

UN-SPIDER RSO Coordination Meeting, November 2022 in Vienna

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

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

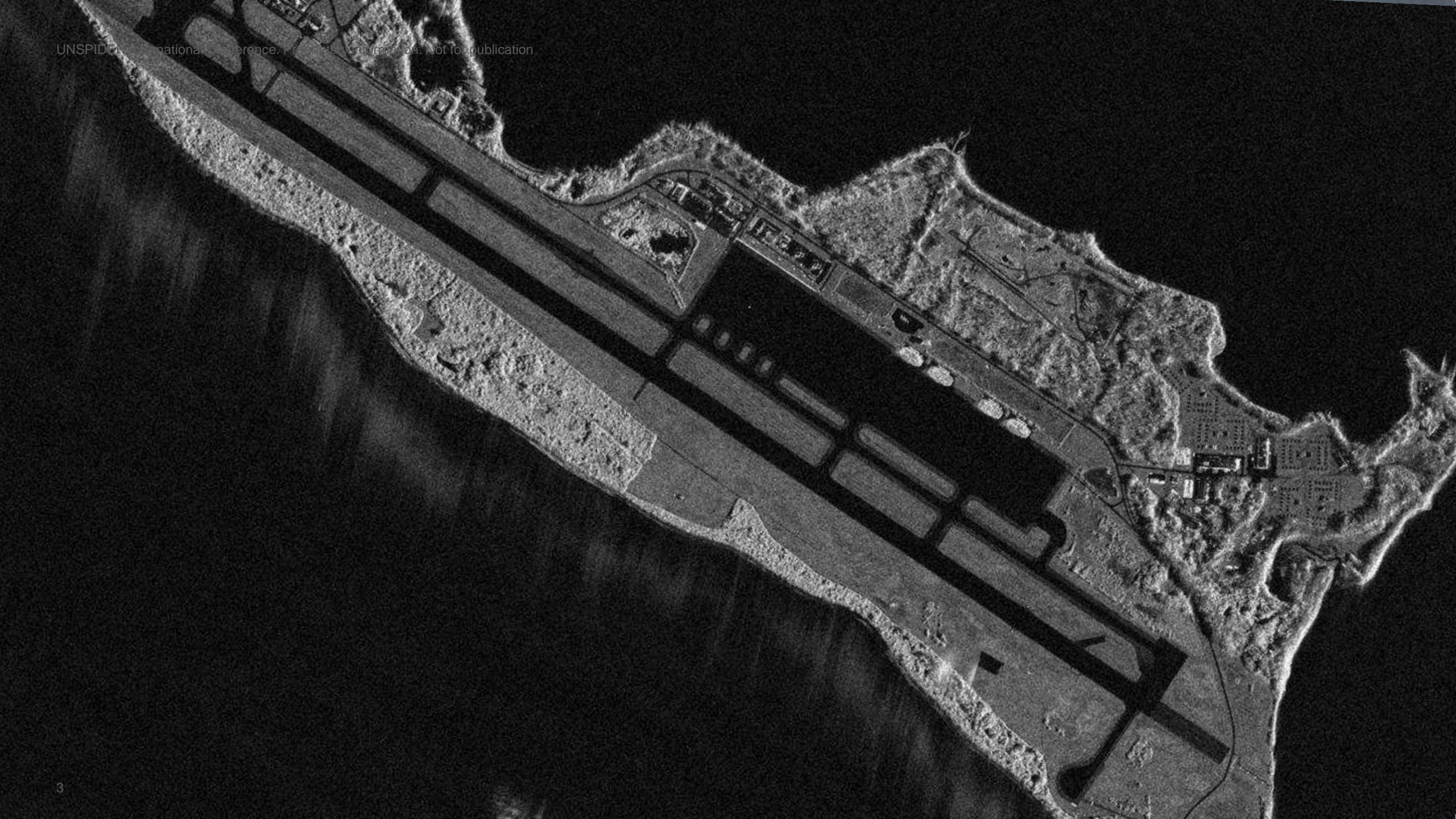
TerraSAR-X Neo



Next Generation Service Scenarios

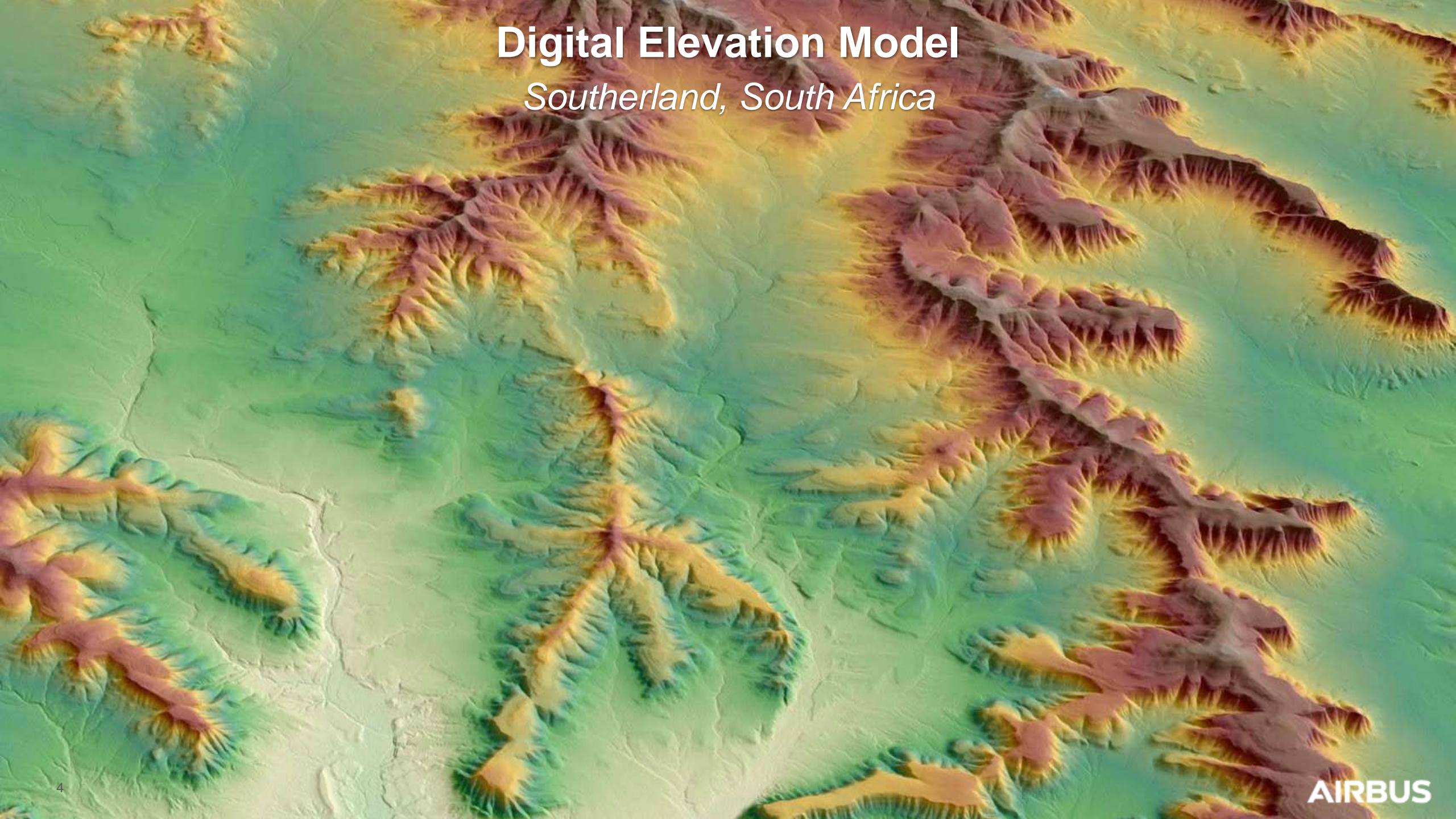
WorldSAR Constellation Cooperation
with Hisdesat (ES)

