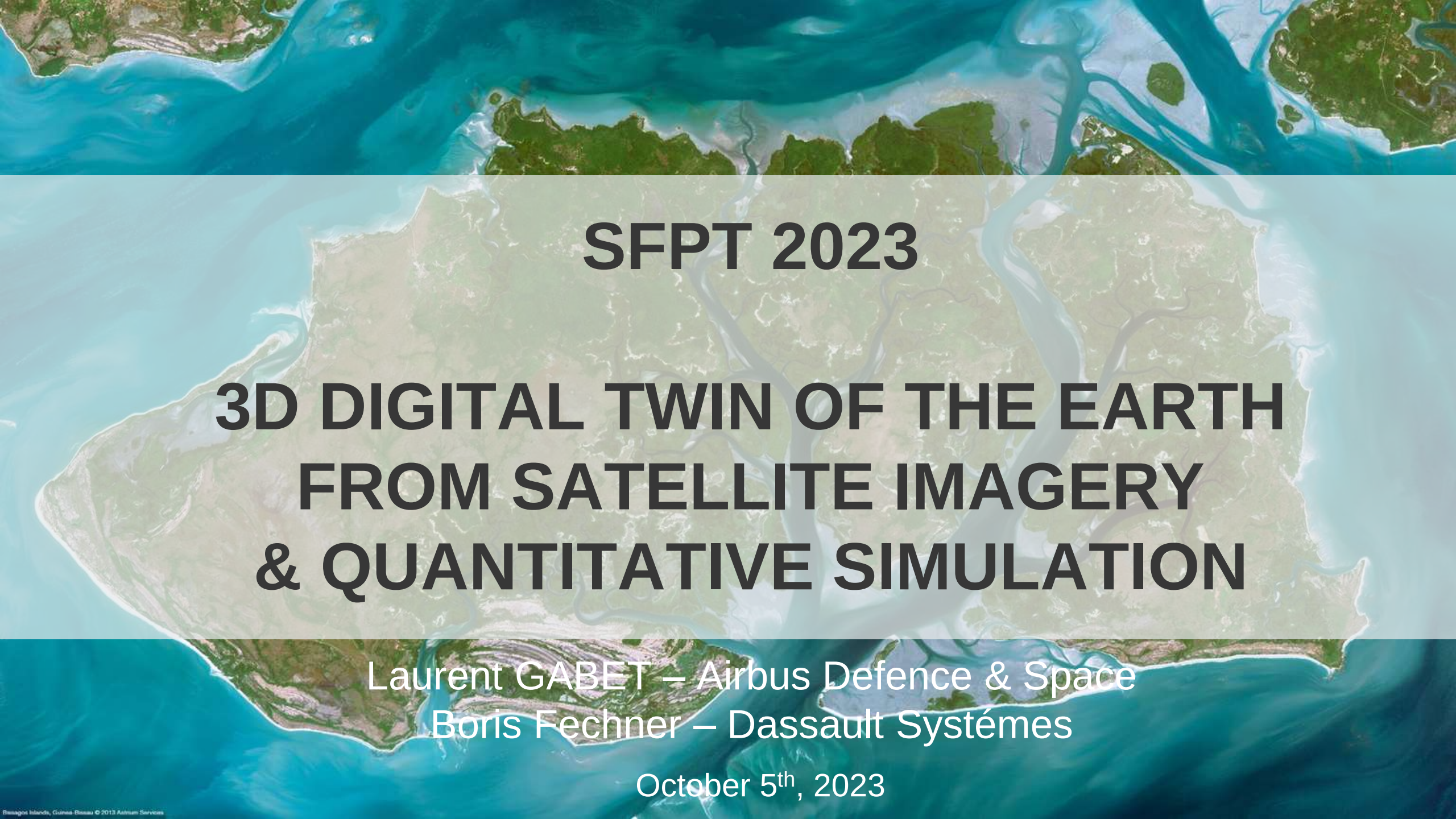


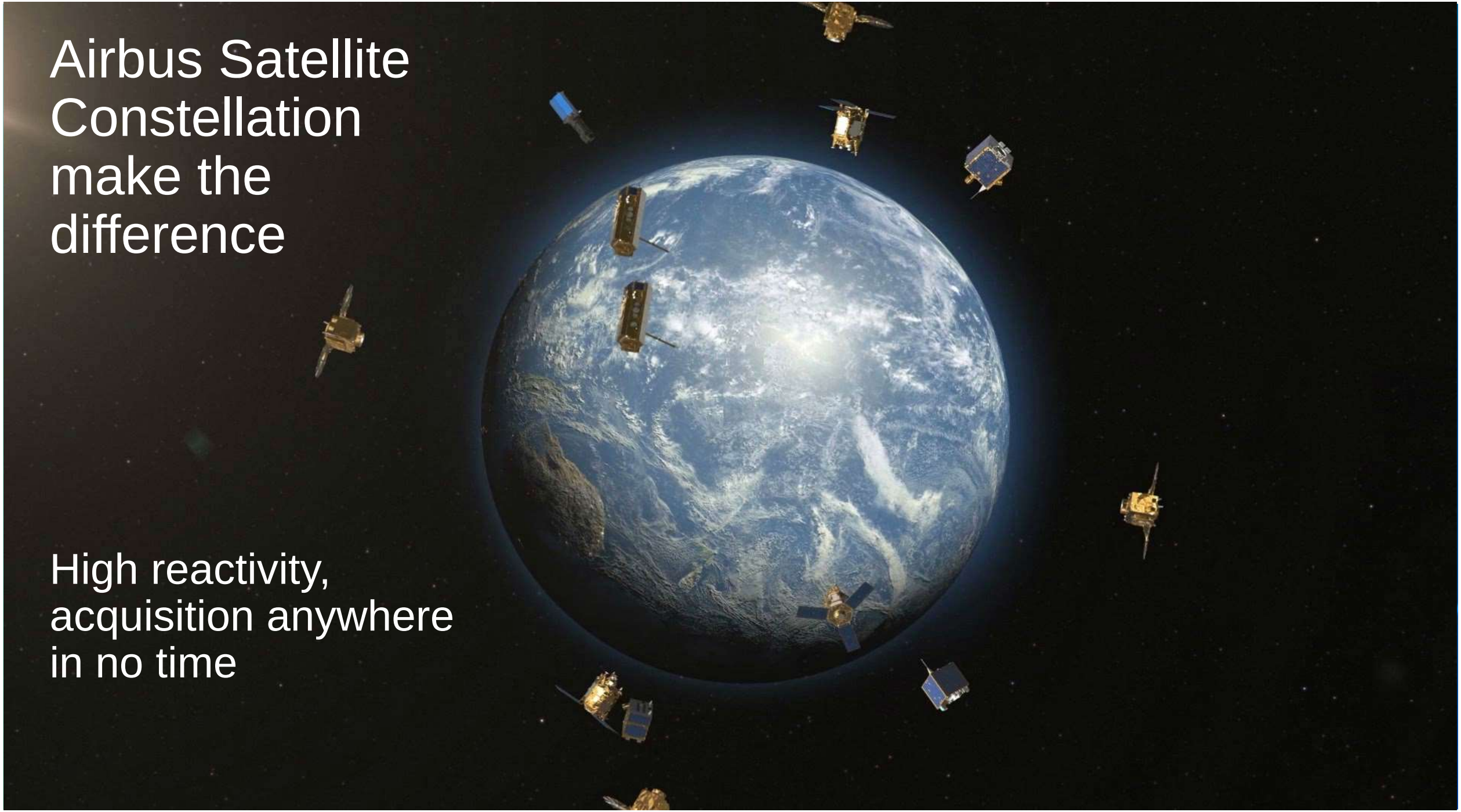
# SFPT 2023

# 3D DIGITAL TWIN OF THE EARTH FROM SATELLITE IMAGERY & QUANTITATIVE SIMULATION

Laurent GABET – Airbus Defence & Space
Boris Fechner – Dassault Systémes

October 5th, 2023

