ASAR and ERS SAR data acquired at Matera (Italy) Ground Station
- Available processing levels: RAW, SLC, PRI, GEC
- Detailed descriptions of all products are in the Eurimage *Products and Services Guide*
- Contact Eurimage Help Desk and Customer Service for further information on these points

## Archive Products

<i>Product</i>	<i>Acquisition Mode</i>	<i>Price (€)</i>	<i>Media</i>
ERS	Narrow Swath	<b>400</b>	CD
ENVISAT	Narrow Swath or Wide Swath	<b>400</b>	CD, ftp
ENVISAT MRI	Narrow Swath	<b>75</b>	CD, ftp

# Future Acquisitions

ERS-1/2; Envisat

SAR; ASAR

## New Acquisitions

- Fulfillment of a New Acquisition request is subject to feasibility, to be confirmed by ESA through Eurimage Customer Service
- Available world-wide for all products
- Envisat Standard programming requests must be submitted at least 15 days before acquisition date
- Envisat Rush programming requests must be submitted at least 8 working days before acquisition date
- Envisat Emergency programming requests must be submitted at least 3 working days before acquisition date. Contact Eurimage Customer Service for more urgent needs
- Price in € per scene, Including Programming Fee and Product Price
- MRI products are discounted by 25% vs Full Resolution products

Satellite	Description	Programming type			Media
		Standard	Rush	Emergency	
ERS SAR	1 Narrow Swath Scene	<b>500</b>	<b>N/A</b>	<b>N/A</b>	CD
ERS SAR	Subsequent contiguous Narrow Swath Scenes (max 3) along the same orbit	<b>400</b>	<b>N/A</b>	<b>N/A</b>	CD
ERS SAR	Additional contiguous Narrow Swath Scenes (from 5 <sup>th</sup> ) along the same orbit segment	<b>425</b>	<b>N/A</b>	<b>N/A</b>	CD
ENVISAT ASAR	1 Narrow Swath or 1 Wide Swath scene	<b>600</b>	<b>900</b>	<b>1,600</b>	CD, ftp
ENVISAT ASAR	Subsequent contiguous Narrow Swath Scenes (max 3) along the same orbit	<b>400</b>	<b>400</b>	<b>400</b>	CD, ftp
ENVISAT ASAR	Additional contiguous Narrow Swath Scenes (from 5 <sup>th</sup> ) along the same orbit	<b>440</b>	<b>440</b>	<b>440</b>	CD, ftp

## Packages

- Discounts are available for large Multi-temporal and Interferometry data sets and for volume orders. Please contact Eurimage for details

# Satellite Planning

ERS-1/2; Envisat

SAR; ASAR

## On-request services

### Programming Fee

- Fulfilment of programming requests is subject to feasibility, to be confirmed by ESA through Eurimage Customer Service
- Available world-wide for all products
- Envisat Standard programming requests must be submitted at least 15 days before acquisition date
- Envisat Rush programming requests must be submitted at least 8 working days before acquisition date
- Envisat Emergency programming requests must be submitted at least 3 working days before acquisition date. Contact Eurimage Customer Service for more urgent needs
- An Envisat segment is the total number of contiguous images programmed along the same orbit
- Fees due in case of programming requests only, not combined with production requests

<i>Satellite</i>	<i>Type</i>	<i>Note</i>	<i>Price (€)</i>
ERS SAR	Standard	First 4 contiguous scenes along the same orbit	<b>100</b>
ERS SAR	Standard	Additional contiguous scene along the same orbit	<b>25</b>
ENVISAT ASAR	Standard	First 4 contiguous Narrow Swath scenes, or one Wide Swath scene, along the same orbit	<b>200</b>
ENVISAT ASAR	Standard	Additional contiguous Narrow Swath scene along the same orbit	<b>40</b>
ENVISAT ASAR	Rush*	Per each programmed segment	<b>300</b>
ENVISAT ASAR	Emergency*	Per each programmed segment	<b>1,000</b>

\*Fee to be added to the total Standard Programming Fee

# Data Ordering



Please Print in CAPITAL letters using black ink  
Return form to Eurimage Distributor or directly to  
Eurimage Customer Service  
Fax (+39) 06 406 94 305

## Order Cover Form

Reset Form

Date

### Billing Address

Contact Person (responsible for payment)	Company	Street address	Postal code	City
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Country	Tel	Fax	Email	VAT number
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Credit Card Details

<input type="checkbox"/> Eurocard	<input type="checkbox"/> Master Card	<input type="checkbox"/> Visa	Number	Card holder	Expiration date
			<input type="text"/>	<input type="text"/>	<input type="text"/>

### Shipping Address (if different from billing address)

Contact Person	Technical Contact Person	Company	Street address	Postal code
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
City	Country	Tel	Fax	Email
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### End User (if different from billing address)

Contact Person	Company	Street address	Postal code	City
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Country	Tel	Fax	Email	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

### Application:

☐ Agriculture ☐ Cartography ☐ Risk Management ☐ Telecom ☐ Geology & Exploration ☐ Environment ☐ Forestry ☐ Security ☐ Utilities ☐ Marine & Coastal ☐ Media & Consumer