AIRBUS



Digital Elevation Model

Southerland, South Africa



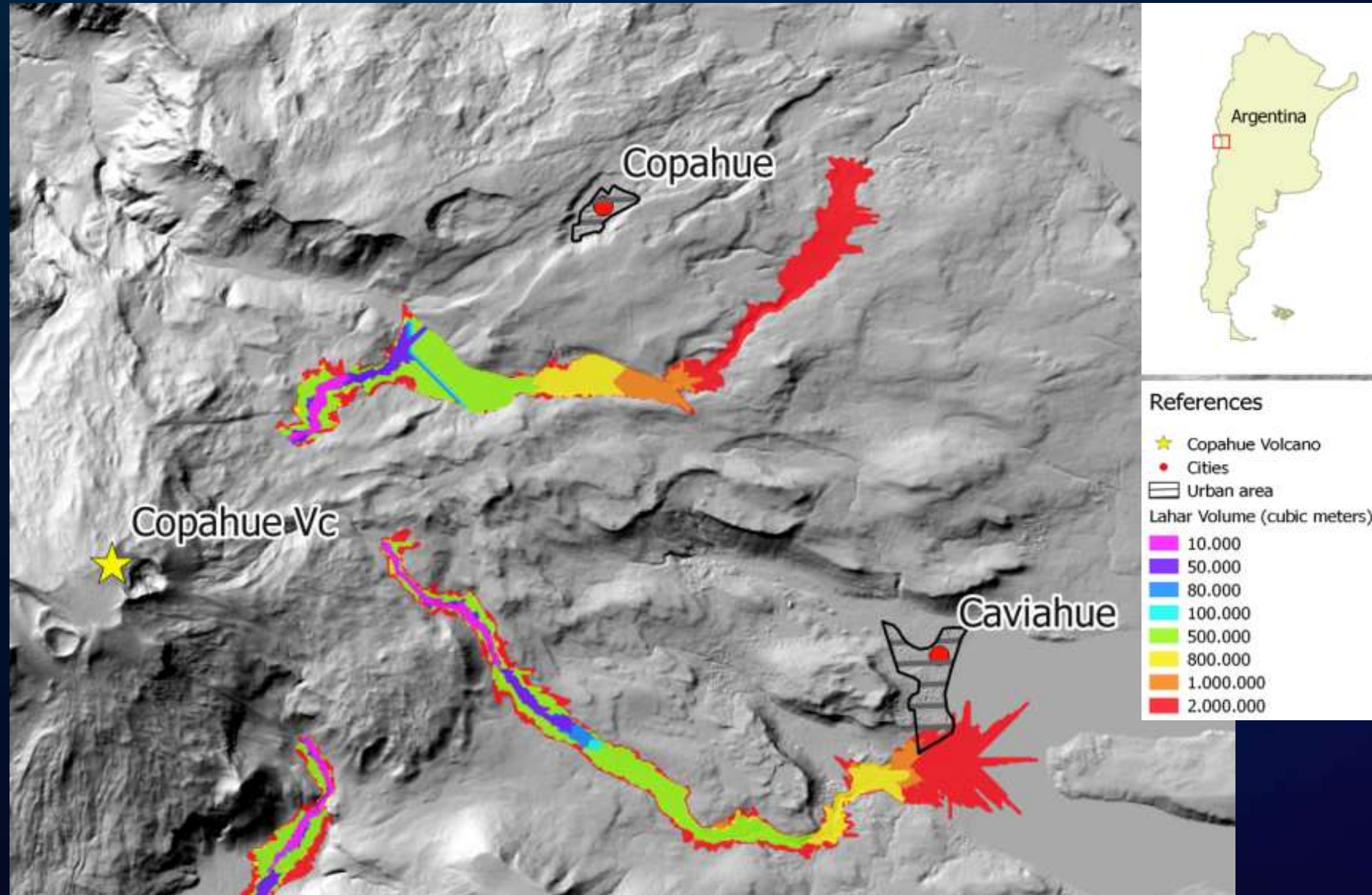
Use Case #1

Argentina: Lahar Modelling *Using WorldDEM™*

Applications:

- Lahar modelling
- Settlement areas hazard risk assessment

Lahar Modelling, Copahue Vulcano, Argentina



Use Case #2

Ghana: Inundation Hazard Modelling

Applications:

- Storm Surges
- Coastal Floods



Coastal flooding simulation, Accra West, Ghana



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Use Case #2

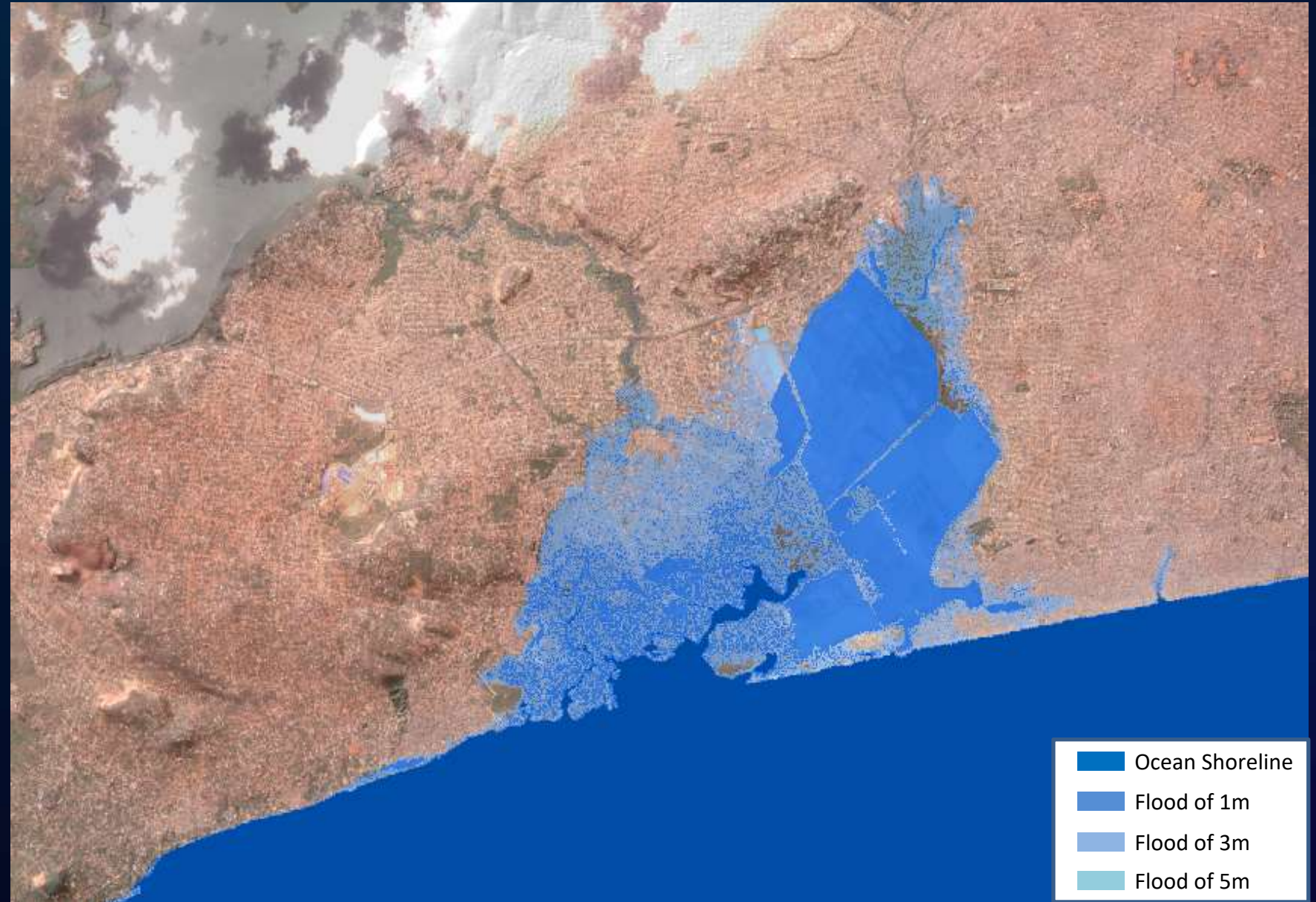
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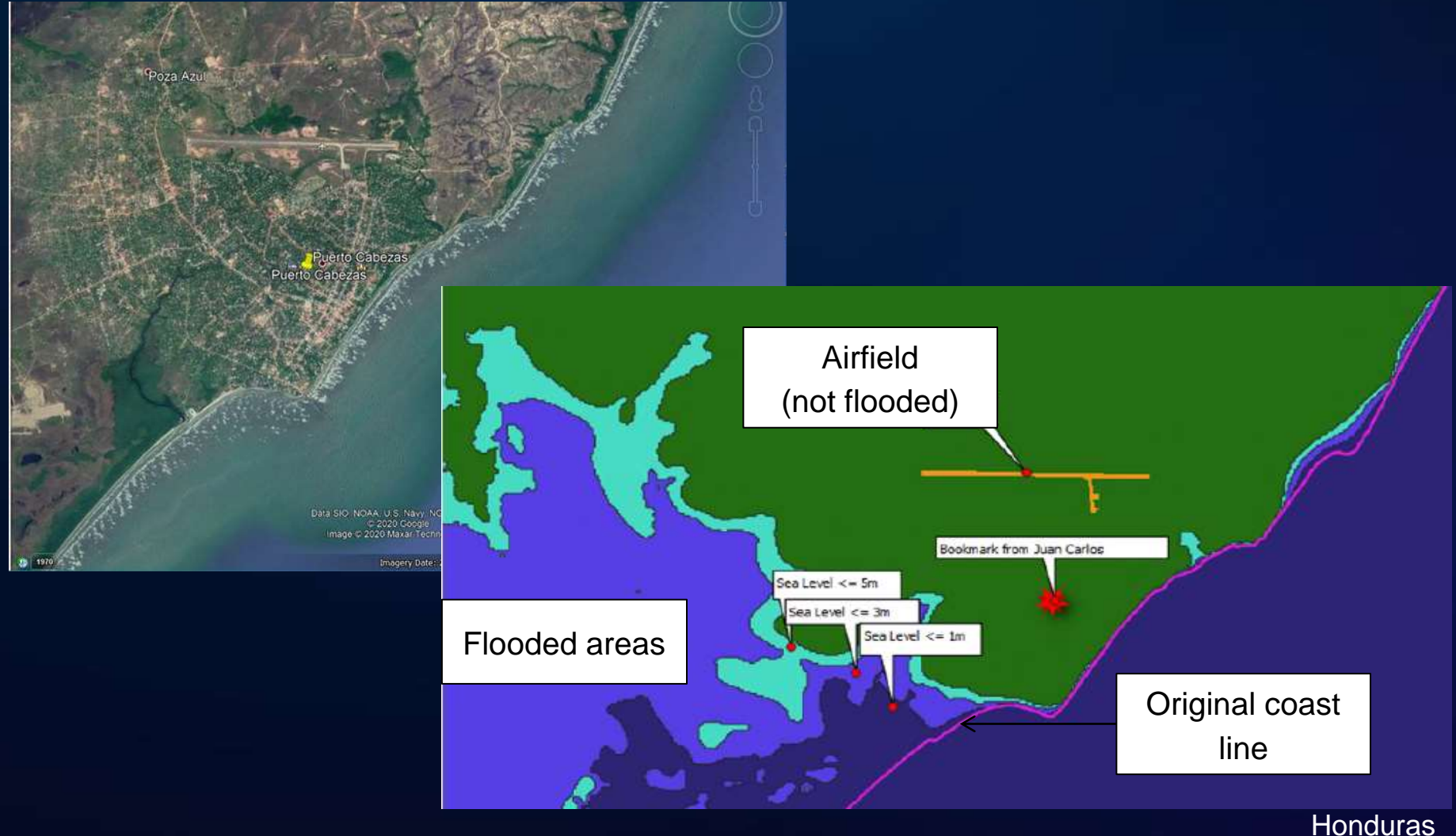
Use Case #3

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

Applications:

- Emergency response
- Storm surges
- Hurricanes

Nicaragua – Hurricane November 2020

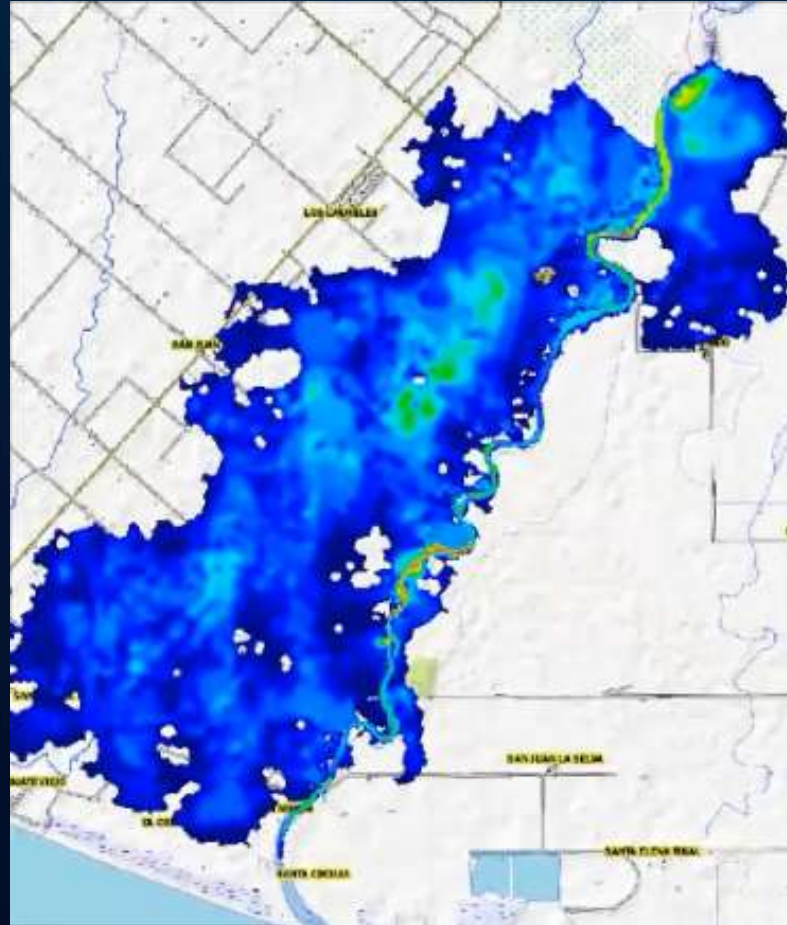


Use Case #4

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 es acción para enfrentar el cambio climático”



AIRBUS

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

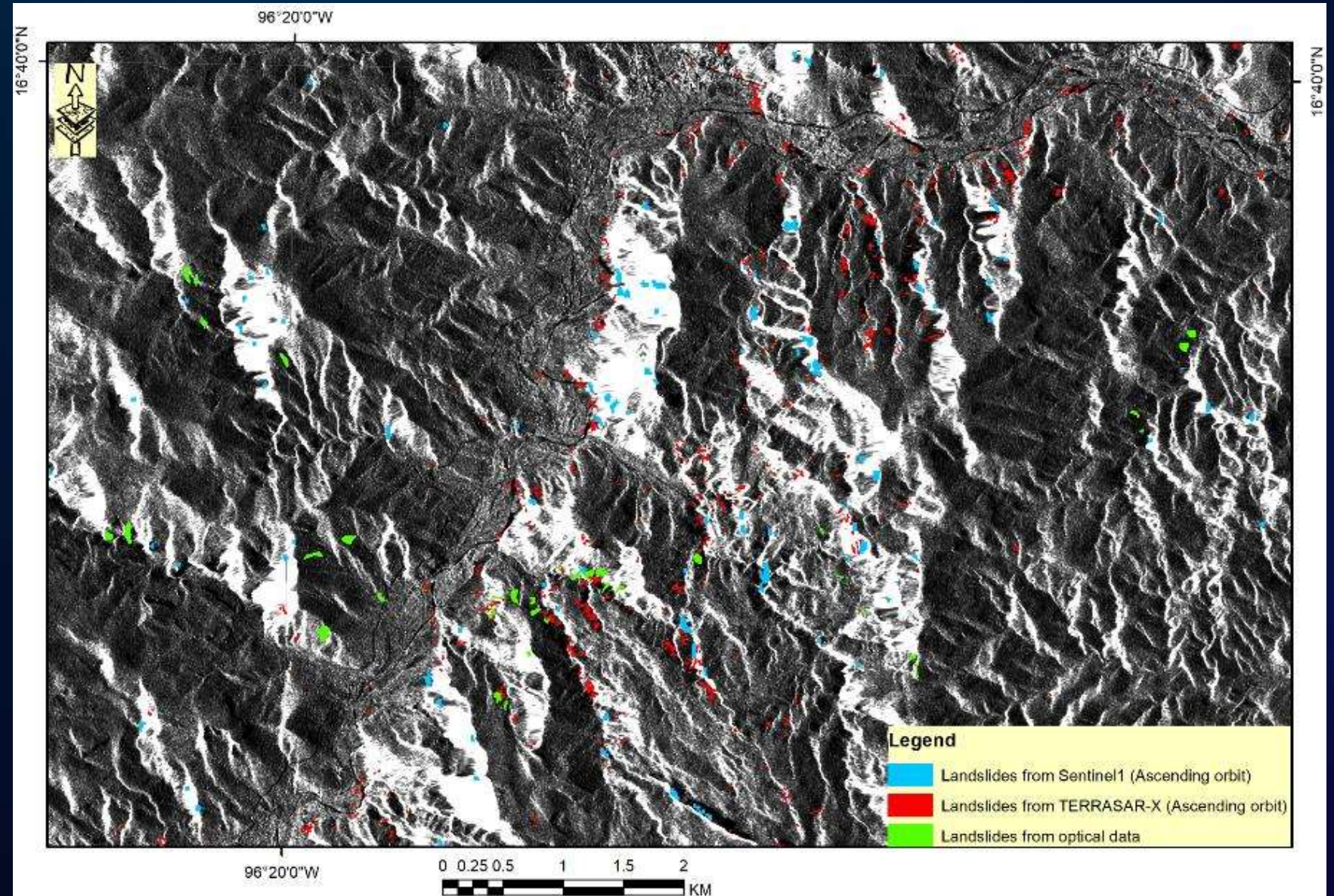
Mexico: Analysis of Land slides after Earthquake

A simulation model of
landslides as a result
from 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