# Airbus Satellite Constellation make the difference



High reactivity, acquisition anywhere in no time

# 3D Digital Twin of the Earth from Satellite Imagery

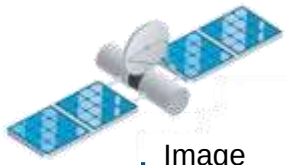
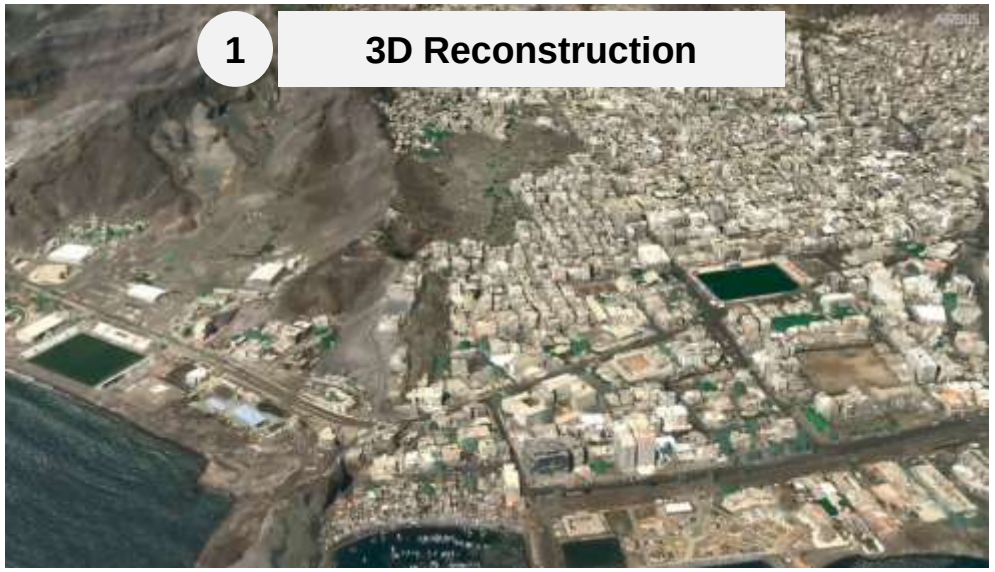
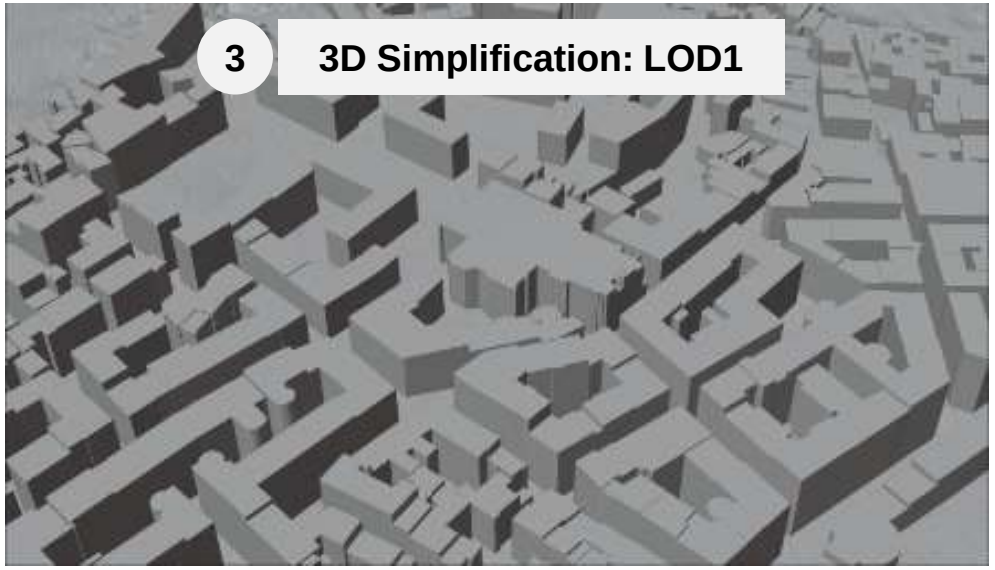


