

e-geos

AN ASI / TELESPAZIO COMPANY

Company Overview and COSMO-SkyMed Programme



RESTEC Forum 2022

Luciana Di Domenico, Defence & Intelligence and COSMO-SkyMed

LoB Geoinformation



Geoinformation

TELESPAZIO + **e-geos** + **GAFAG**
a LEONARDO and THALES company AN ASI / TELESPAZIO COMPANY an e-GEOS (ASI / Telespazio) Company

600+ 50% in Italy, 50% ROW

120M € Revenues

Geo-information Downstream Services Value Chain



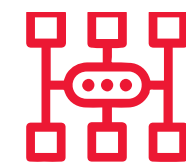
DATA OPERATOR

Global 24/7
& NRT Monitoring
Matera Space Center



Management of Earth
Observation Receiving
Ground Segment

**GEODESY – Earth Observation -
NRT Maritime – Emergency -
Multiple Sensors**



DATA ACCESS HUB



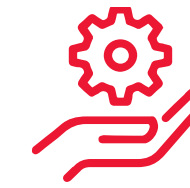
Multi-source earth
observation data
distributions



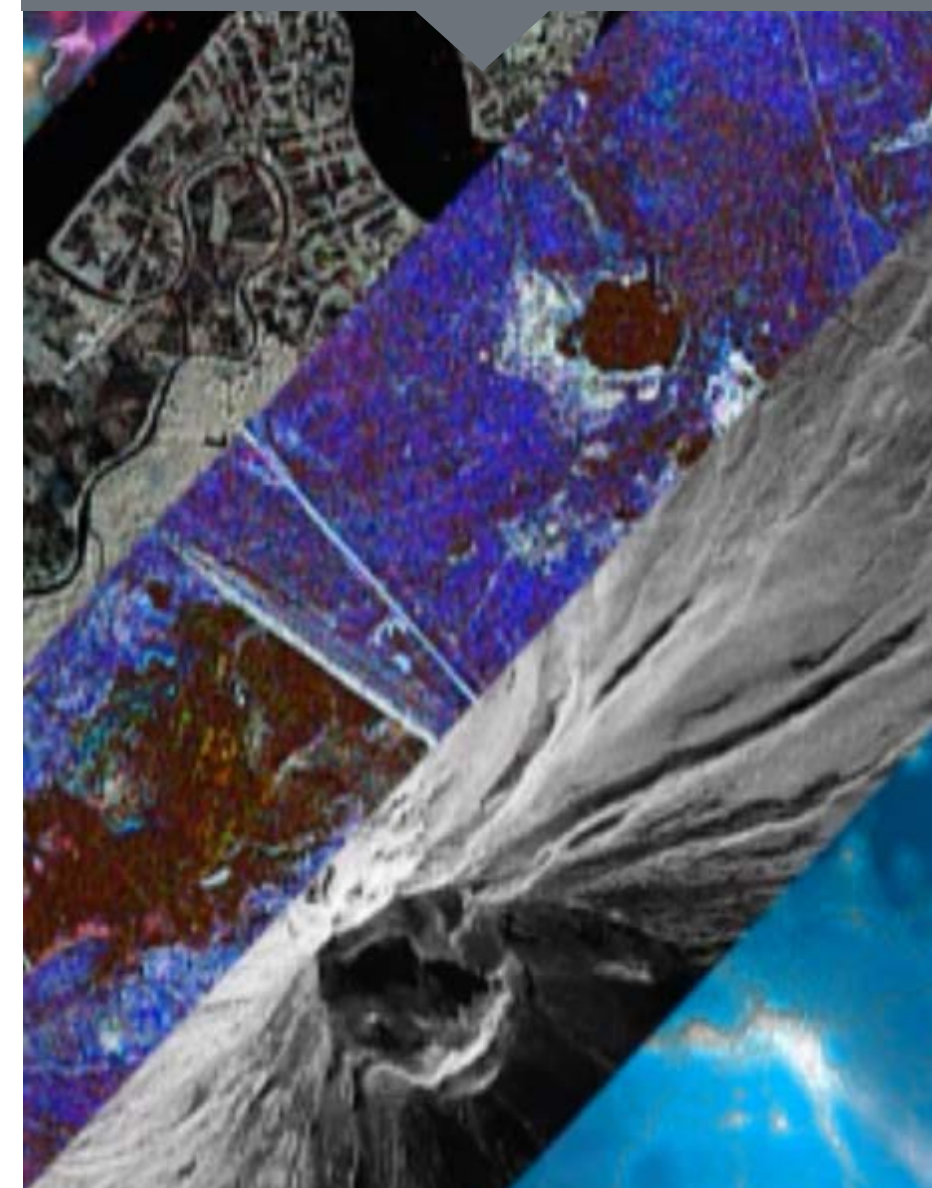
CONTENT DEVELOPER



Data Analysis and Integration
& Geography Layers
Production



SERVICES AND PLATFORM PROVIDER



Geoinformation Digital
Services & AI EO solutions
based on multi sensors & Big
Data



CONSULTANT



Projects Fed by
International Funding
Institutions

e-GEOS & GAF Premises



170 people

ROME

Headquarter



111 people

MATERA

Space Centre



3 people

SCANZANO

Space Centre



204 people

MUNICH

GAF Headquarter



32 people

NEUSTERLITZ

GAF/DLR Station

e-GEOS Matera Space Center

e-GEOS Matera Space Center is the infrastructure for operational services



TO RECEIVE, GENERATE
STORE AND DISSEMINATE
EARTH OBSERVATION DATA



NRT **MARITIME**
SERVICES



GLOBAL 24/7 &
NRT MONITORING



EMERGENCY
MANAGEMENT
SERVICES



MULTIPLE SENSORS
(SENTINEL, COSMO-SKYMED, ECC..)



