

UN-SPIDER International Workshop, December 2022 in Bangkok

Radar Earth Observation (SAR) & Digital Elevation Model Solutions for Disaster Management

Simone Sasse, Key Account Manager United Nations and Affiliate Organisations

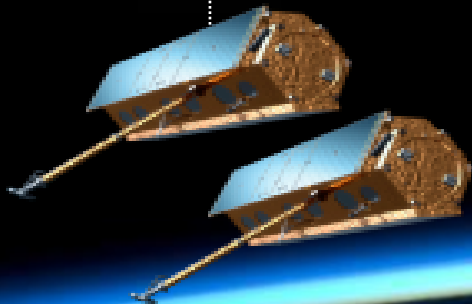
Airbus Defence and Space Germany

AIRBUS

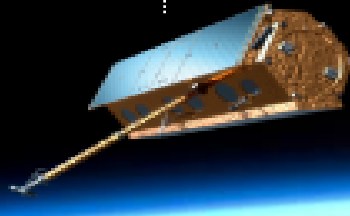


EO SAR: Airbus Missions

TerraSAR-X (2007)
TanDEM-X (2010)



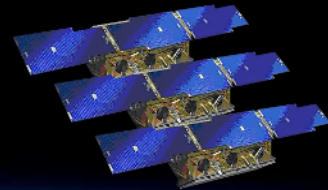
PAZ (2018)