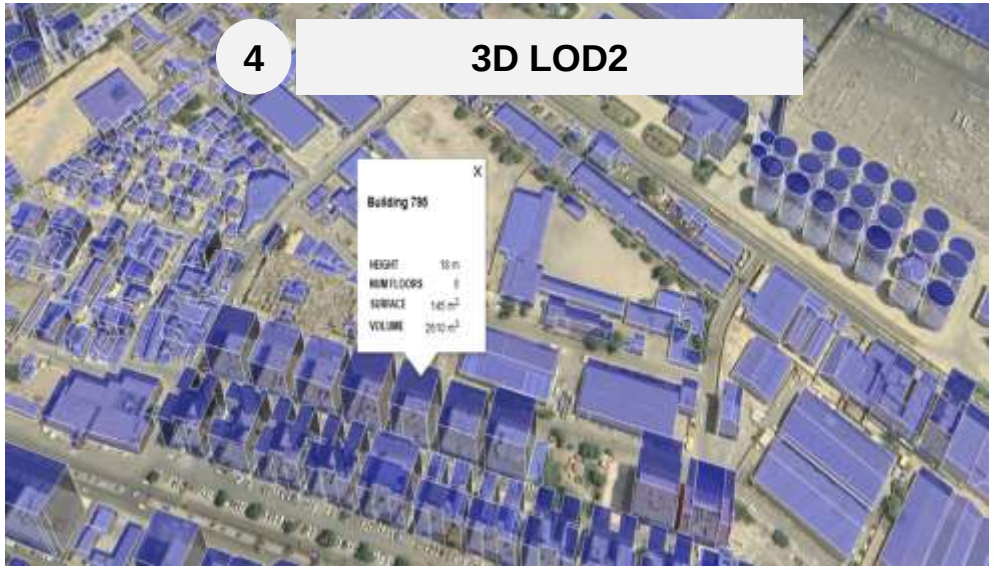
Image acquisition

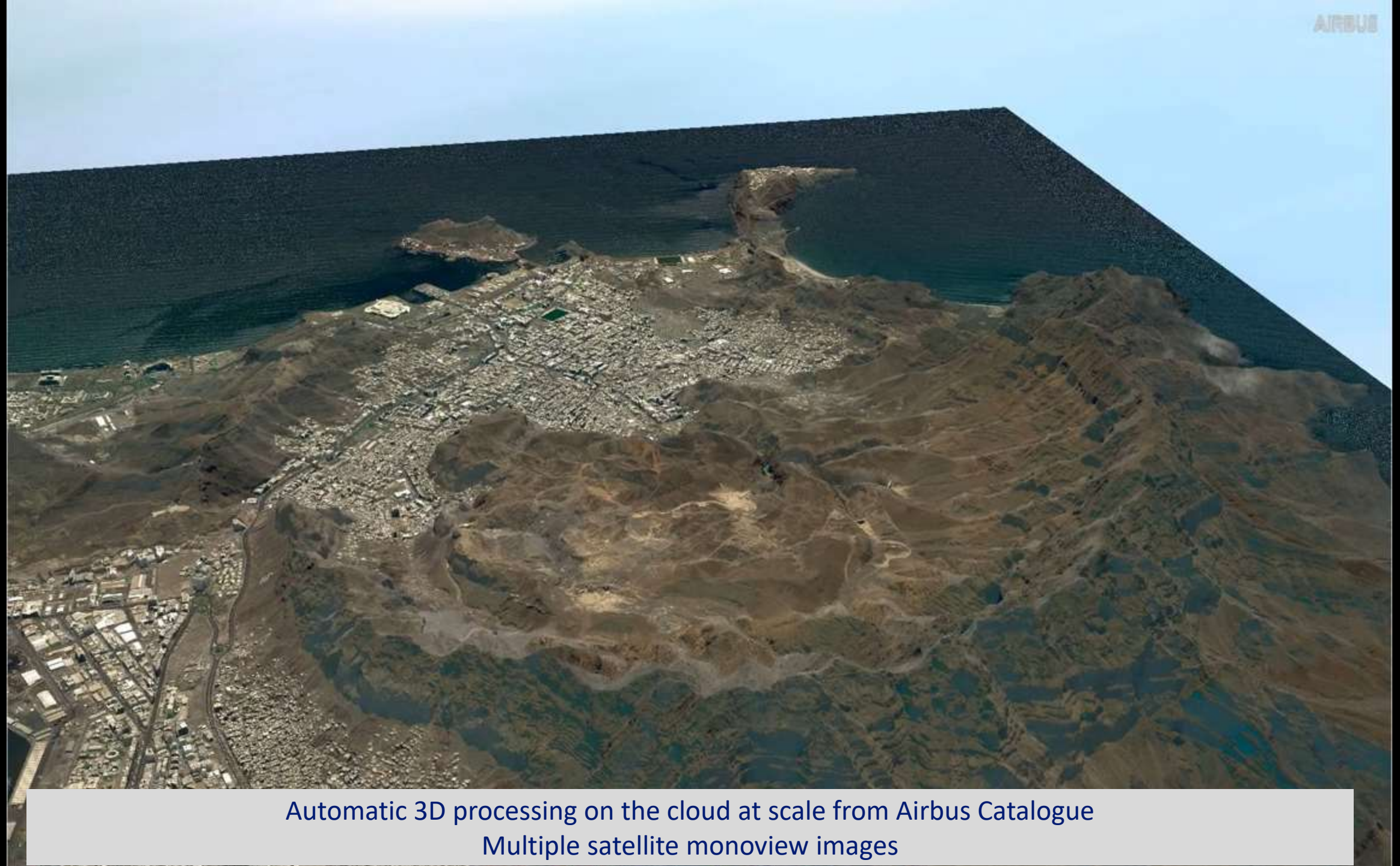
**City / area of interest**