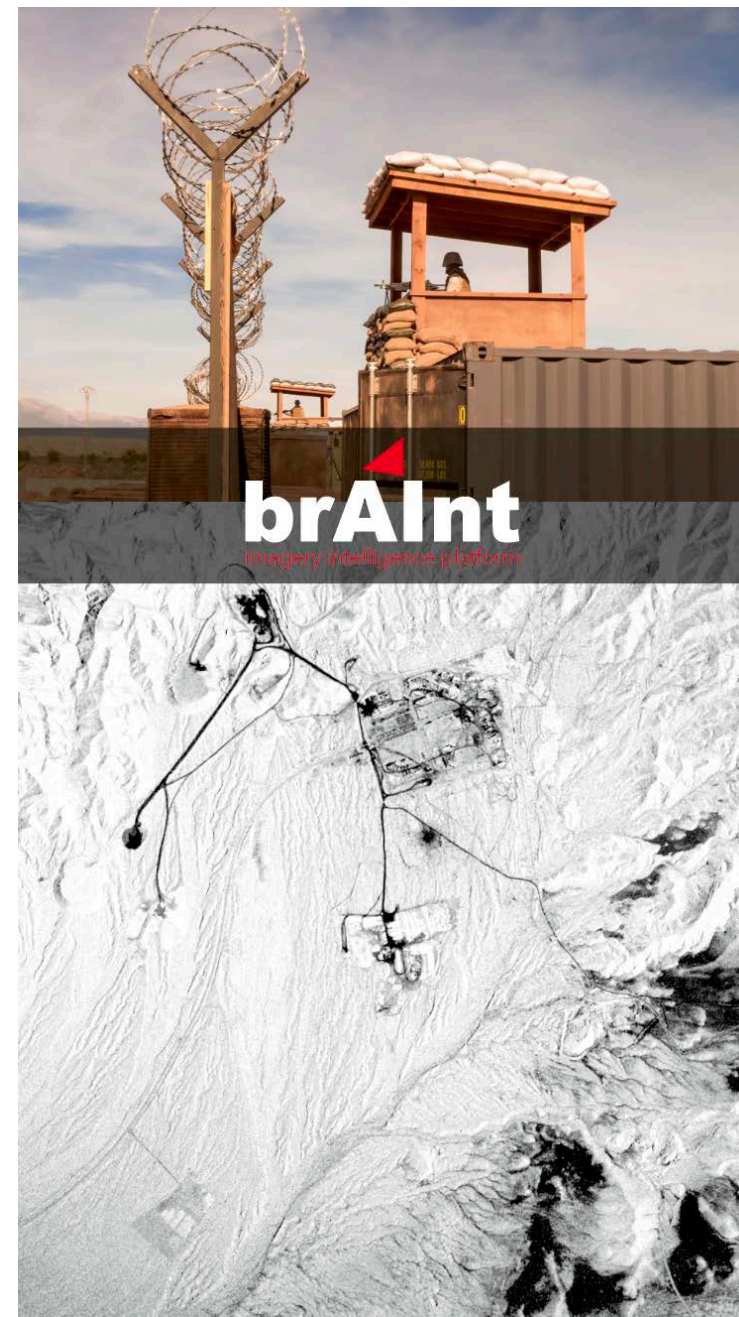
SPACE GEODESY
ANALYSIS CENTER



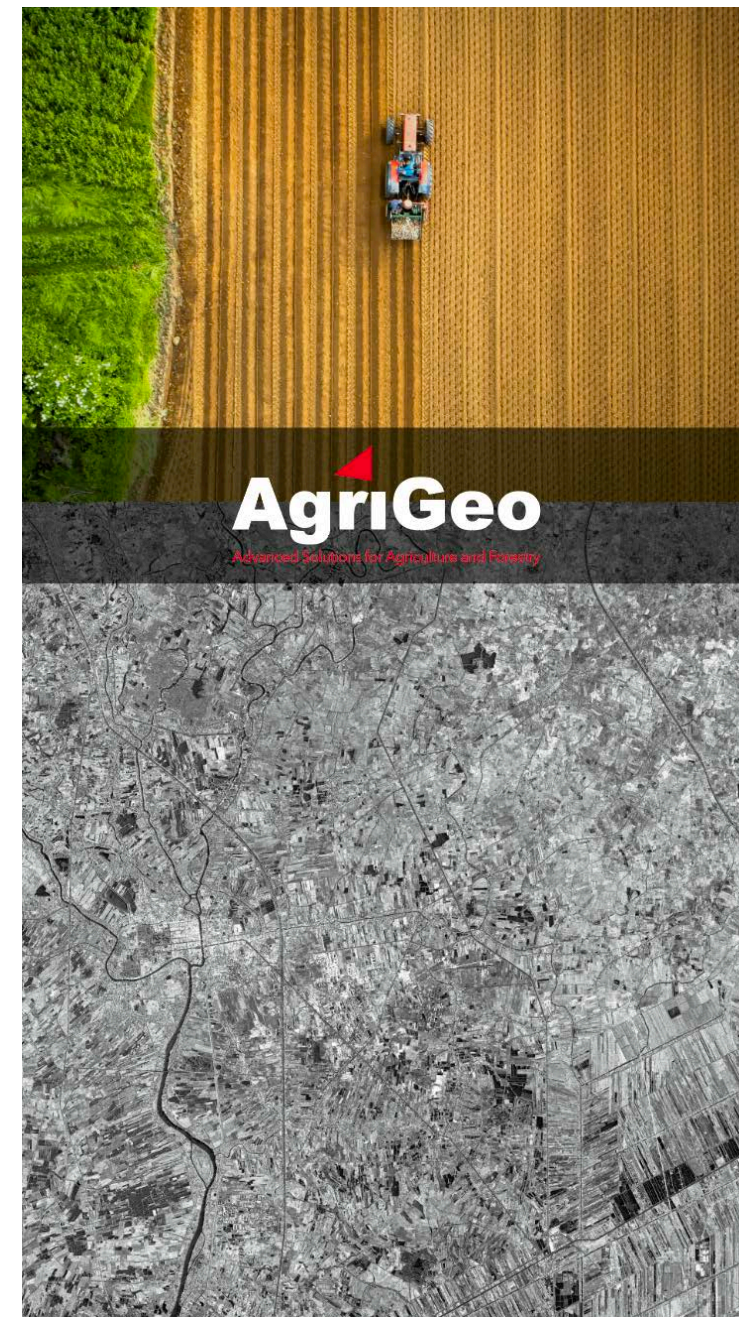
CLEOS and the Digital Solutions for Vertical Services