Description or other

Your reference

Customer Signature: \_\_\_\_\_

# Data Production Parameters



Please Print in CAPITAL letters using black ink  
or complete form on screen - use TAB to move  
between fields, click to check boxes

Return form to Eurimage Distributor or directly to  
*Eurimage Customer Service*  
Fax (+39) 06 406 94 305

## Radar Order Form 4 Envisat ASAR

**Reset Form**

Orbit Number	or Acquisition Date DD   MM   YY	Acquisition Start Time HH   MM   SS	Acquisition Stop Time HH   MM   SS	Centre Latitude N/S Degrees   Minutes	Centre Longitude E/W Degrees   Minutes

Swath	Polarization	Level	Processing Type
Wide (WS)	<input type="checkbox"/> H/H <input type="checkbox"/> V/V	<input type="checkbox"/> 0 <input type="checkbox"/> 1	HR Level 0 (RAW) Wide Swath Image

Standard	Image Mode (IM)	<input type="checkbox"/> H/H <input type="checkbox"/> V/V	<input type="checkbox"/> 0 — HR Level 0 (RAW) <input type="checkbox"/> 1 — <div> <input type="checkbox"/> Precision Image (PRI)  <input type="checkbox"/> Single Look Complex (SLC)  <input type="checkbox"/> Geocoded Image (GEC)  <input type="checkbox"/> Medium Resolution (MRI)         </div>
	Alternating Polarization (AP)	<input type="checkbox"/> VV/HH <input type="checkbox"/> VV/VH <input type="checkbox"/> HH/HV	

Swath  
number

<input type="checkbox"/>	IS 1
<input type="checkbox"/>	IS 2
<input type="checkbox"/>	IS 3
<input type="checkbox"/>	IS 4
<input type="checkbox"/>	IS 5
<input type="checkbox"/>	IS 6
<input type="checkbox"/>	IS 7

Order Type

<input type="checkbox"/>	Planning only
<input type="checkbox"/>	Planning & production
<input type="checkbox"/>	Production from archive

Planning	Production
<input type="checkbox"/> Standard	<input type="checkbox"/> Standard
<input type="checkbox"/> Rush	<input type="checkbox"/> Rush
<input type="checkbox"/> Emergency	

☐ *Reset all check boxes*

*Eurimage CS only*

ASA_	P
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Please sign both (a) and (b)

By signing this Order Form, Customer also accepts the attached *Eurimage Standard Terms and Conditions of Licence*.

Customer expressly accepts the following clauses of the *Eurimage Standard Terms and Conditions of Licence*:  
3.5 (Limitation of Liability); 4.2 (Terms of Payment); 5. (Term; Termination); 6. (Governing Law and Jurisdiction);  
7 (Miscellaneous).

Date: \_\_\_\_\_ Customer Signature (a) \_\_\_\_\_

Date: \_\_\_\_\_ Customer Signature (b) \_\_\_\_\_

# DESCW Catalogue

DESCW Windows Application

File Edit View Define Search Database Window Help

Navigation Map:1

Scene List

Zoom Window: Mission = ENVISAT ASAR Narrow Swath

Missions and Filters

Selected Missions

Miss.	Date range	Orbit range	Track	Frame	Status	Pass	Mission dependent info	Station	BkN
ES	20051001 20060301	18751 20926	0 0	9 7192	all	Desc	Swath 2	All stations	000

Mission and Sensor

Mission Filters

Date Start: 20051001 Date End: 20060301

Orbit Start: 18751 Orbit End: 20926

Track Range: 0 Adjacent: 0

Frame Start: 9 Frame End: 7192

Status: ☐ Acquired ☐ Planned ☐ Visible ☐ All

Pass: ☐ Asc ☒ Desc

Swaths: Swath 1 Swath 2 Swath 3 Swath 4 Swath 5 Swath 6 Swath 7

Add Update Remove Collection

OK Cancel Help

ERS Shifted Frames

Ref. Frame Number: 2655

Shifted Frame Number: 2650

Delta Nodes: -5

Entering coordinate

Lat: 47°01'00" Find node

Coordinates

North-West	North-East
Lat: 47°56'	Lat: 47°44'
Lon: 017°01'	Lon: 018°23'

South-West	South-East
Lat: 47°03'	Lat: 46°51'
Lon: 016°44'	Lon: 018°05'

OK Cancel

Track n.: 2480 - Frame n.: 2655

Mission	Date	Orbit	Parallel Baseline (m)	Perpendicular Baseline (m)	Delta Days	Doppler(KHz)
EN	20051023	19071	-93	310	-70	99.90
EN	20051127	19572	74	-198	-35	99.90
EN	20060101	20073	0	0	0	99.90

Double clicking to choose the "reference" orbit. All the baselines will be computed vs this one.

WARNING: the baseline information is reliable ONLY if a couple is shown (not a single line)

WARNING: a doppler value of 99.90 means no doppler info available. 12.70 means that the doppler could be over the threshold

OK Print Delete Item Save

Ready

AUSTRIA 95000 kmq

Frames stored: 91

Lat. 43°01' Lon. 006°55'

***Thank you***  
***Any Questions!***

***More Information on Envisat:***

***[www.eurimage.com](http://www.eurimage.com)***

***[www.envisat.esa.int](http://www.envisat.esa.int)***