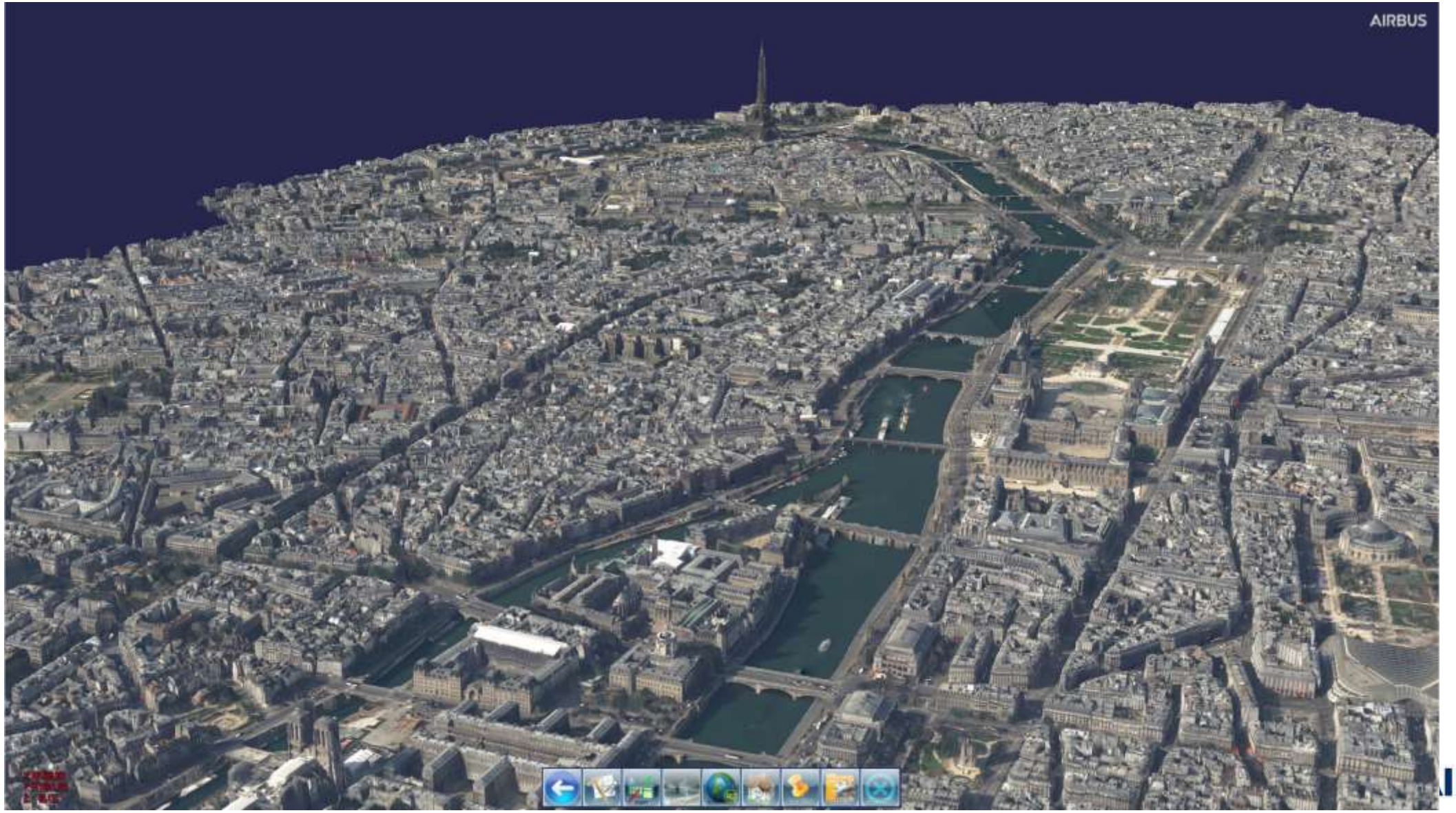


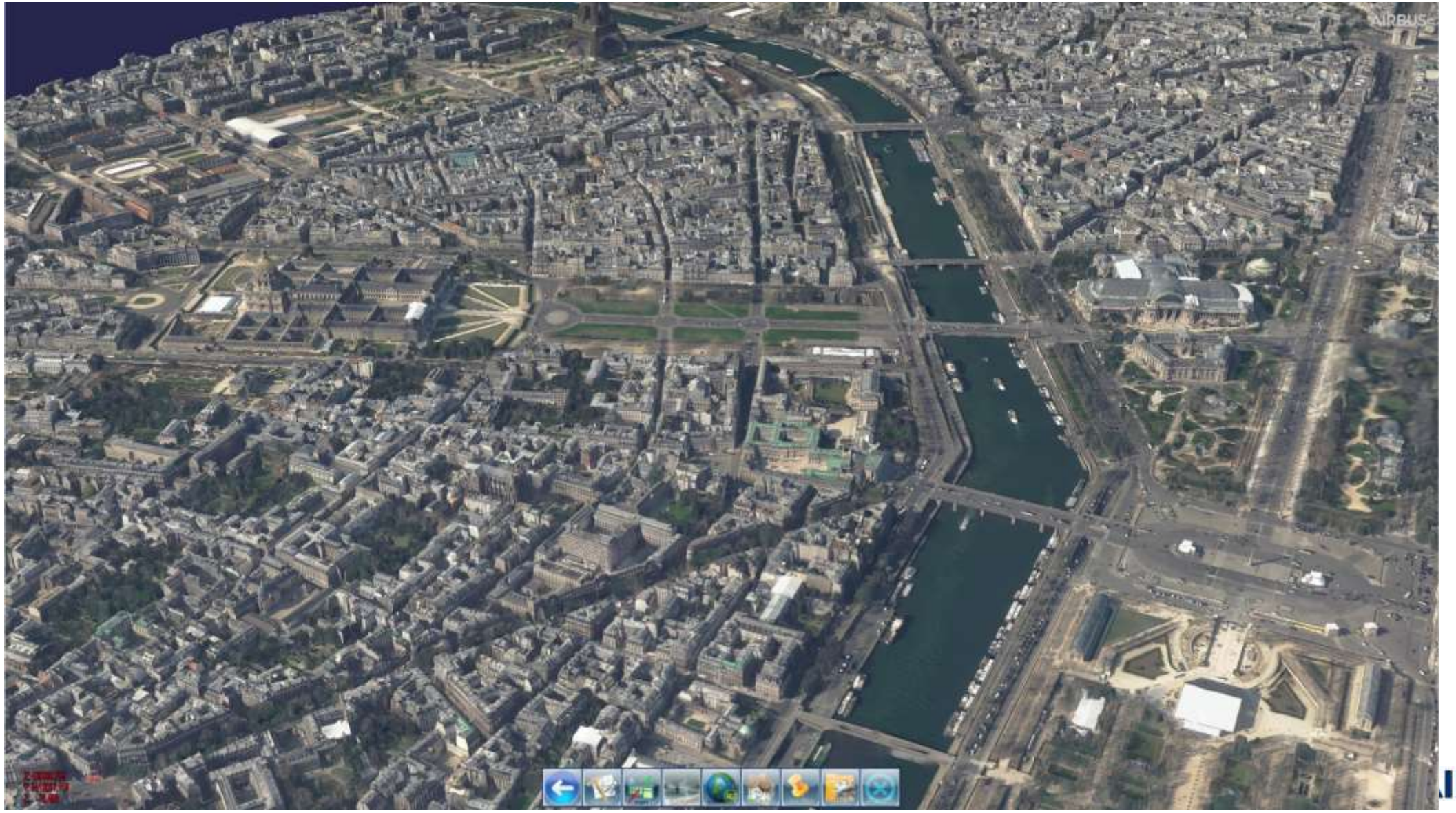



Automatic 3D processing on the cloud at scale from Airbus Catalogue