Use Case #7

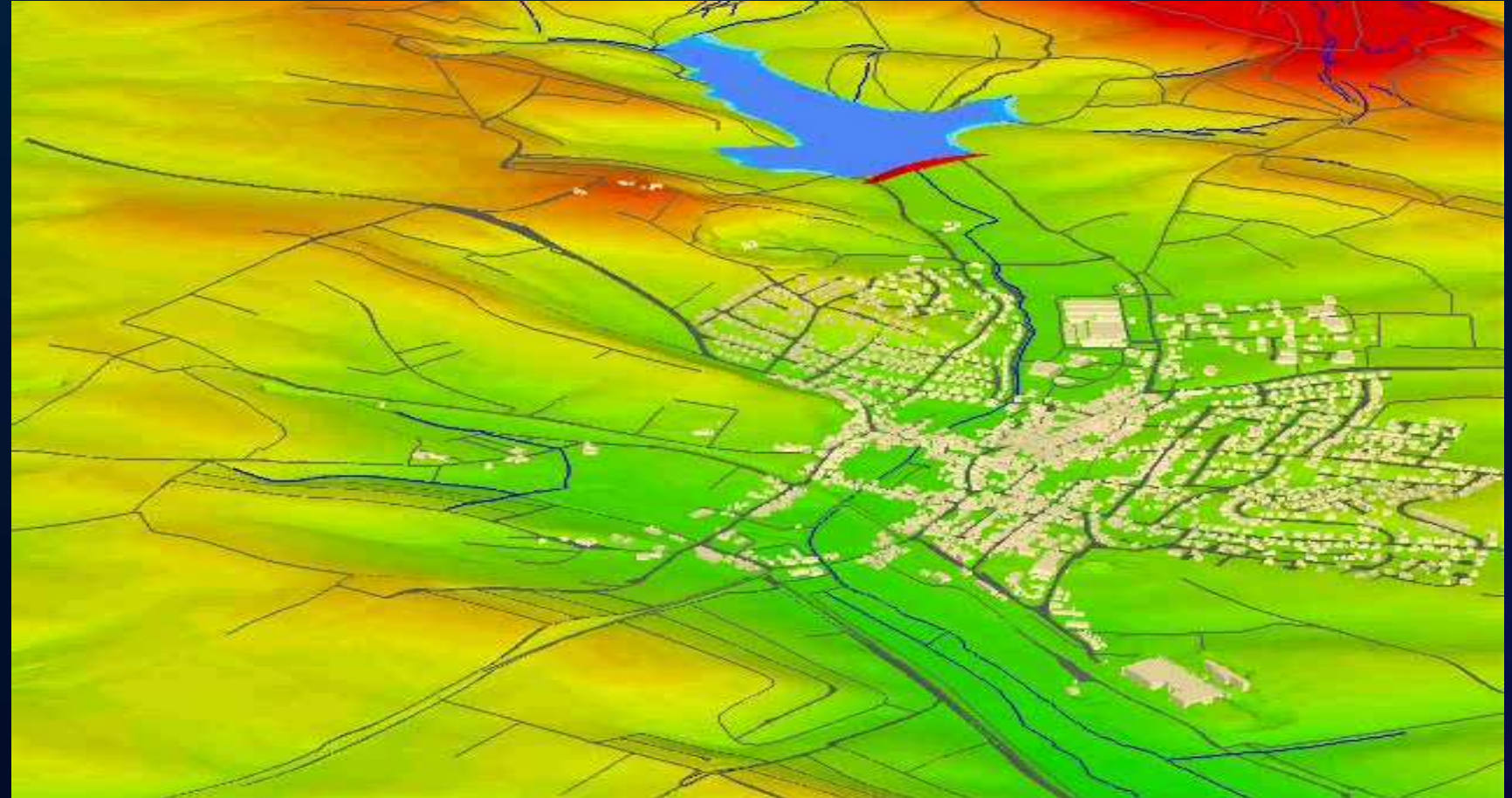
Simulation: Dam Failure scenario

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:



Combination of DTM and buildings 3D for flood simulation



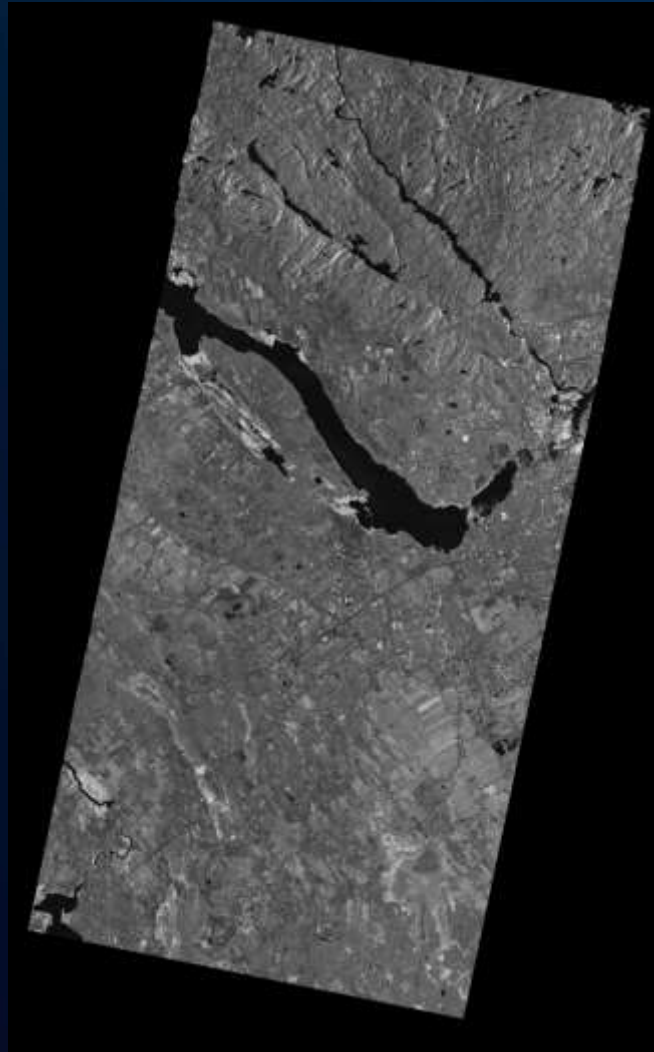
Slide with animation

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



TSX1_SAR_EEC_RE__SM_S_SRA_2019051
5T112133_20190515T112143



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

Use Case #9

Australia: Fire change detection

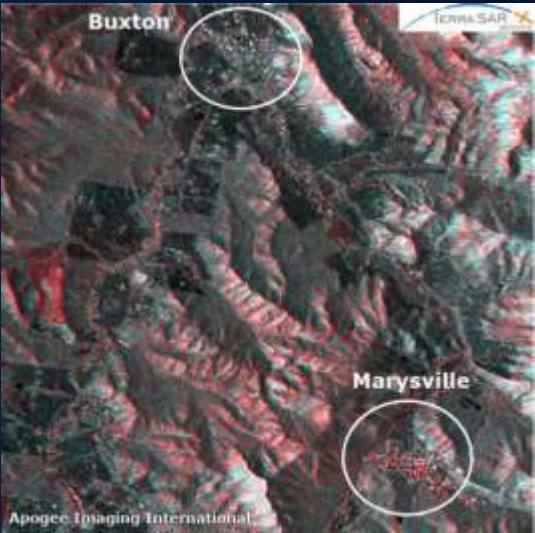
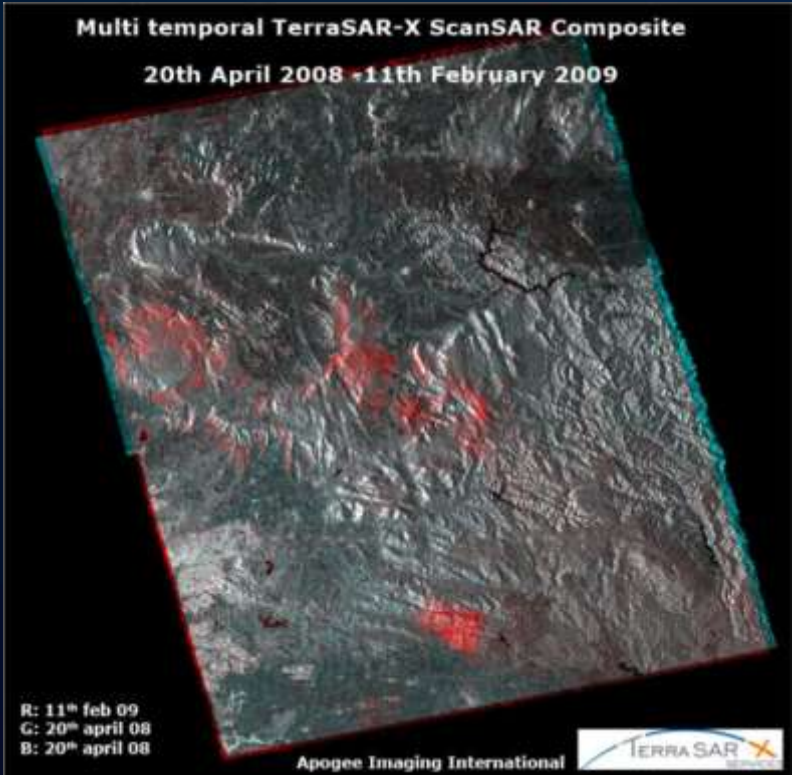
Combined visualization of TerraSAR-X data of dates previously and during the fire event shows burned areas.