PAZ 2

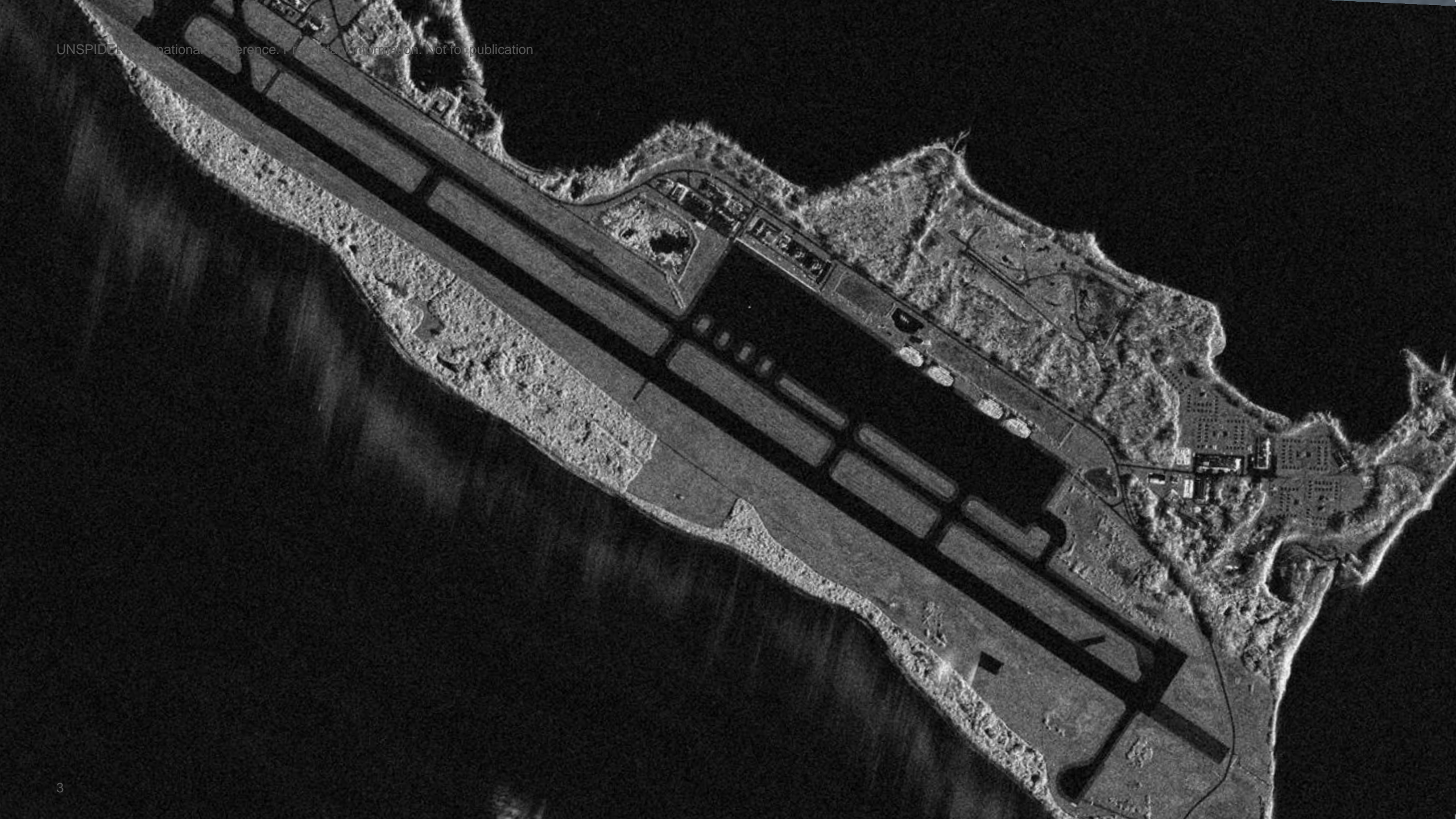


TerraSAR-X Neo



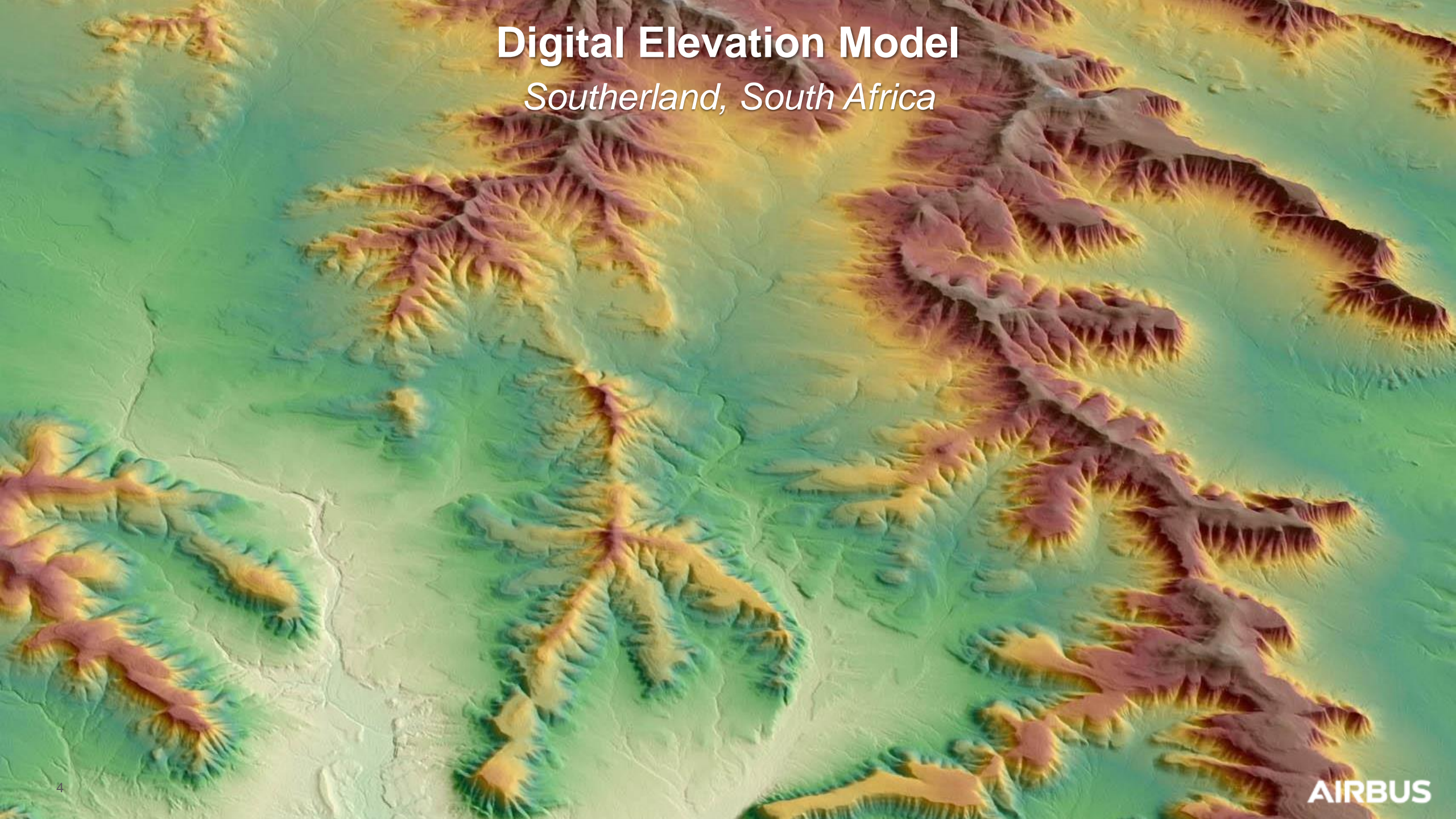
Next Generation Service Scenarios

WorldSAR Constellation Cooperation
with Hisdesat (ES)



Digital Elevation Model

Southerland, South Africa



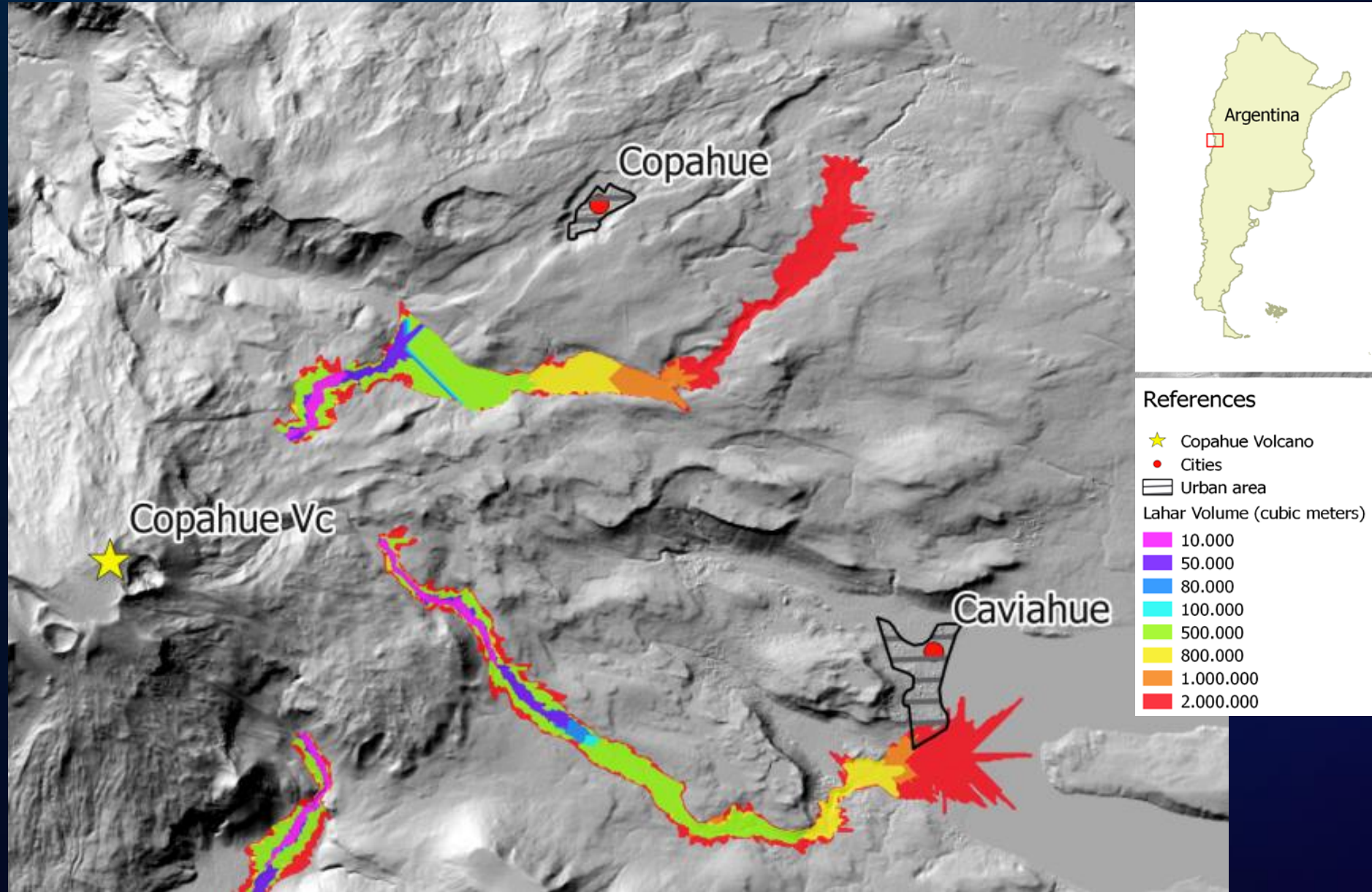
Lahar Modelling, Copahue Vulcano, Argentina

Use Case #1

Argentina: Lahar Modelling Using WorldDEM™

Applications:

- Lahar modelling
- Settlement areas hazard risk assessment



Coastal flooding simulation, Accra West, Ghana



Dark Blue	Ocean Shoreline
Medium Blue	Flood of 1m
Light Blue	Flood of 3m
Very Light Blue	Flood of 5m

Use Case #2

Ghana: Inundation Hazard Modelling

Applications:

- Storm Surges
- Coastal Floods



11 SUSTAINABLE CITIES AND COMMUNITIES



13 CLIMATE ACTION



15 LIFE ON LAND



Coastal flooding simulation, Accra West, Ghana



Use Case #2

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Applications:

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11 SUSTAINABLE CITIES AND COMMUNITIES