Multiple satellite monoview images

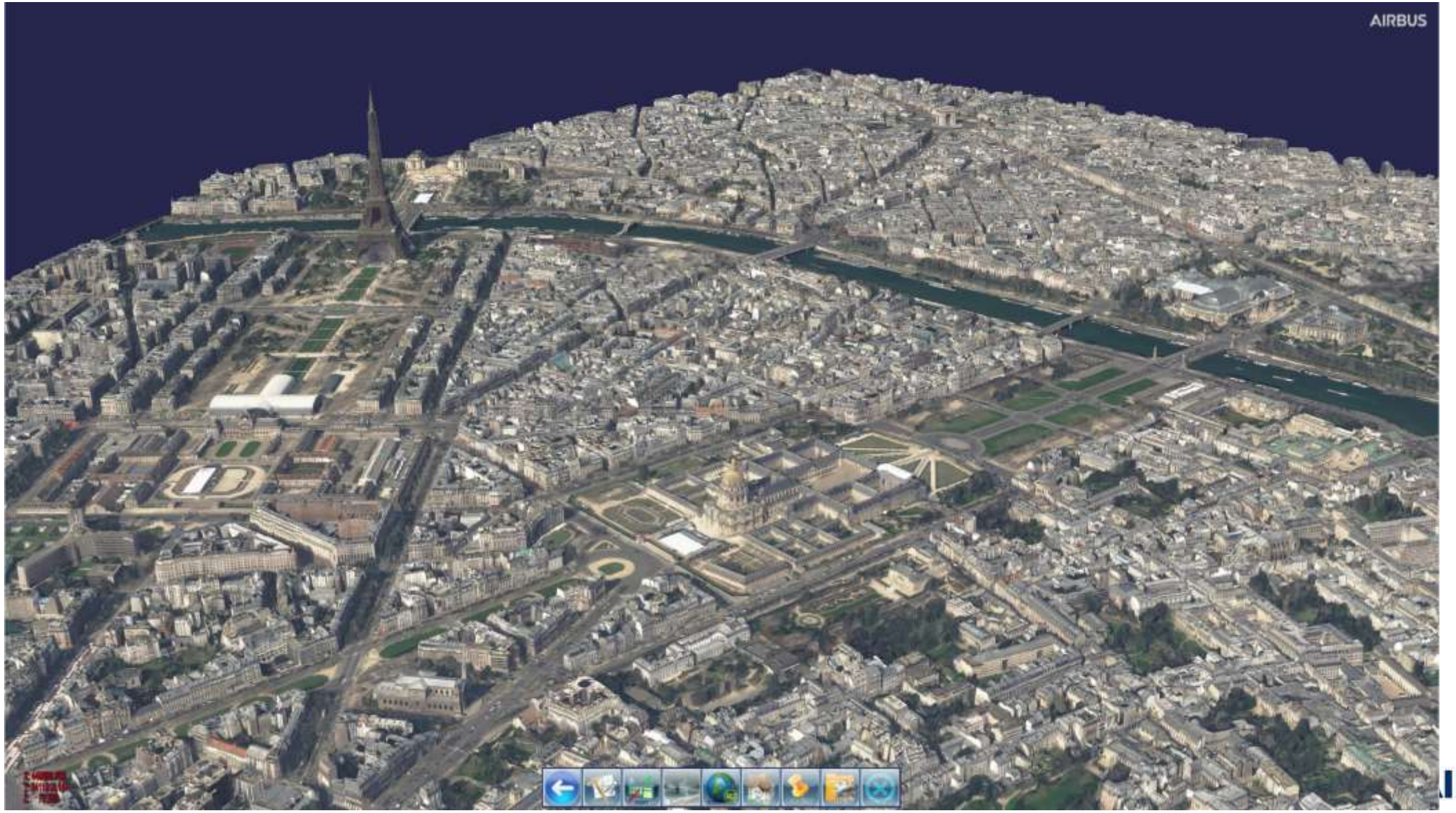
# Paris 3D textured Product with PNEO tristereo