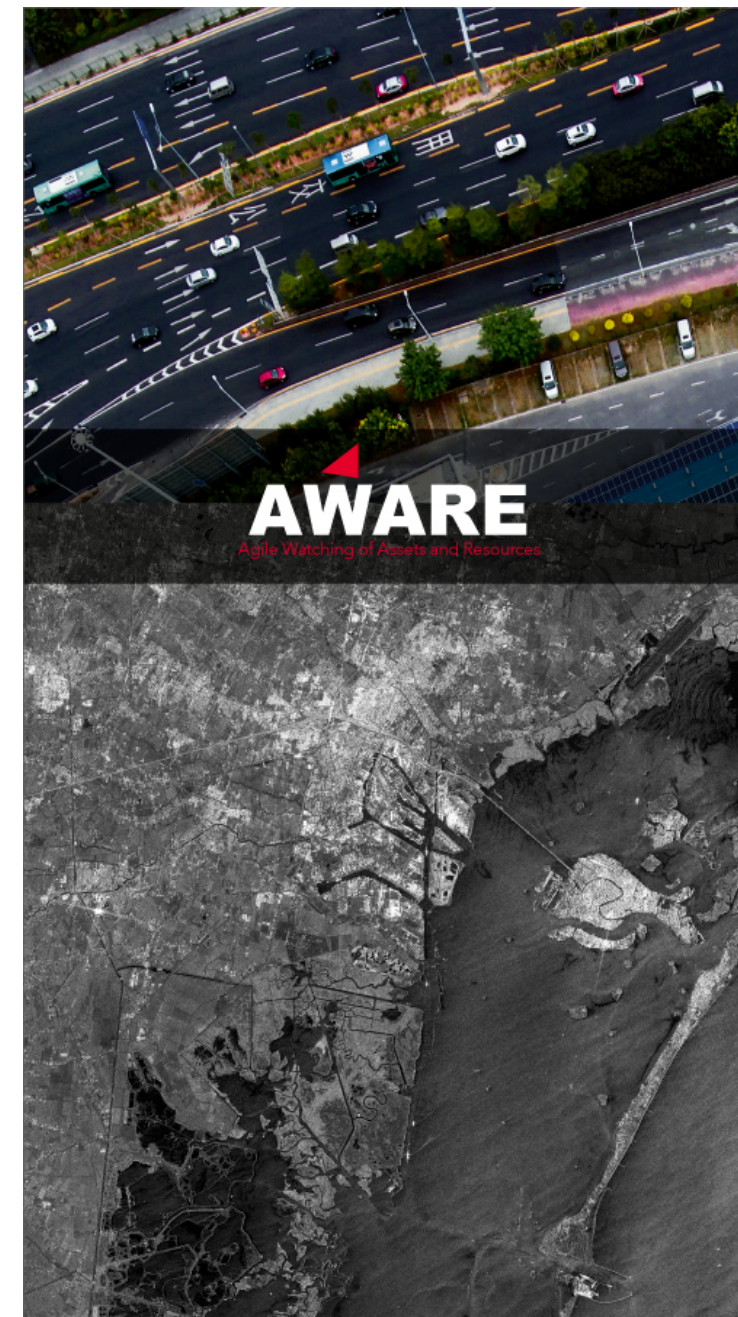
MARITIME SURVEILLANCE



DEFENCE AND INTELLIGENCE



AGRICULTURE MANAGEMENT



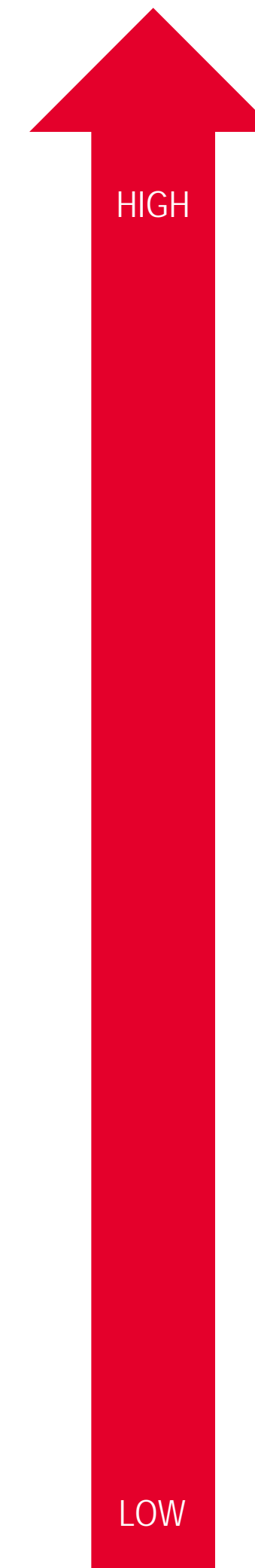
ASSET MANAGEMENT



EMERGENCY MANAGEMENT



The online marketplace to access geo information Analytics & Geoinformation Digital Service, driving the e-GEOS digital transformation process of its portfolio