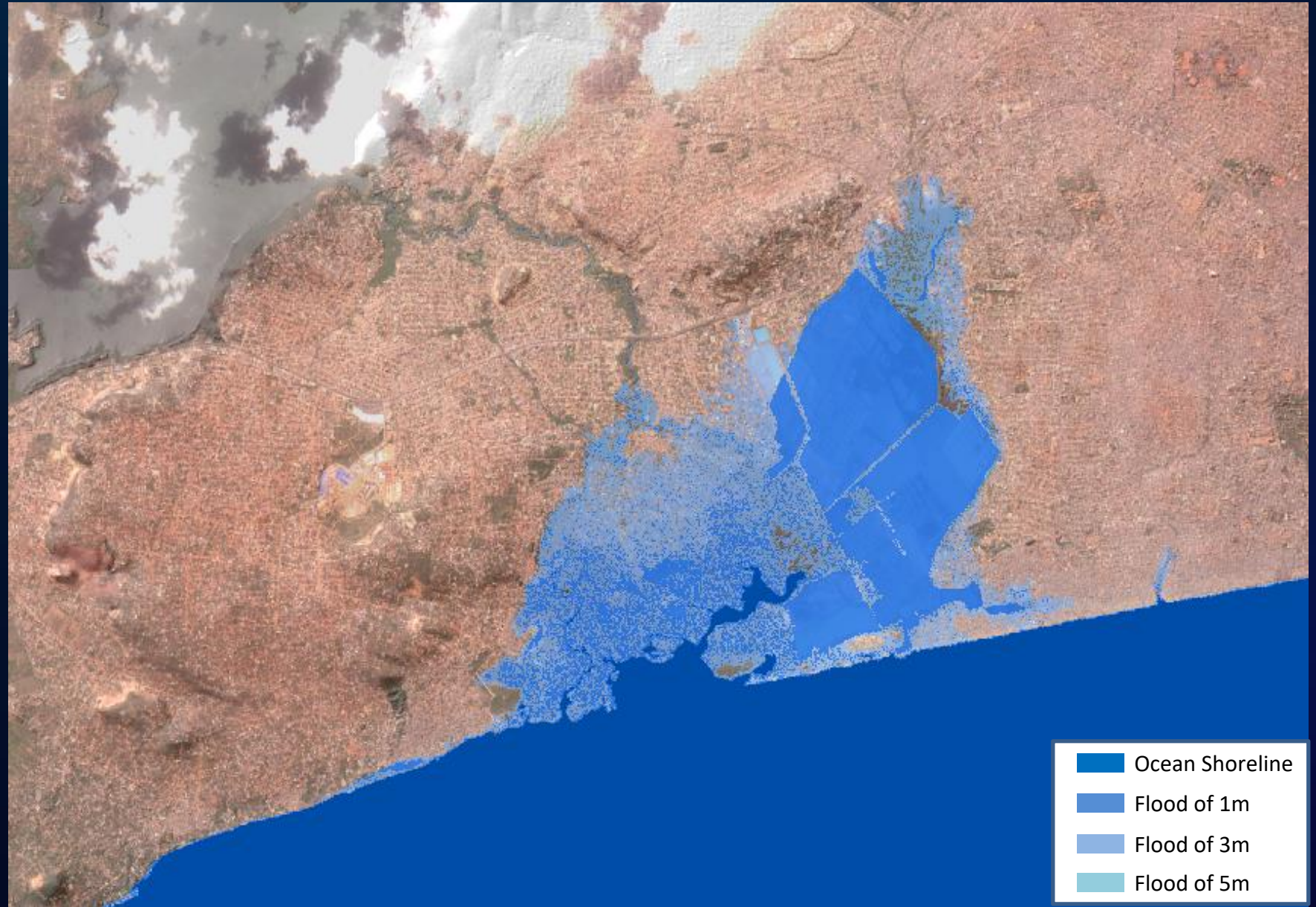
13 CLIMATE ACTION



15 LIFE ON LAND



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11 SUSTAINABLE CITIES AND COMMUNITIES



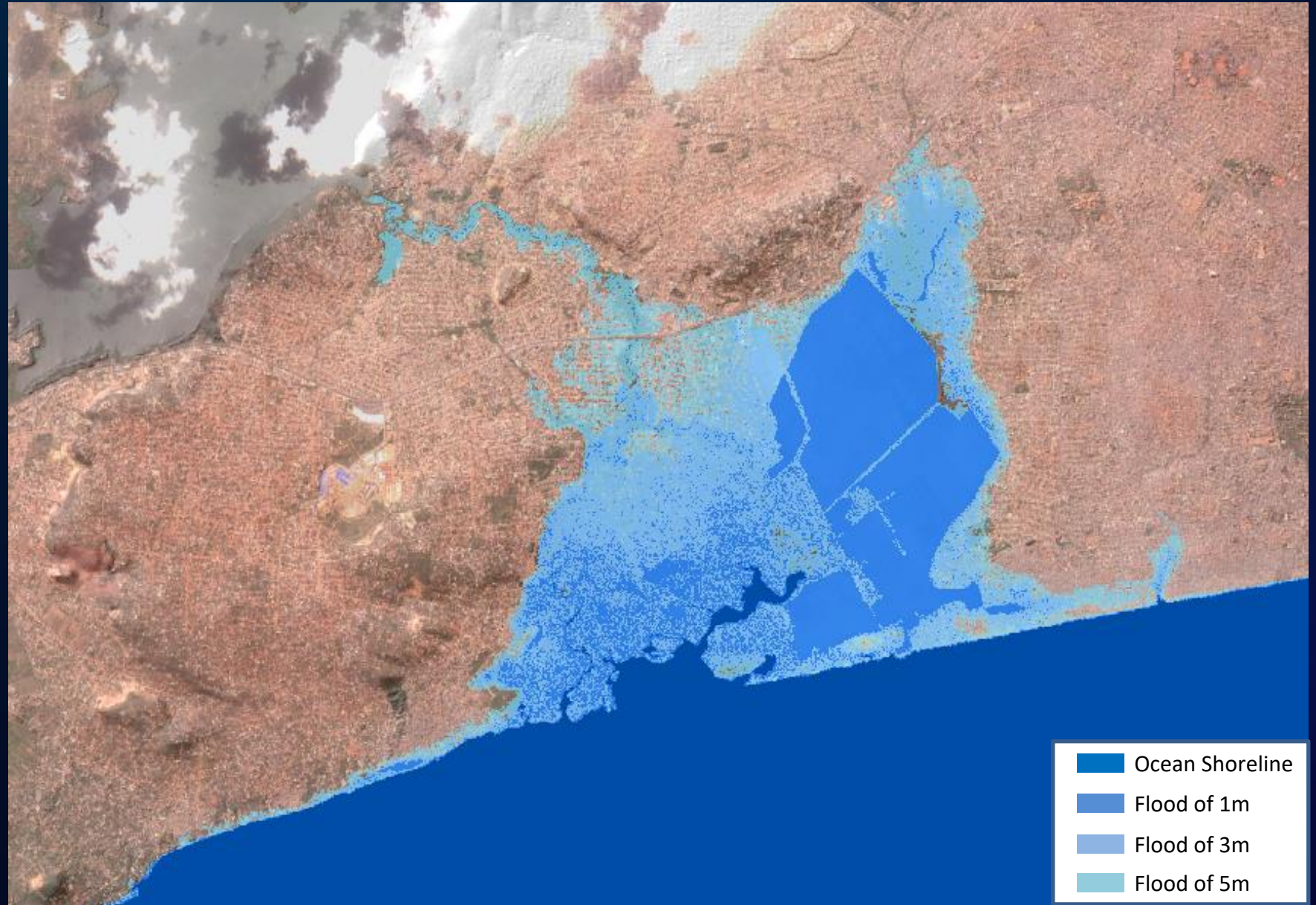
13 CLIMATE ACTION







15 LIFE ON LAND



Coastal flooding simulation, Accra West, Ghana



	Ocean Shoreline
	Flood of 1m
	Flood of 3m
	Flood of 5m

Use Case #2

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Applications:

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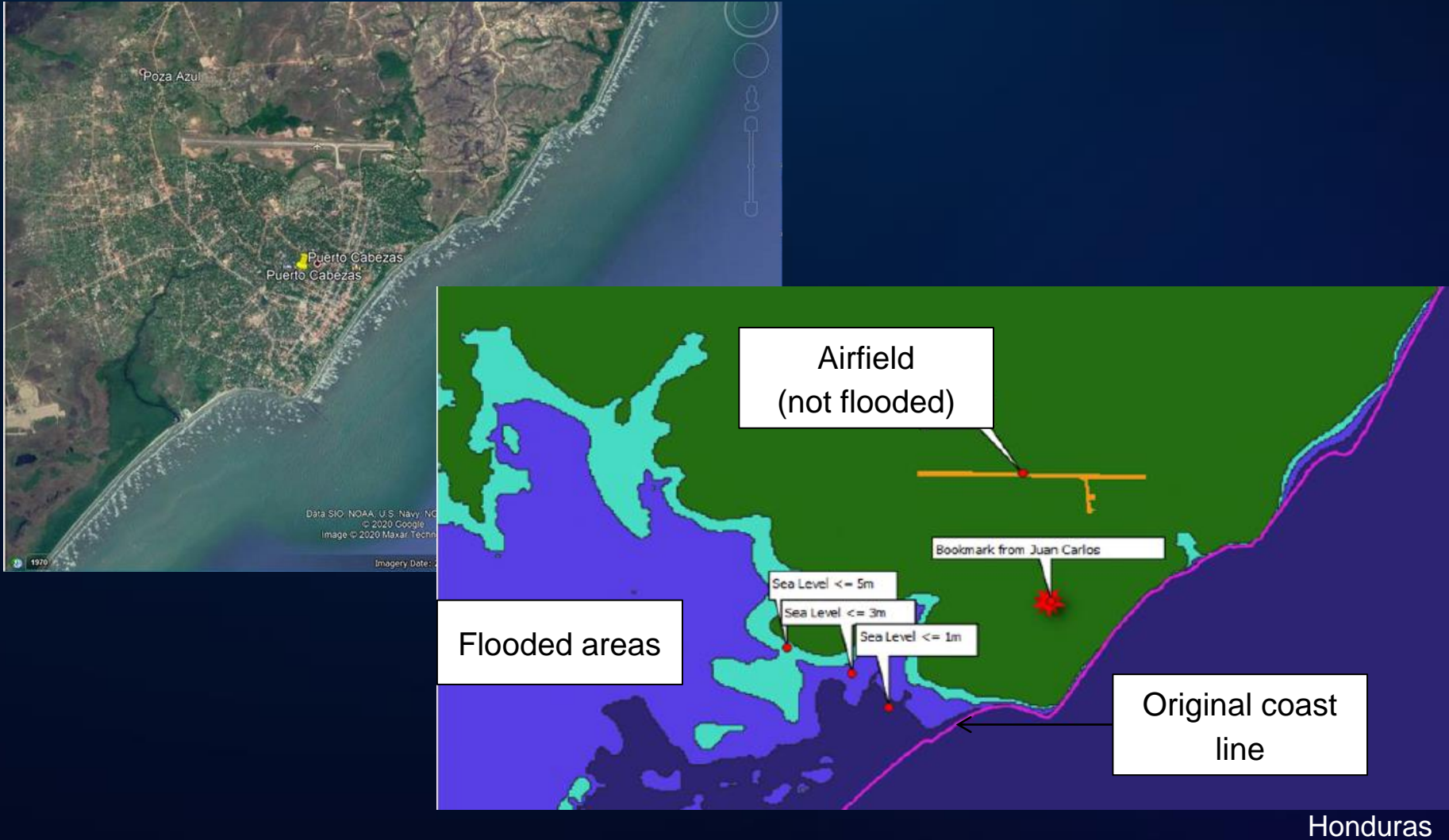
Use Case #3

Nicaragua: Flood maps to enable first aid to land in safe airfield

Applications:

- Emergency response
- Storm surges
- Hurricanes

Nicaragua – Hurricane November 2020

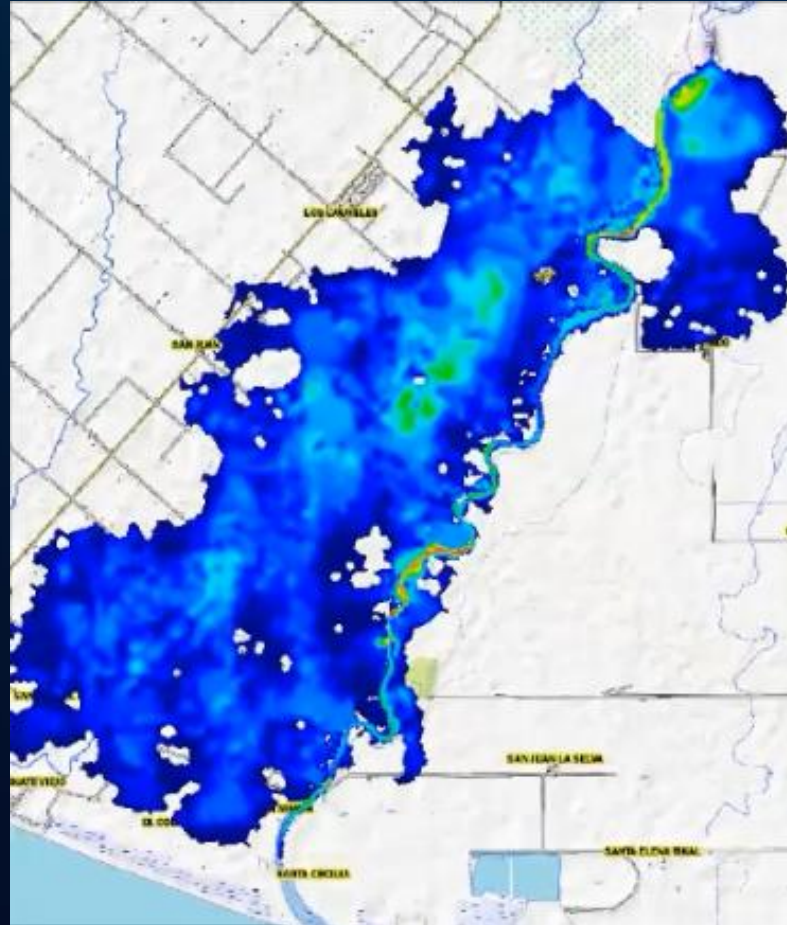


Use Case #4

Guatemala: River Inundation Modelling

*Comparison between
WorldDEM and free and
open data*

Flood Simulation, Coyolate River, Guatemala



Specific discharge
SRTM, 30M

VS



Specific discharge
WorldDEM, 12M



¡Ciencia en acción para enfrentar el cambio climático!



Use Case #5

Germany: River Inundation modelling with WorldDEM DTM_{lite}

Example of a 100 Year
Return Flood modelling.
Neckarau (Germany)

Example of a 100 Year Return Flood modelling. Neckarau (Germany)



Slide with animation

In collaboration with:



Use Case #6

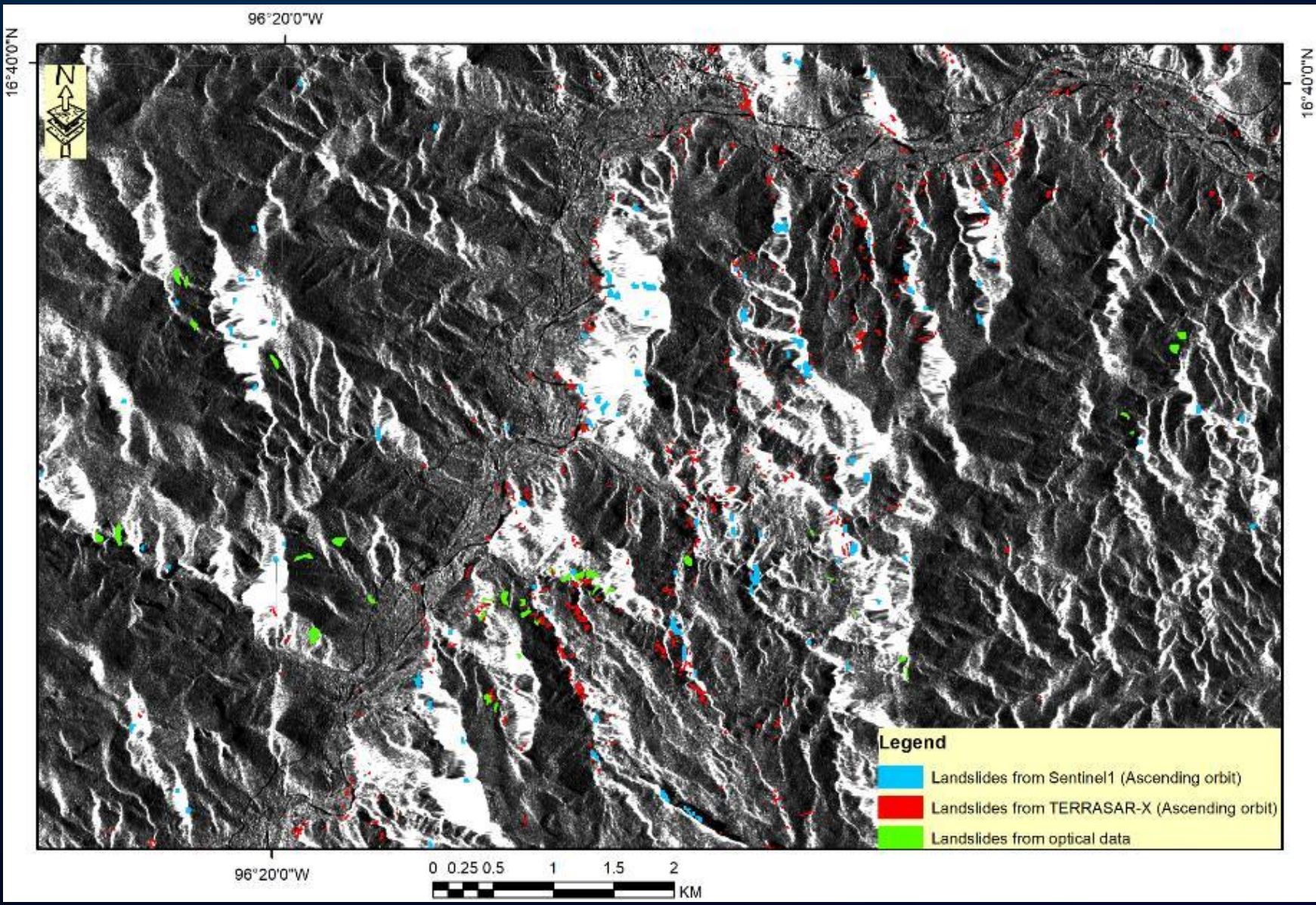
Mexico: Analysis of Land slides after Earthquake