# Paris 3D textured Product with PNEO tristereo



# Paris 3D textured Product with PNEO tristereo



# 3D Digital Twin of the Earth from Satellite Imagery

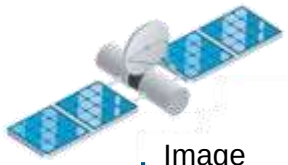
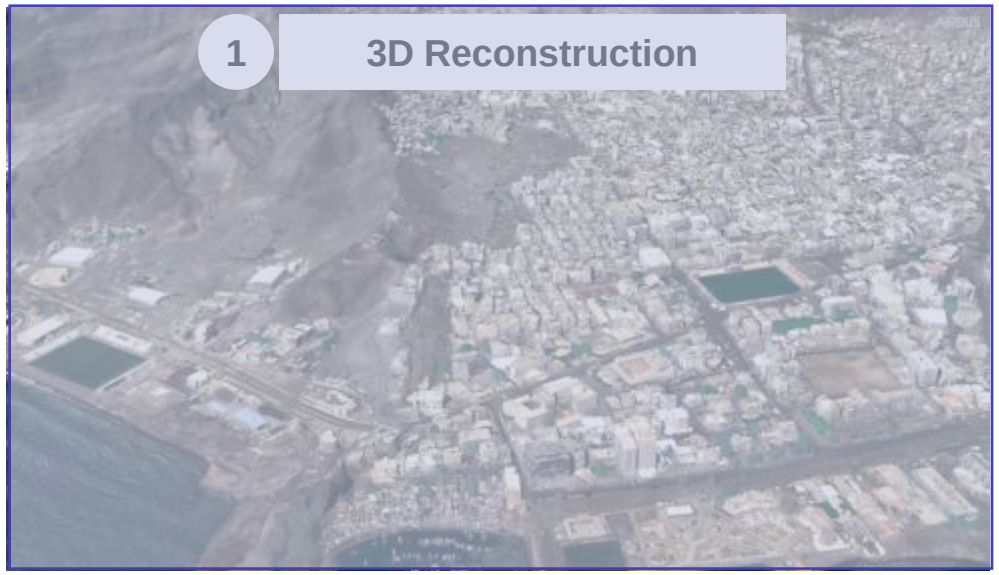
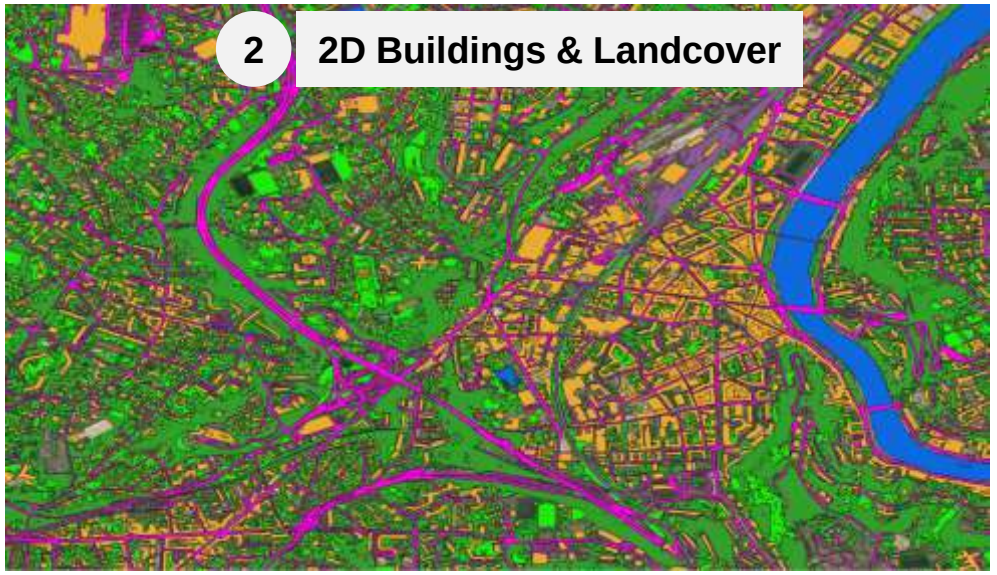
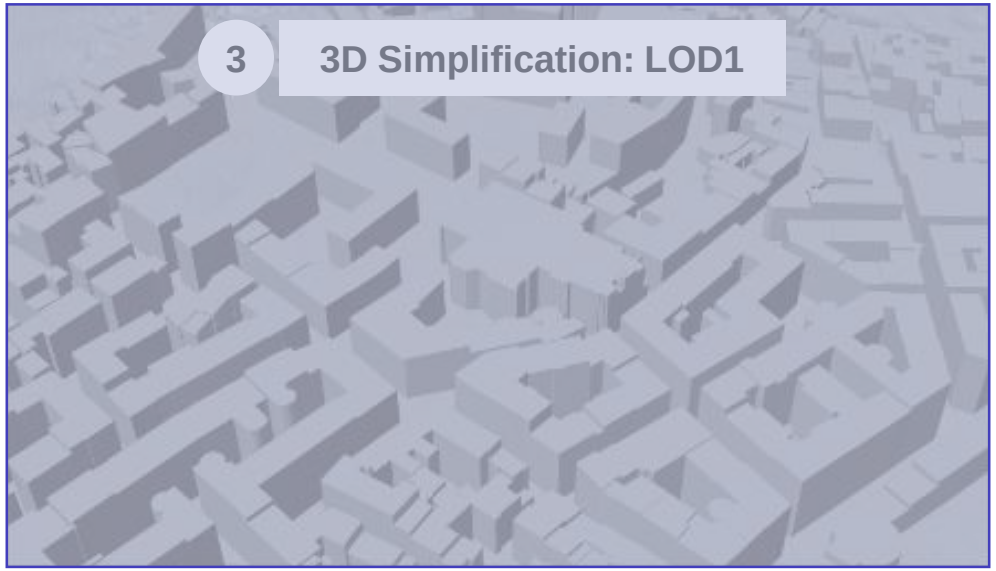