Big Data Analysis



Information Products



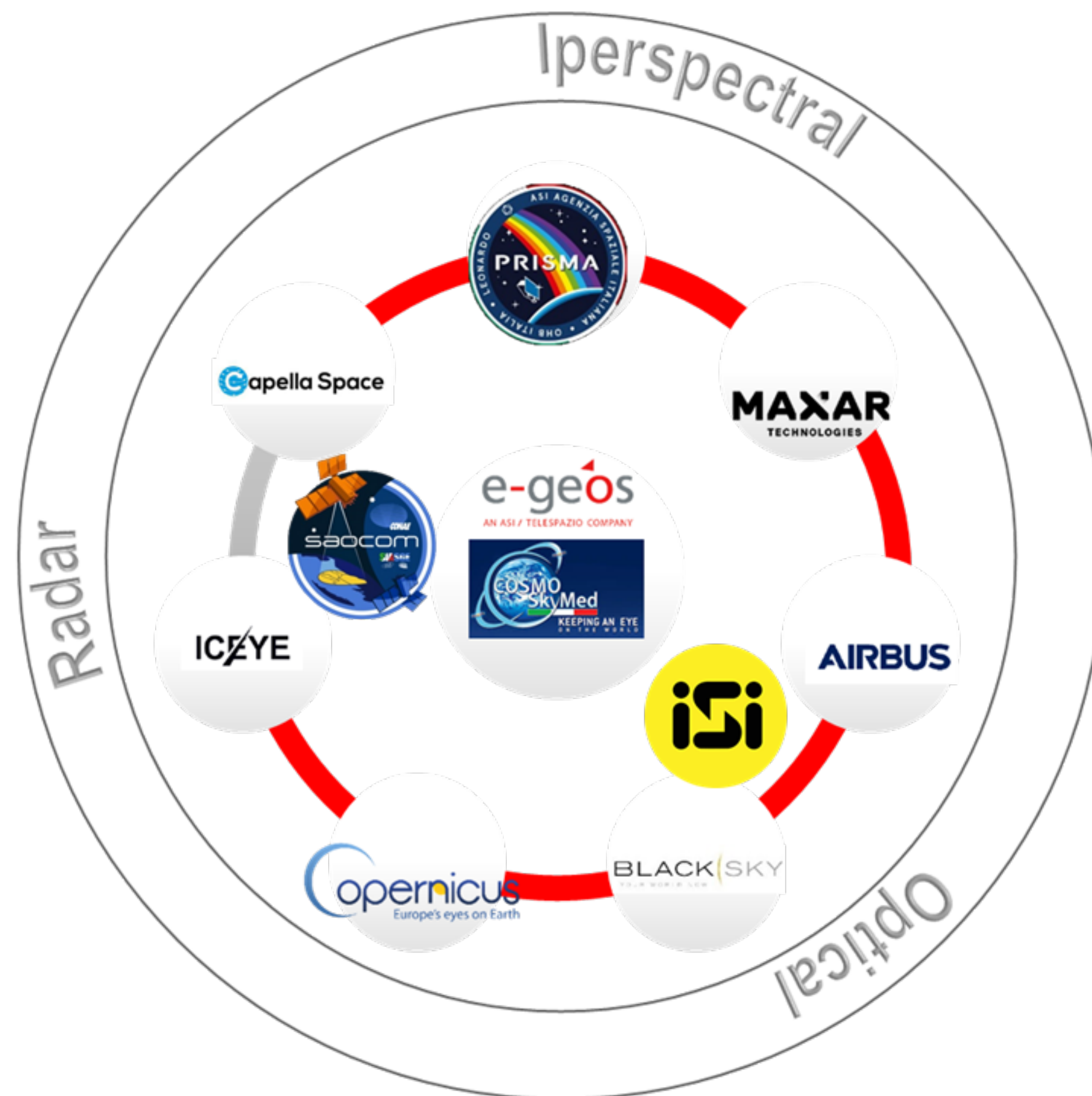
Value Adds Services



Data

Satellite Data Access

Federation of assets is a fundamental feature for application platforms and the evolution path to information products and Geospatial digital services



COSMO-SkyMed

e-GEOS is the
exclusive global commercial distributor
for COSMO-SkyMed constellation

3 COSMO First Generation + **2** COSMO Second Generation

Operational Synthetic Aperture Radar Satellites

1500+

Stripmap per day

300+

Spotlight per day

1800

Scenes per day



Large area coverage
at global scale



Left/Right
Looking



Fastest
Revisit Time



All weather
Day/Night



e-geos

AN ASI / TELESPAZIO COMPANY

All COSMO-SkyMed images © ASI - Agenzia Spaziale Italiana

e-GEOS S.p.A – L.O. Contrada Terlecchie snc – Matera / HQ Via Tiburtina, 965 – Roma

✉ maria.angelucci@e-GEOS.it

 [@e_geos](https://twitter.com/e_geos)

 [e-geos](https://www.linkedin.com/company/e-geos)

 [@egeosEO](https://www.facebook.com/egeosEO)

 [@e_geos](https://www.instagram.com/e_geos)

COSMO-SkyMed

Axel Oddone, Head of COSMO-SkyMed and Satellite Data



COSMO-SkyMed system

- The most advanced SAR satellites on the market, providing unique imaging capabilities
 - System owned by ASI and IMOD
 - Built by Thales Alenia Space Italia and Telespazio
 - Operations by Telespazio and e-GEOS
 - e-GEOS is the exclusive worldwide commercial reseller
- Currently 3 satellites of first generation (CSK) + 2 satellites of second generation (CSG)
- Huge archive of data since 2008