A simulation model of
landslides after the 7.4
magnitude earthquake
occurring in June 2020 in
the Oaxaca Province

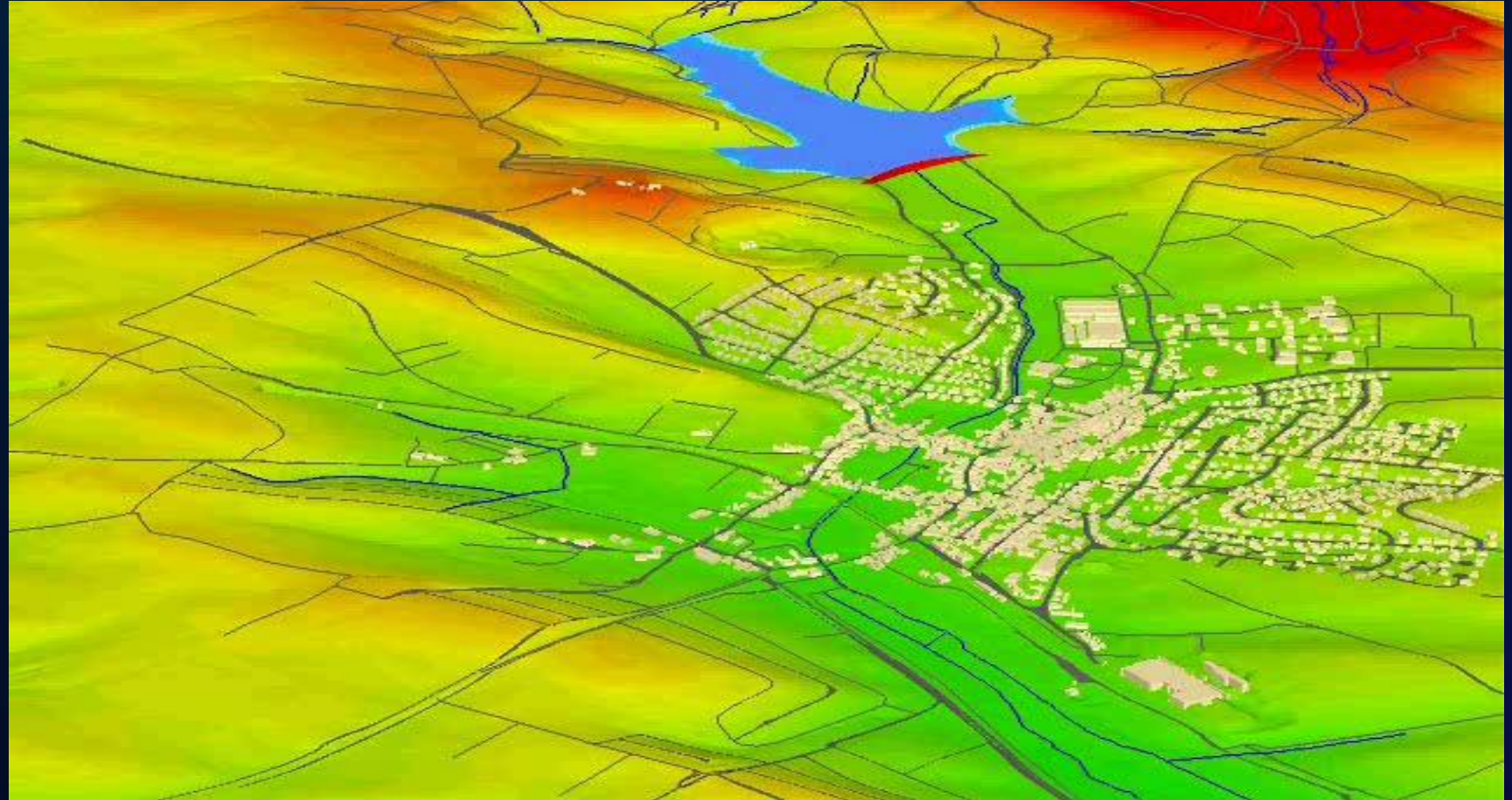


In collaboration with:

Combination of Sentinel1, TerraSAR-X and optical satellite images



Combination of DTM and buildings 3D for flood simulation



Slide with animation

Use Case #7

Simulation: Dam Failure scenario

With simulation models such as FloodArea and Airbus Digital Elevation models, these processes can be well modeled to fit the customer requirements

In collaboration with:

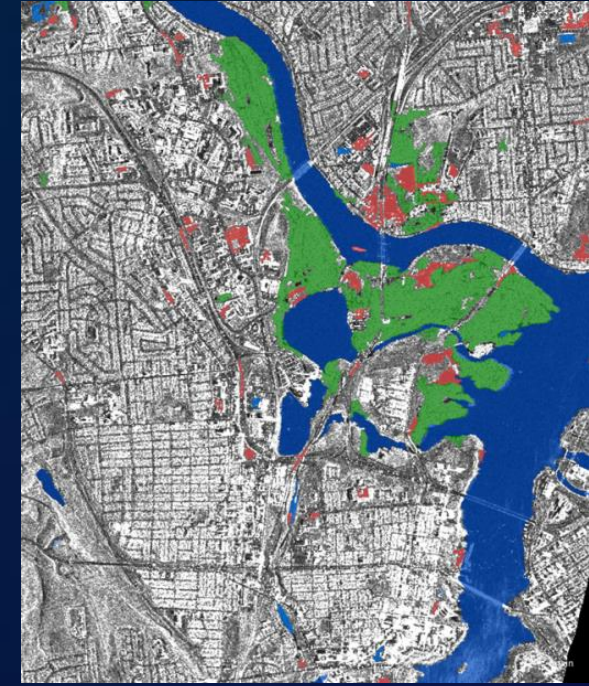
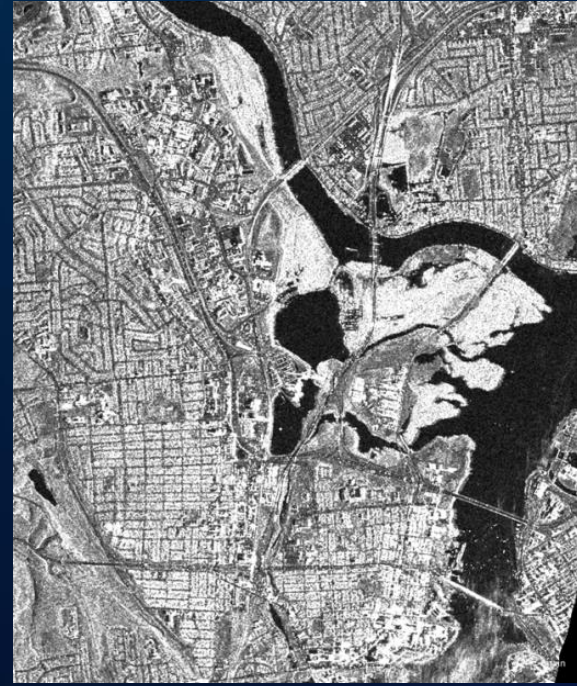