Image acquisition

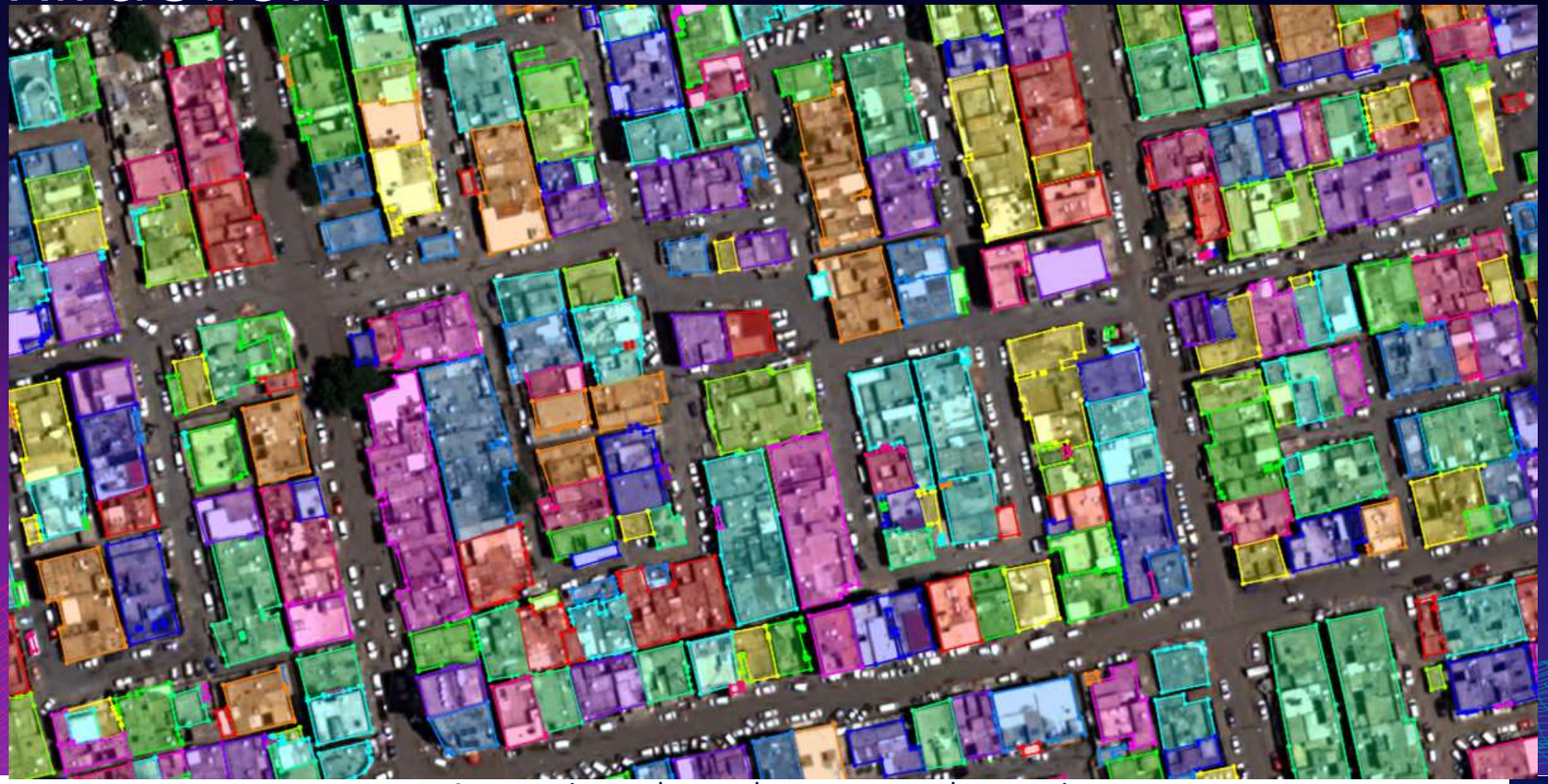
**City / area of interest**




# Automatic AI Based building foot print extraction



Automatic result on aden, no manual correction

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# Automatic AI Based building foot print extraction

Automatic result on Ndjamena, no manual correction

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# Automatic AI Based building foot print extraction

Automatic result on Copenhague, no manual correction

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# Automatic AI Based Landcover extraction