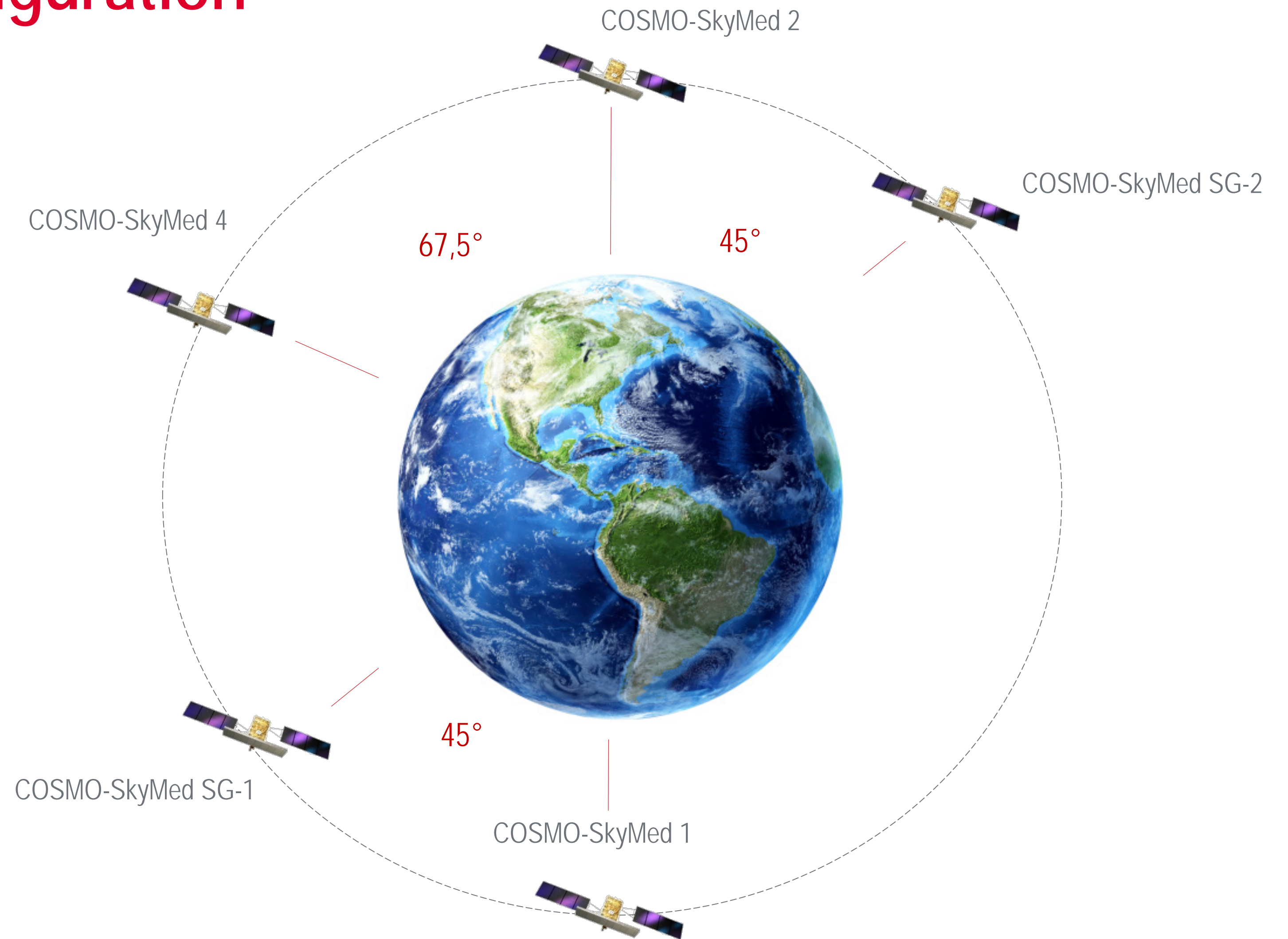
COSMO-SkyMed satellites

- The first 4 CSK satellites launched between 2007 and 2010
 - CSK3 deorbited on 01 May 2022
 - Other 3 satellites still operational
- First CSG satellite launched on 18 Dec 2019, fully operational since 18 Jan 2021
- Second CSG launched on 31 Jan 2022
 - Currently in OQ phase, fully available starting from 10 Aug 2022
- Third and Fourth CSG satellites construction contract signed end 2020
- Lessons learned from CSK
 - Enhanced geometric resolution
 - Multi polarization options
 - Enhanced geolocation accuracy
 - 7 years lifetime
 - Higher agility of the platform
 - Higher operative profiles
 - Control moment gyro and other unique high-end technologies



COSMO-SkyMed orbital configuration

- All satellites on the same sun-synchronous orbit
 - Ascending acquisitions at about 6 AM local time
 - Descending acquisitions at about 6 PM local time
- Minimum revisit 12 hours, but there are several acquisitions within a short orbital interval



COSMO-SkyMed imaging modes

- Spotlight modes
 - Submetric (need ad-hoc authorization)
 - CSK/CSG Spotlight-2A
 - CSG Spotlight-2B
 - Metric
 - CSK Spotlight-2
 - CSG Spotlight-2C
- Stripmap modes
 - CSK/CSG 3-m Stripmap mode
 - CSK/CSG Ping Pong mode with alternate polarization
 - CSG QuadPol
- ScanSAR modes
 - CSK/CSG ScanSAR Wide/1
 - CSK/CSG ScanSAR Huge/2



All CSG imaging modes are available also with dual polarization (see color composites in next examples)



CSG Spotlight-2A

- Resolution:
 - Azimuth: 0,3 m
 - Ground range: 0,5 m
- Image size: 3,5 x 7 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -20 / -23,5 dB

CSK Spotlight-2A has 0,7 m range resolution and 5x7 Km image size, and has only single polarization.

Access to this imaging mode subject to ad hoc authorization

CSG Spotlight-2B

- Resolution:
 - Azimuth: 0,6 m
 - Ground range: 0,6 m
- Image size: 10 x 10 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -22 dB



CSG Spotlight-2C

- Resolution:
 - Azimuth: 0,8 m
 - Ground range: 0,8 m
- Image size: 5 x 10 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -19 / -22 dB

CSK Spotlight-2

- Resolution:
 - Azimuth: 1 m
 - Ground range: 1 m
- Image size: 10 x 10 Km
- Polarization: HH or VV
- Incidence range: 20-60°
- NESZ: -21 dB