Use Case #8

Canada: Flood Rapid Mapping

Combination of
WorldDEM data and
TerraSAR-X images
within a completely
automated process

Use of WorldDEM™ data to support rapid mapping of flood events



- Water in time 2 - Open water
- Water in time 2 - water under vegetation
- Water in time 1 - main permanent water bodies

TSX1_SAR_EEC_RE__SM_S_SRA_2019051
5T112133_20190515T112143

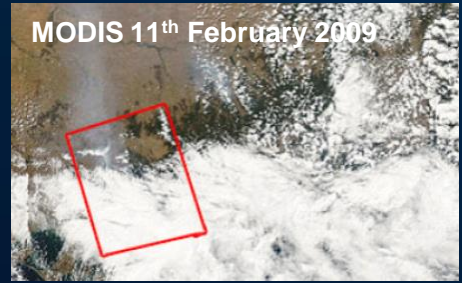
Use Case #9

Australia: Fire change detection

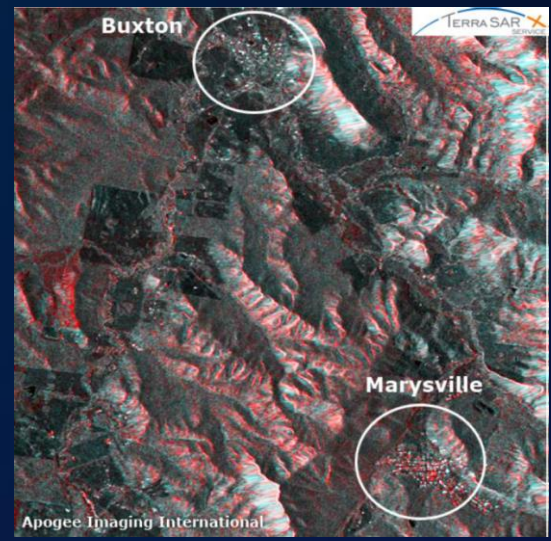
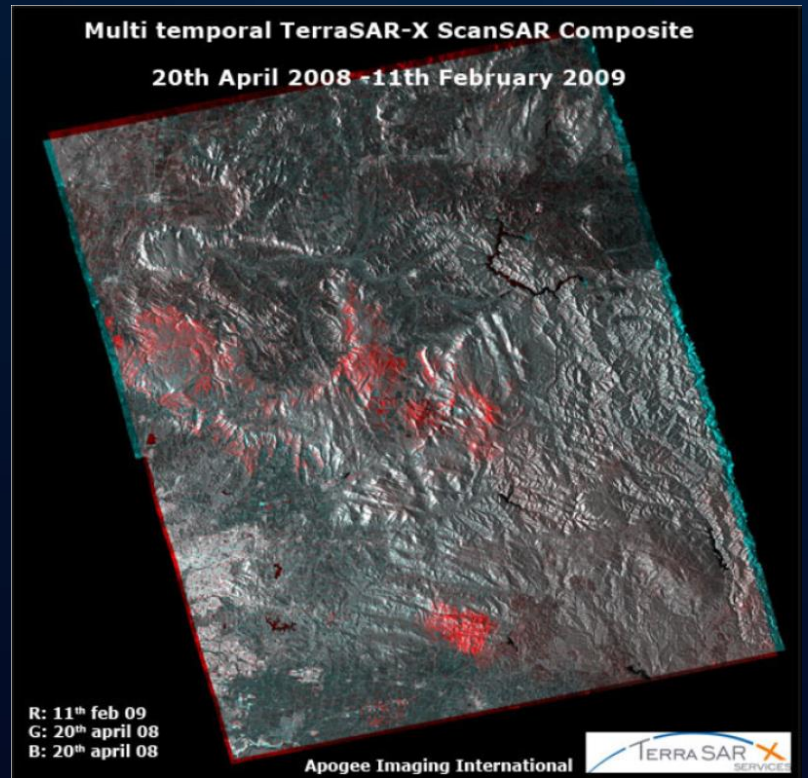
Combined visualization of TerraSAR-X data of dates previously and during the fire event shows burned areas.



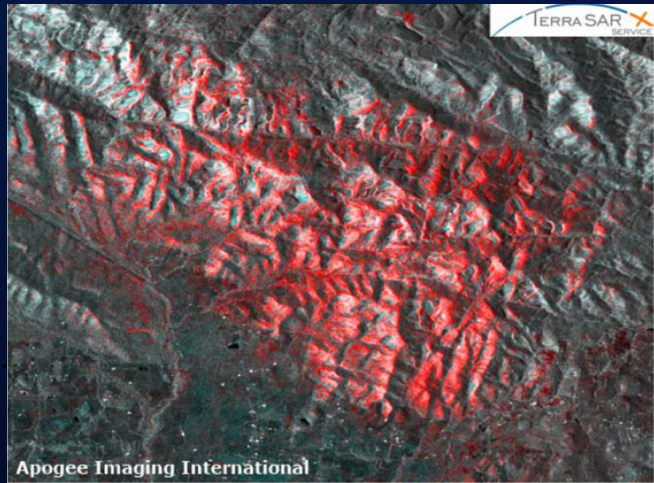
Use of TerraSAR-X to visualize and map burned areas



Victoria/Australia, Feb. 2009



Difference in signal between towns Marysville (mostly destroyed) and Buxton (mostly saved from the flames)