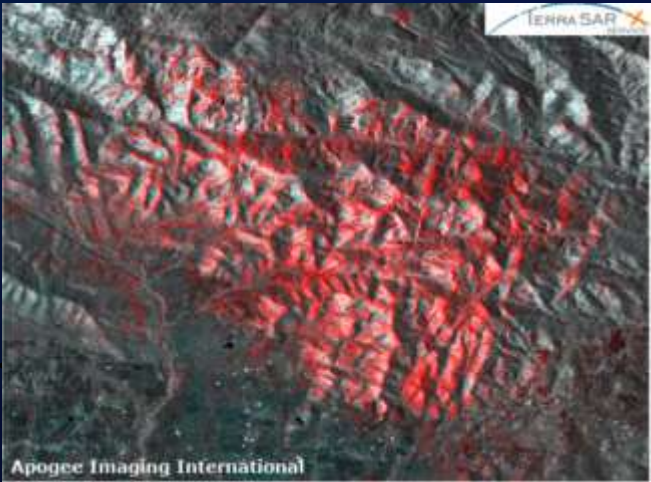
Use of TerraSAR-X to visualize and map burned areas



Victoria/Australia, Feb. 2009



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

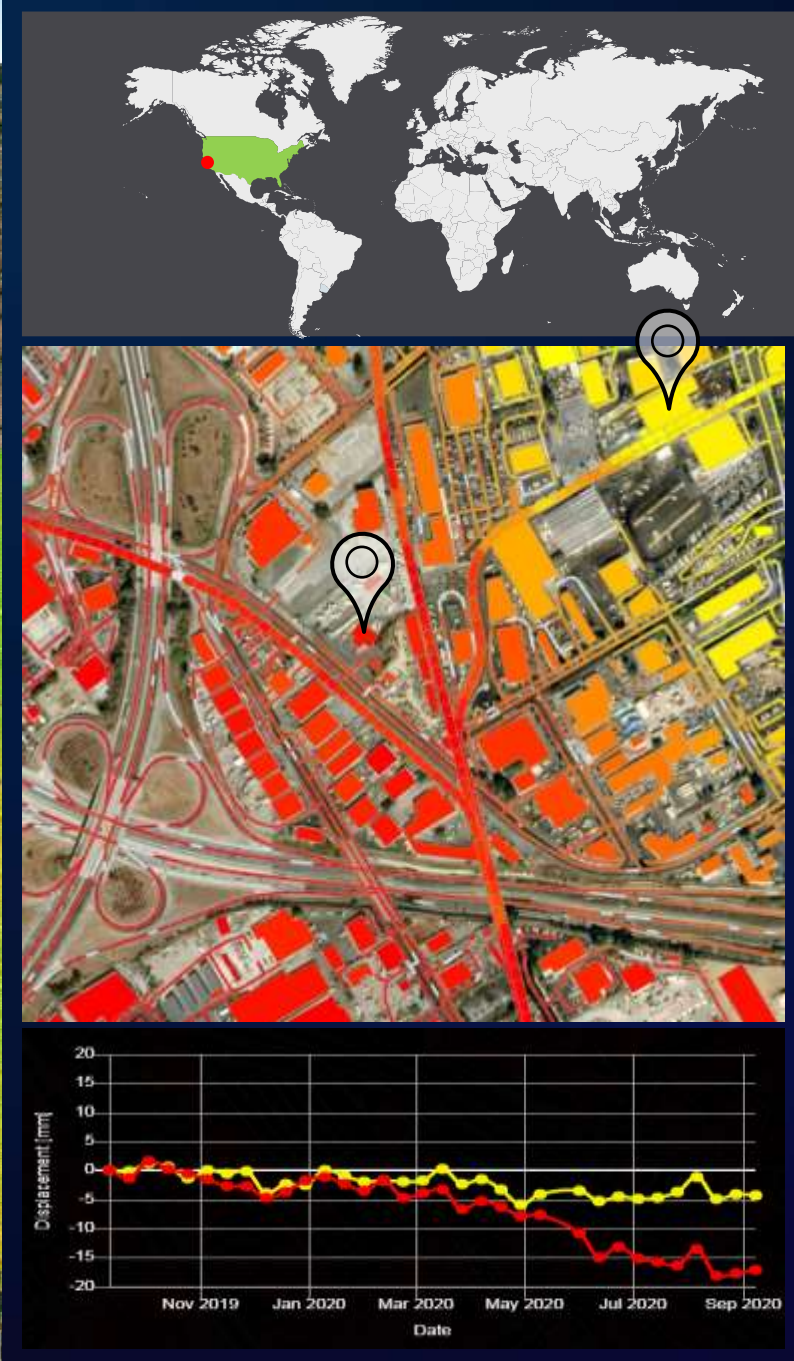
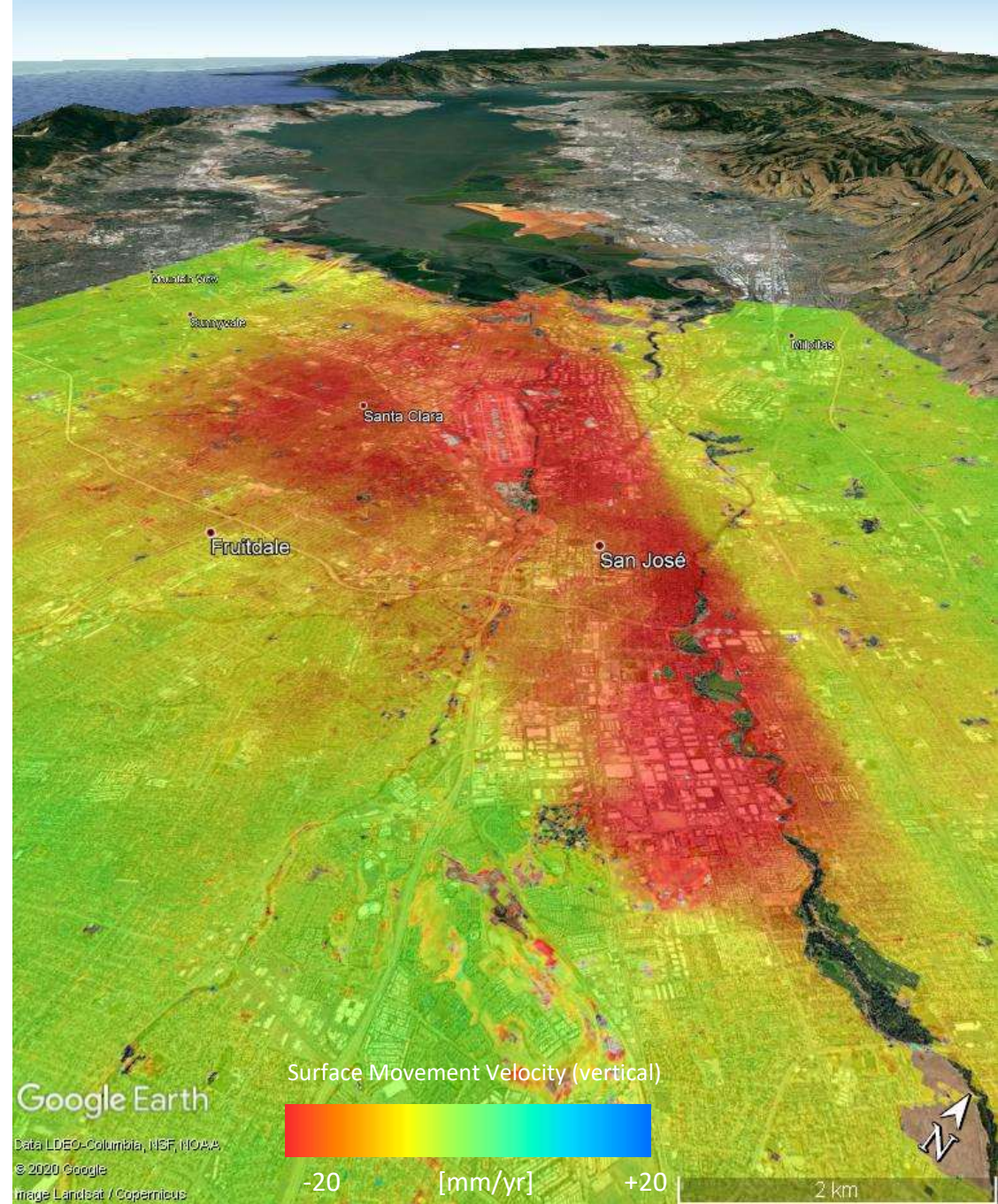