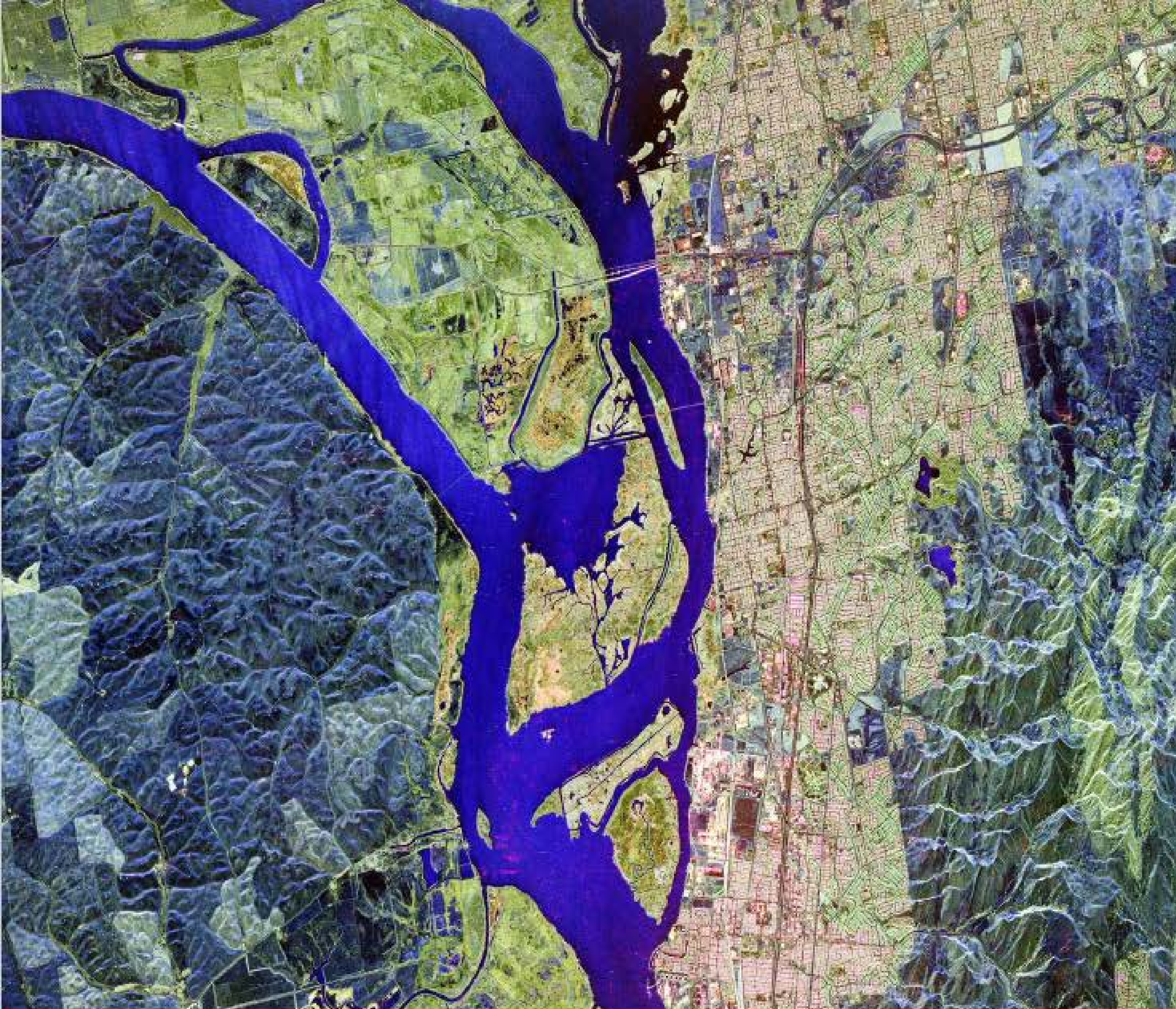


CSG Stripmap



- Resolution:
 - Azimuth: 3 m
 - Ground range: 3 m
- Image size: 40 x 40 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -22 dB

CSK has only single-pol



CSG QuadPol

- Resolution:
 - Azimuth: 3 m
 - Ground range: 3 m
- Image size: 15 x 40 Km
- Polarization: HH+HV+VV+VH
- Incidence range: 20-45°
- NESZ: -22 dB

Red = HH – VV

Green = HV + VH

Blue = HH+VV



CSG PingPong

- Resolution:
 - Azimuth: 12 m
 - Ground range: 5 m
- Image size: 40 x 40 Km
- Polarization (alternating): HH+HV+VV+VH or HH+VV (CSG)
- Incidence range: 20-60°
- NESZ: -22 dB

CSK has 15x15 m resolution, 30x30 Km scene size, dual alternate-pol

CSG ScanSAR-1

- Resolution:
 - Azimuth: 20 m
 - Ground range: 4 m
- Image size: 100 x 100 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -22 dB