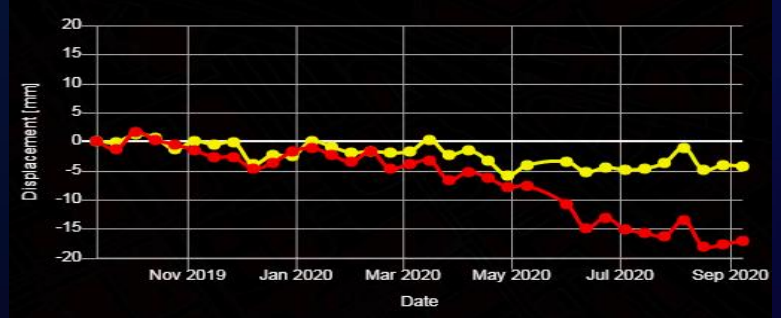
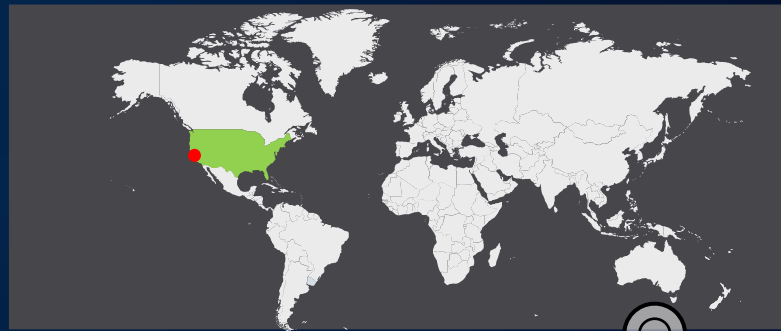
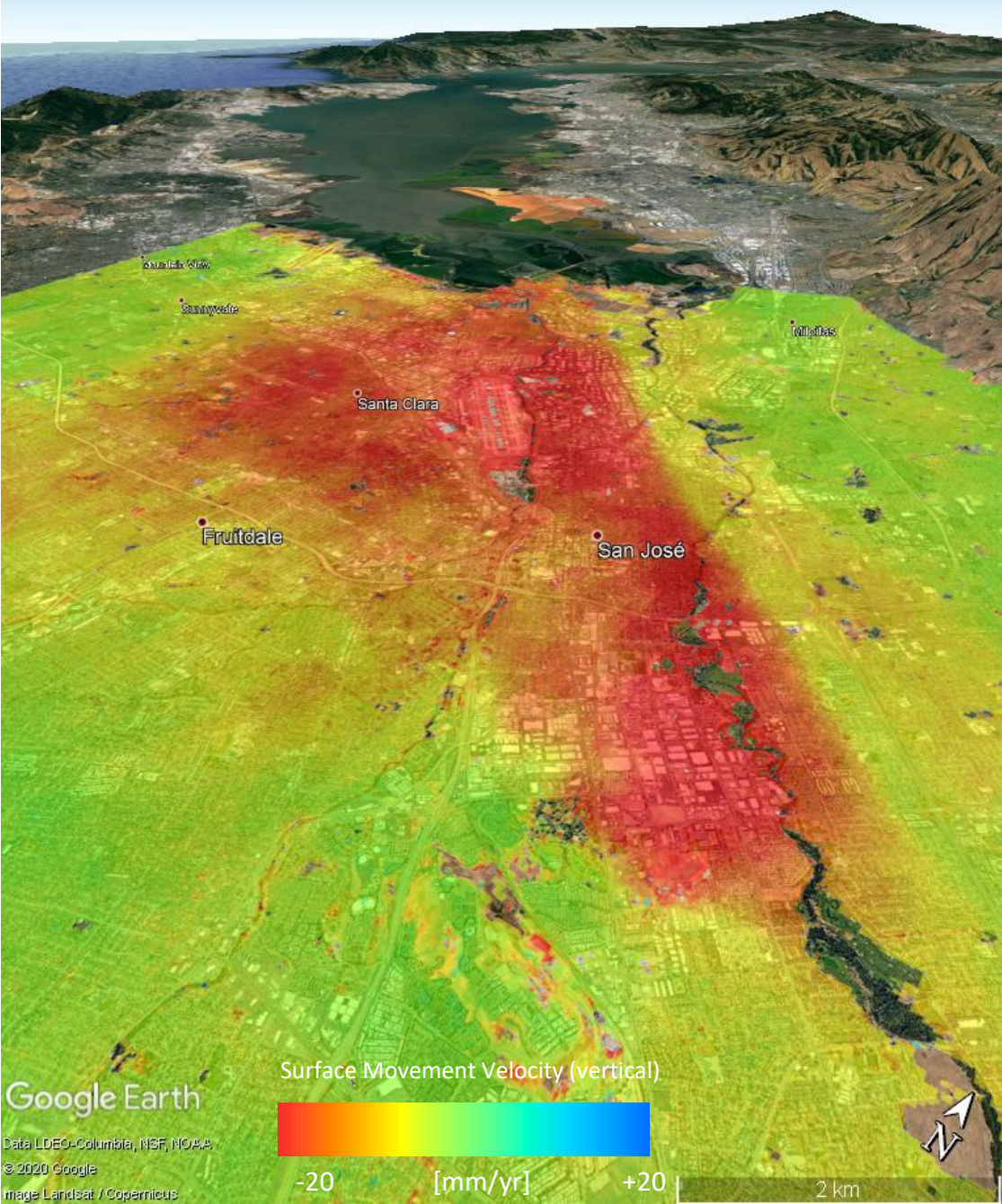


Bunyip State Park

Use Case #10

Silicon Valley (USA): Surface movement monitoring

Measured surface subsidence in mm range with TerraSAR-X and Interferometry.



Radar Imagery and Data

AIRBUS DEFENCE AND SPACE

Home > Imagery > Sample Imagery

Sample

All Imagery |

Optical Im



China, Sanchagang - EEC, SE



USA, South Mississippi - GEC, RE



Argentina, Upsala Glacier - MGD, RE



Spain, Barcelona - ORI, SE



SPOT 7 - Curitiba



SPOT 7 - Amman



Jinzhong



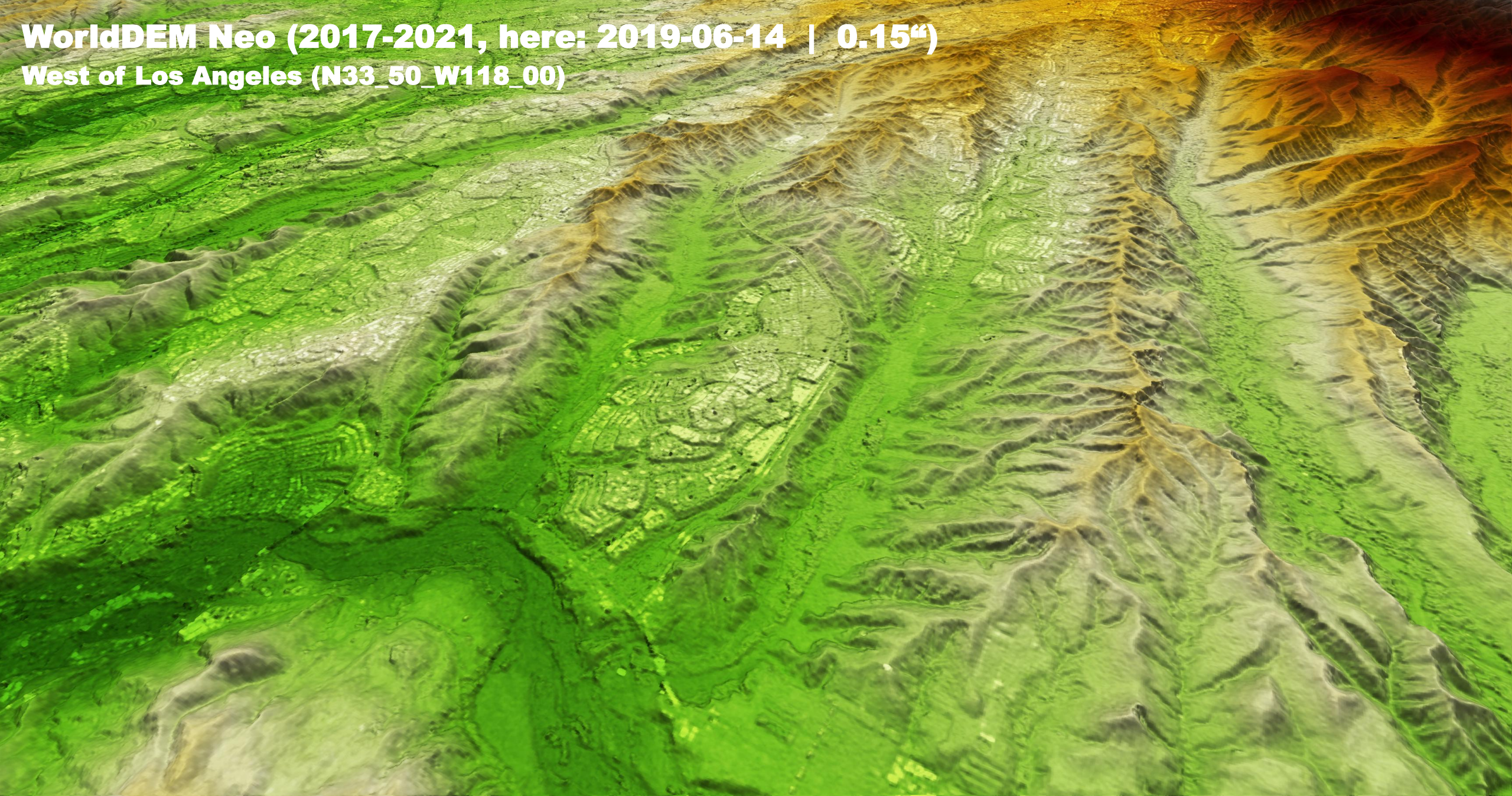
- Aceh

<https://www.intelligence-airbusds.com/imagery/sample-imagery/>
<https://up42.com/marketplace/>