Bunyip State Park

Use Case #10

Silicon Valley (USA): Surface movement monitoring

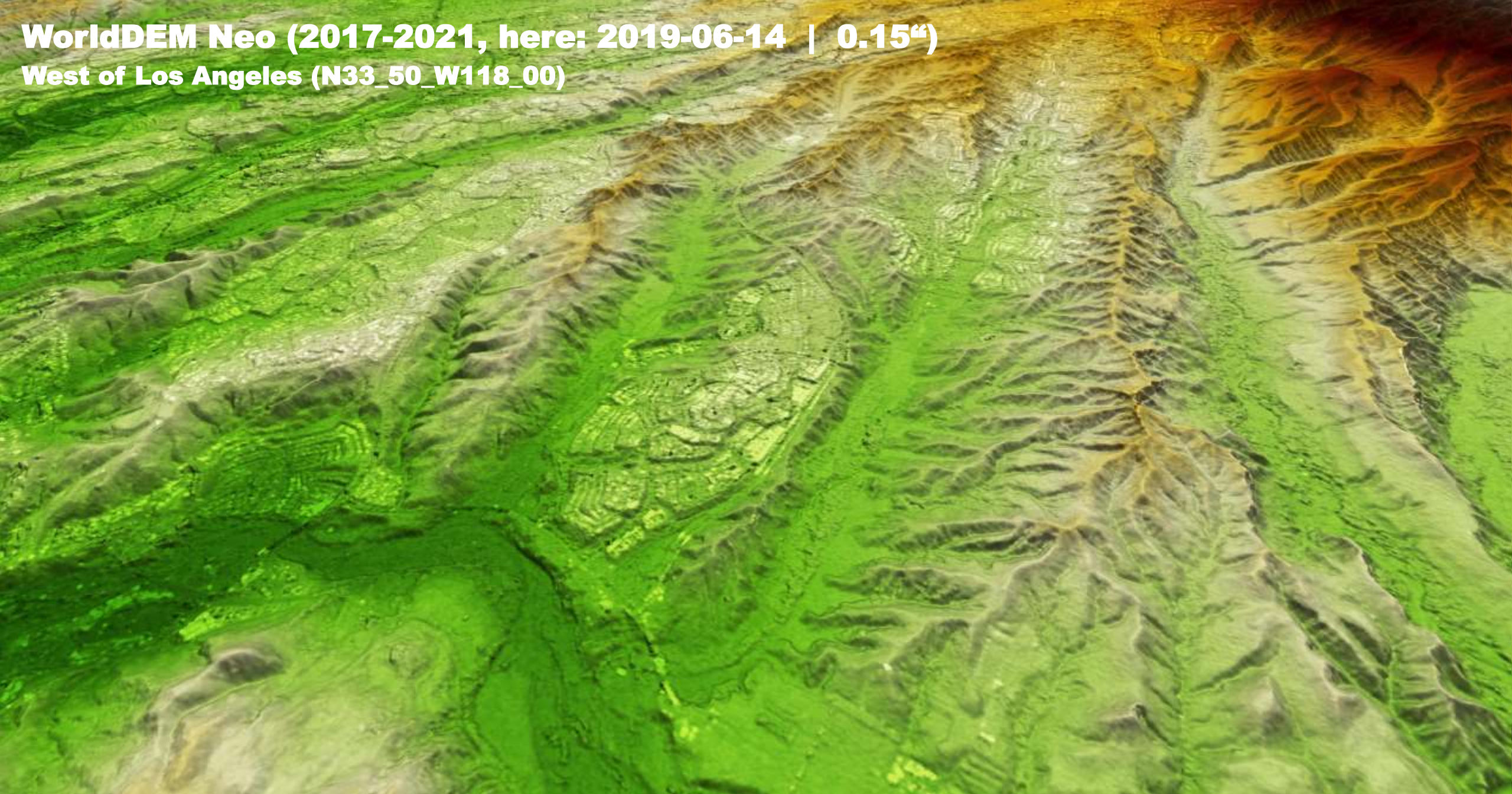
Measured surface subsidence in mm range with TerraSAR-X and Interferometry.