CSK has 23x13,5 m resolution and only single-pol



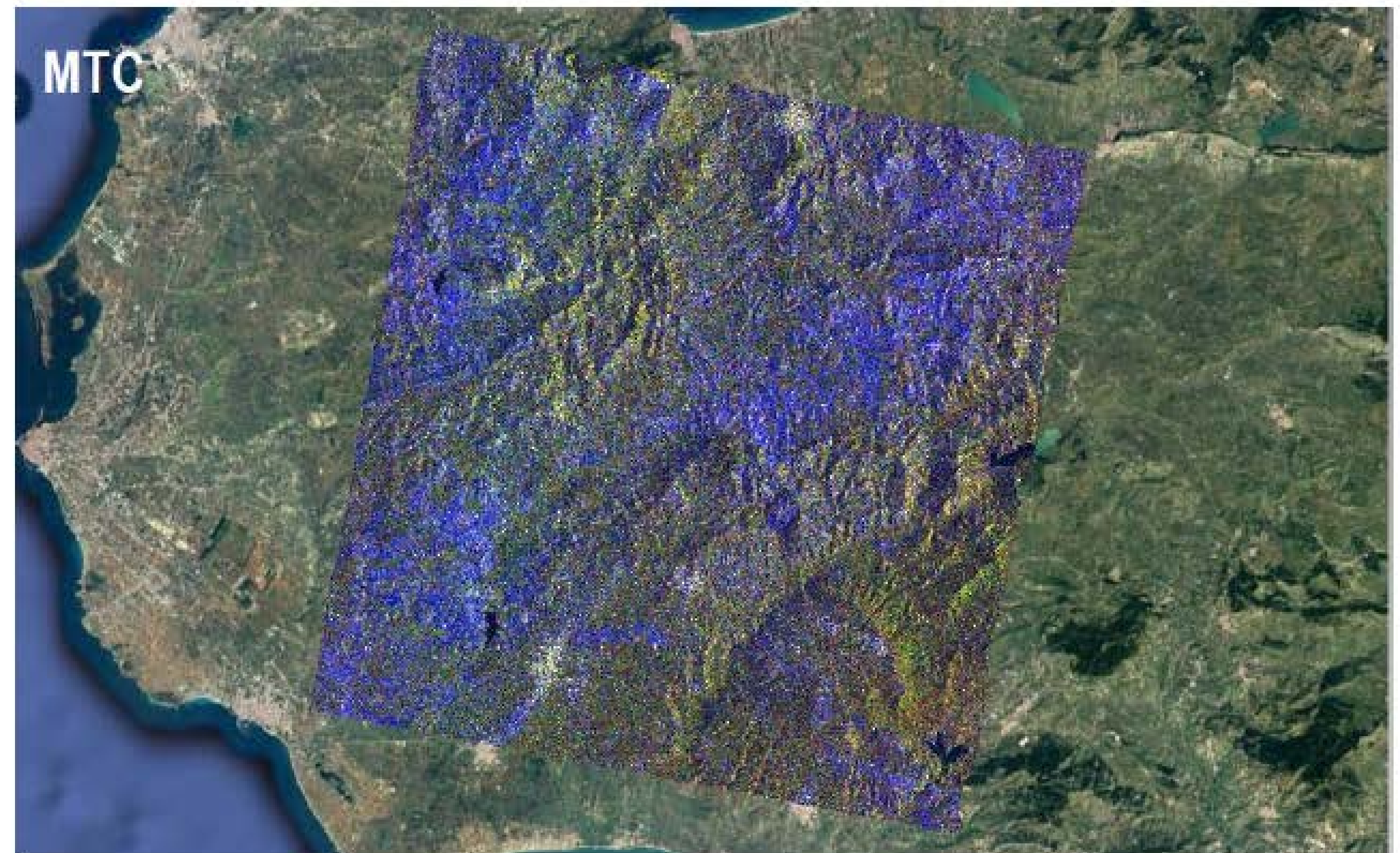
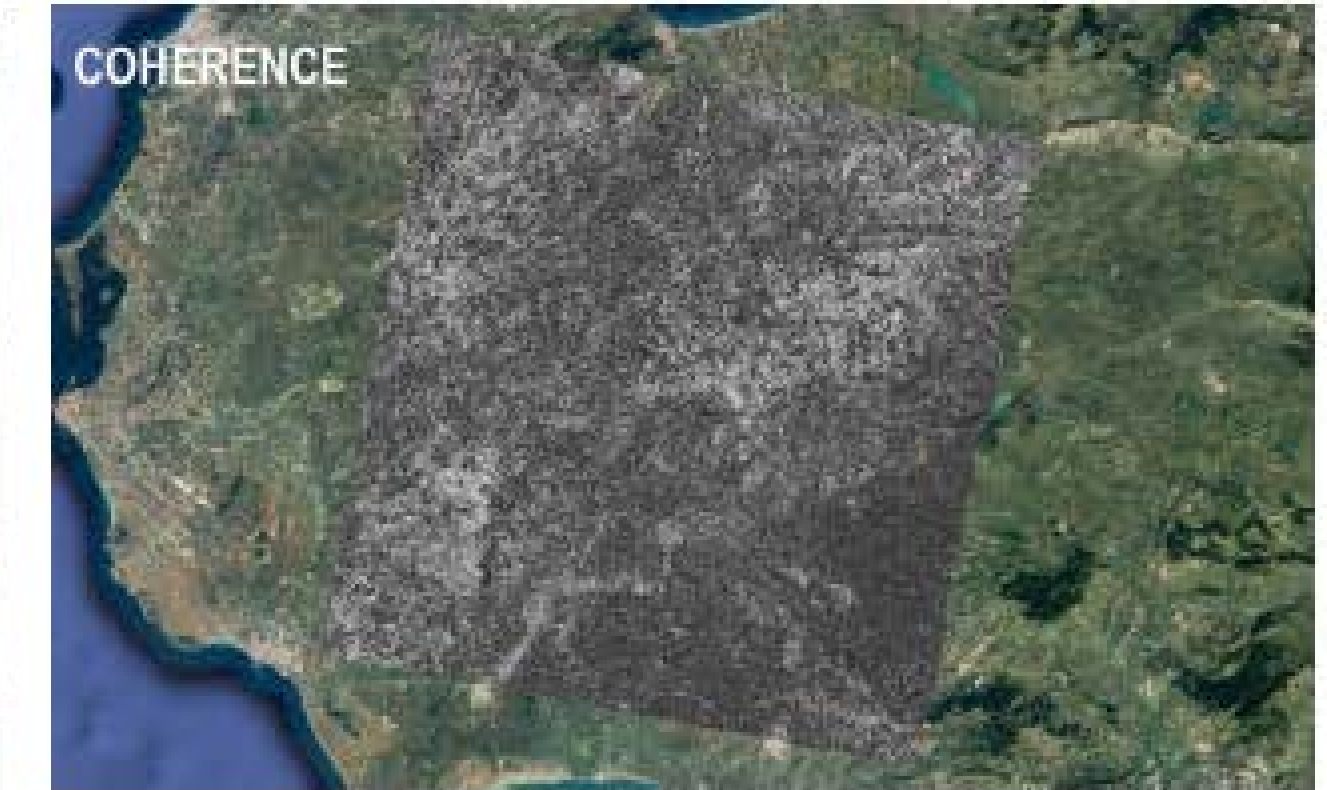
CSK/CSG ScanSAR-2

- Resolution:
 - Azimuth: 40 m
 - Ground range: 6 m
- Image size: 200 x 200 Km
- Polarization: HH or VV or HH+HV or VV+VH
- Incidence range: 20-60°
- NESZ: -22 dB

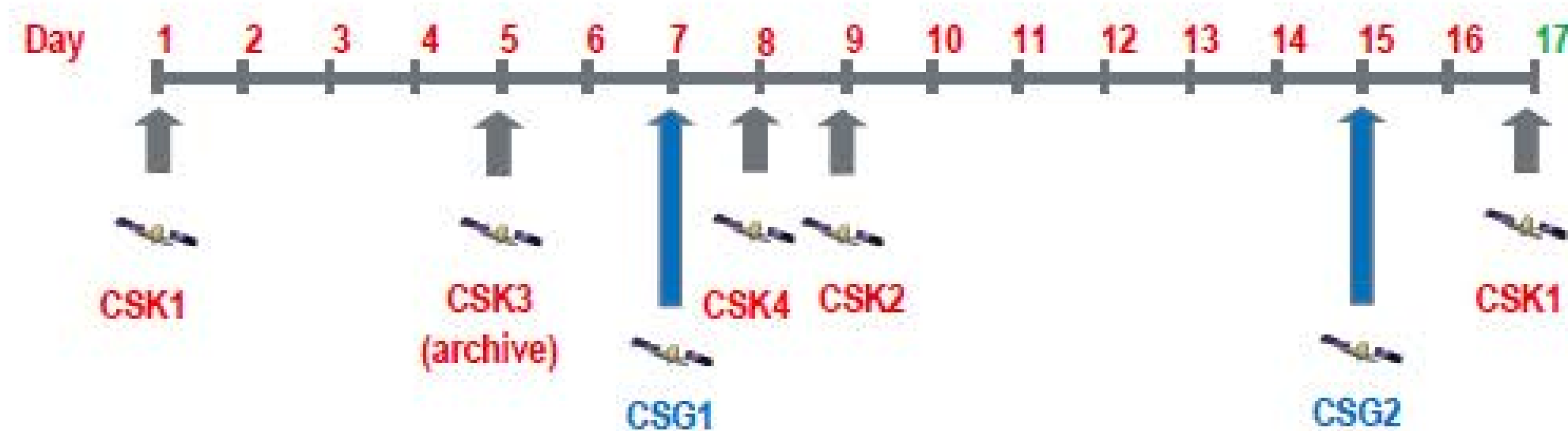
CSK has 38x13,5 m resolution and only single-pol