See

WorldDEM Neo (2017-2021, here: 2019-06-14 | 0.15")

West of Los Angeles (N33_50_W118_00)

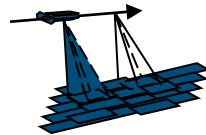


Imagery – Acquisition Modes

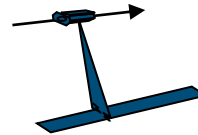
Wide ScanSAR*



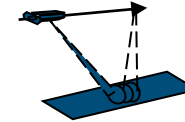
ScanSAR



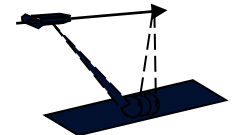
StripMap



High Res. SpotLight & SpotLight



Staring SpotLight*



**Multi-resolution – Multi-scale – Multi-polarized:
Acquisition Modes for various Applications**

40m Resolution

200 - 270 x 200km

Large area maritime monitoring of traffic, oil, ice

18m Resolution

100 x 150km

Detailed maritime monitoring & detection

3m Resolution

30 x 50km

Detection & classification of vessels, infrastructure, etc.

1m/2m Resolution

10 x 5 km / 10 x 10 km

Recognition of objects (aircrafts, hangars, vessels,..)

0.25m Resolution

4 x 3.7km or 2.5 x 7.5km

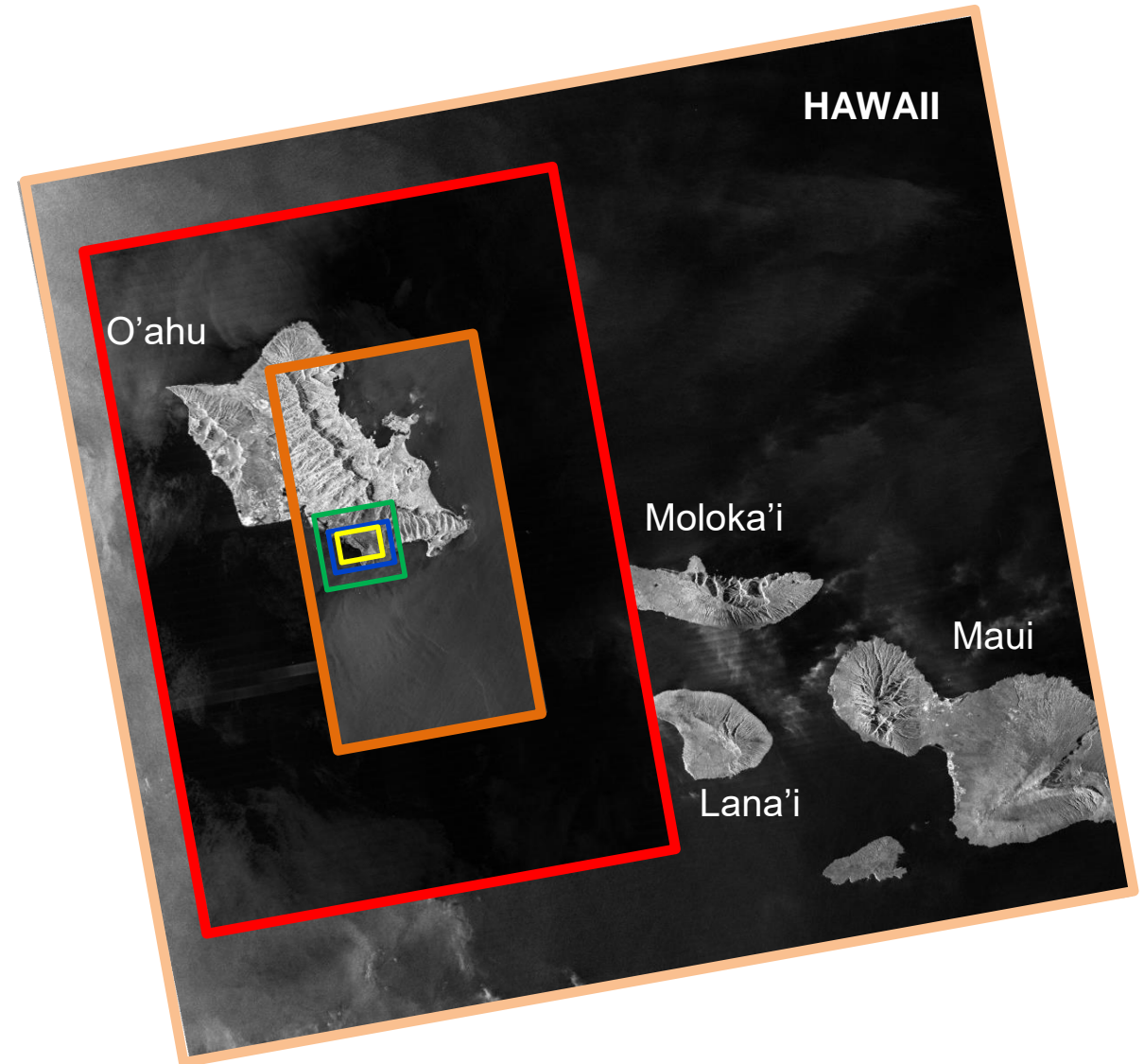
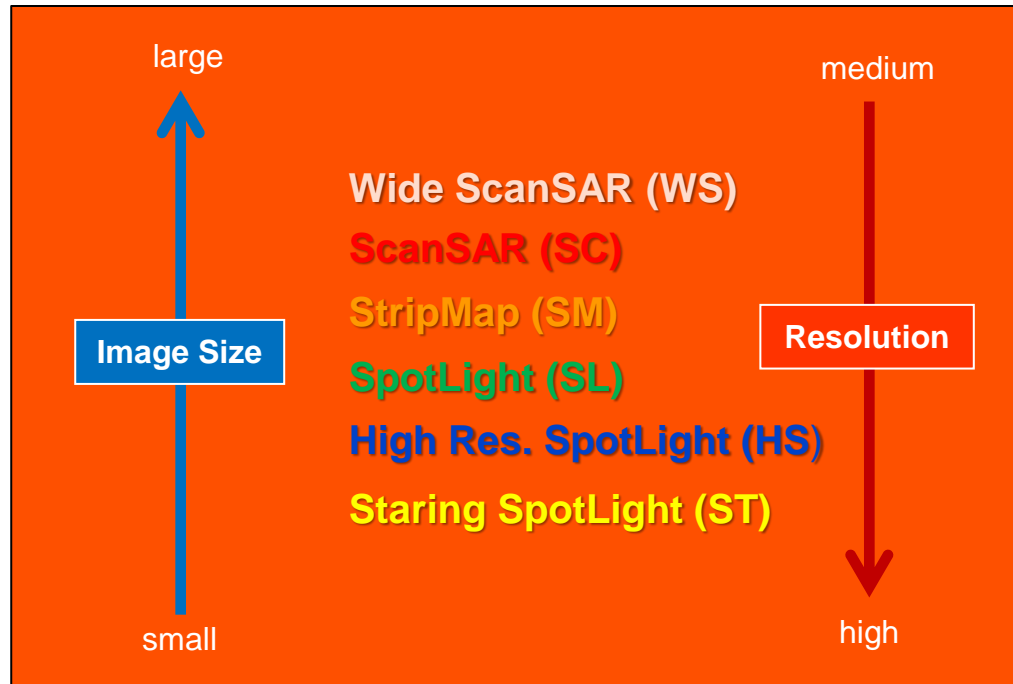
Identification of objects

Monitoring & Detection

Recognition & Classification

Identification

Imagery - Acquisition Modes



Thank you

Contact

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