Radar Imagery and Data



See



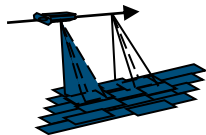
WorldDEM Neo (2017-2021, here: 2019-06-14 | 0.15")
West of Los Angeles (N33_50_W118_00)

Imagery – Acquisition Modes

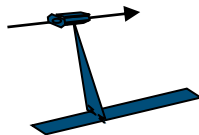
Wide ScanSAR*



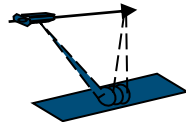
ScanSAR



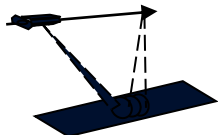
StripMap



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

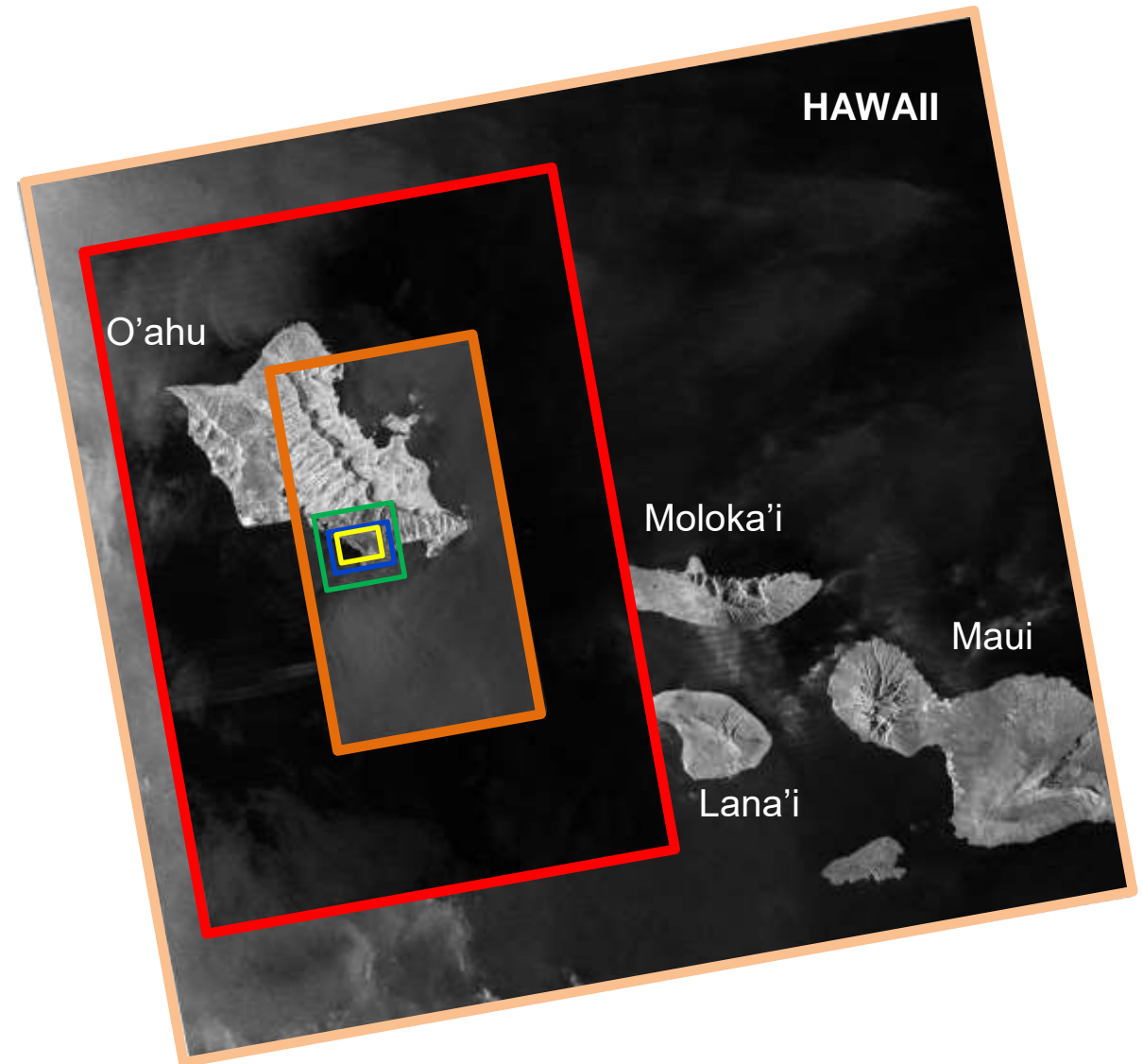
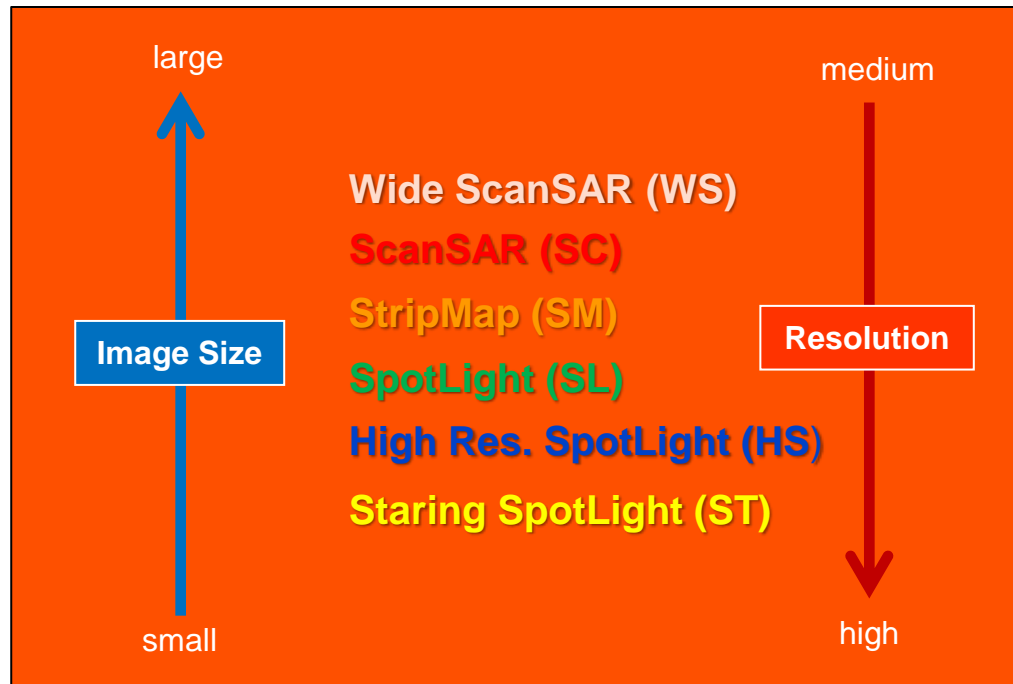
4 x 3.7km or 2.5 x 7.5km
Identification of objects

Monitoring & Detection

Recognition & Classification

Identification

Imagery - Acquisition Modes





Thank you

Contact

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