Interferometry

- All Stripmap and Spotlight modes allow to perform interferometry
- Only Stripmap mode allows interferometry between first and second generation
 - Possibility to continue monitoring using huge interferometric archive over whole World

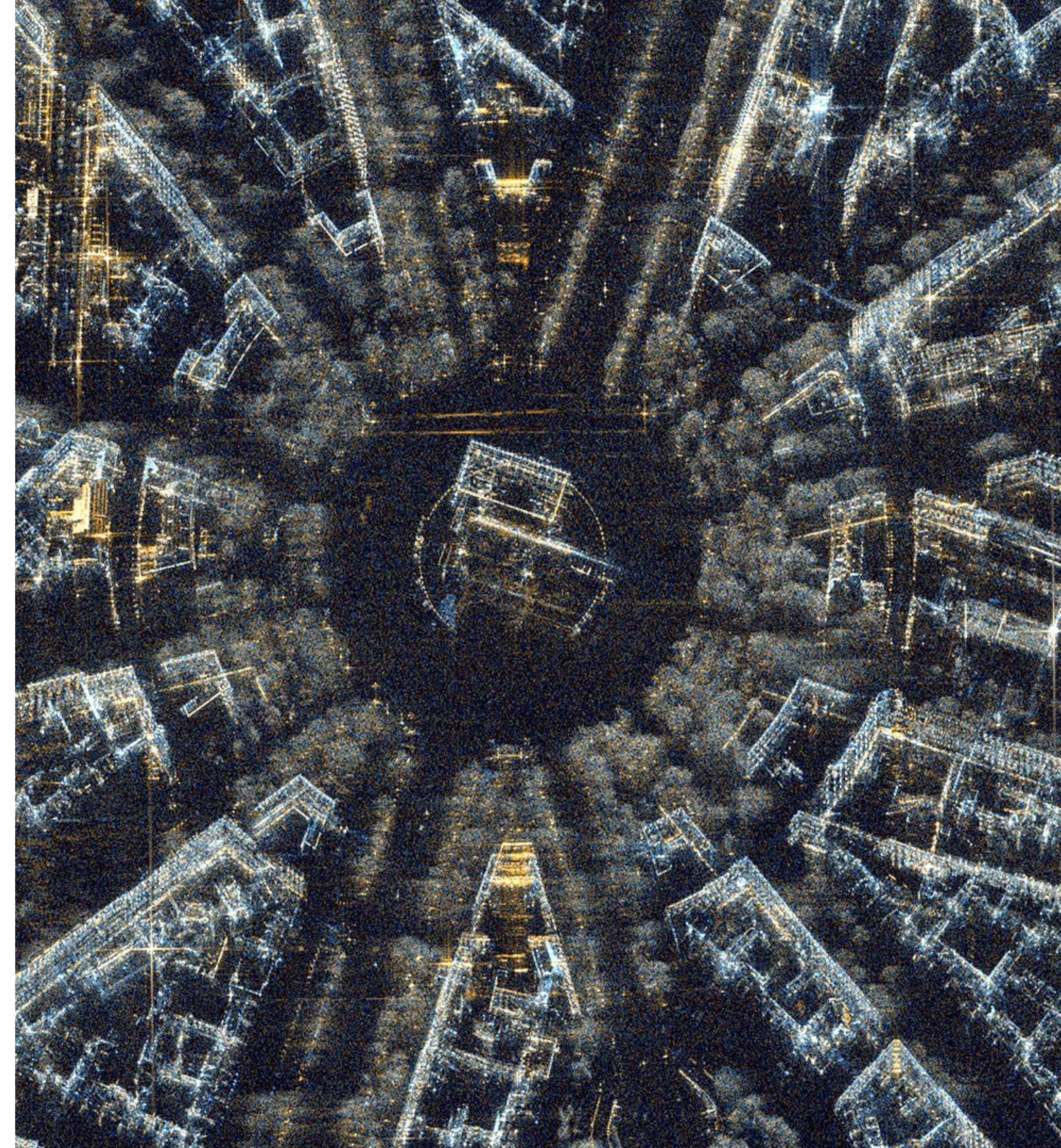


Interferometric revisit:



Product options

- Processing levels:
 - Level 1A (SCS) - Single look
 - Level 1B (DGM) - Path oriented
 - Level 1C (GEC) - Georeferenced
 - Level 1D (GTC) - Terrain Corrected
- CSG has selection of 3 multilooking levels
 - e.g. Stripmap with 1x1 (3x3 m), 2x2 (5,6x6,2 m), 4x4 (11,2x12 m)
- Image formats: hdf5, GeoTIFF, JPG (CSK), JPG2000 (CSG), STANAG (CSG)
- Each CSG polarization is a separate product (and a separate Record Number in the catalogue)



A Synthetic Aperture Radar (SAR) image showing a city grid. The image is rendered in a blue and white color scheme, highlighting the geometric patterns of buildings and streets. The grid is oriented diagonally, and the image shows a high level of detail and contrast, characteristic of SAR technology. The background is dark, and the grid lines are bright, creating a strong visual impact.

Conclusions

- CSK/CSG offer the best performance and image quality on the SAR market, that can not be matched by any small satellite
 - Unique resolution for civilian use
 - Dual and Quad polarization
 - Interferometric modes (also with 1st generation)
 - High geolocation accuracy

e-geos

AN ASI / TELESPAZIO COMPANY

All COSMO-SkyMed images © ASI - Agenzia Spaziale Italiana
e-GEOS S.p.A – L.O. Contrada Terlecchie snc – Matera / HQ Via Tiburtina, 965 – Roma

 info@e-GEOS.it

 [@e_geos](https://twitter.com/e_geos)

 [e-geos](https://www.linkedin.com/company/e-geos)

 [@egeosEO](https://www.facebook.com/egeosEO)

 [@e_geos](https://www.instagram.com/e_geos)