Example on New York, no manual correction

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# Automatic AI Based Landcover extraction

Example on down town, no manual correction

# 3D Digital Twin of the Earth from Satellite Imagery

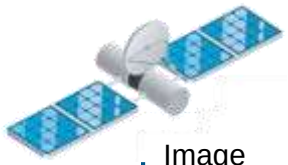
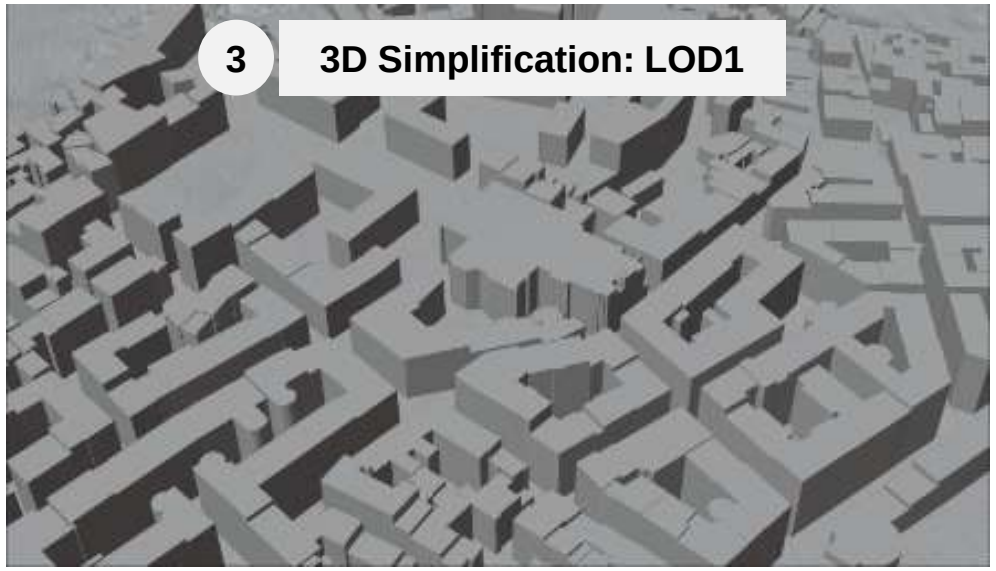


Image acquisition

**City / area of interest**






# LOD1 Automatic Products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# MeshBlock Automatic Products

# 3D Digital Twin of the Earth from Satellite Imagery

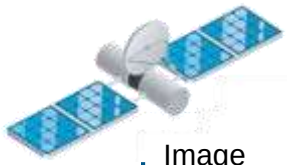
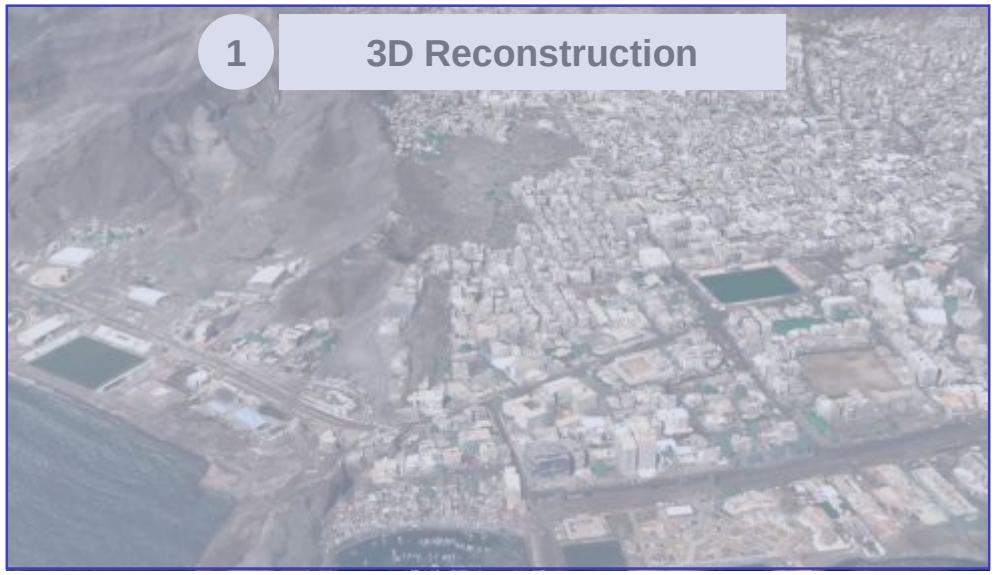
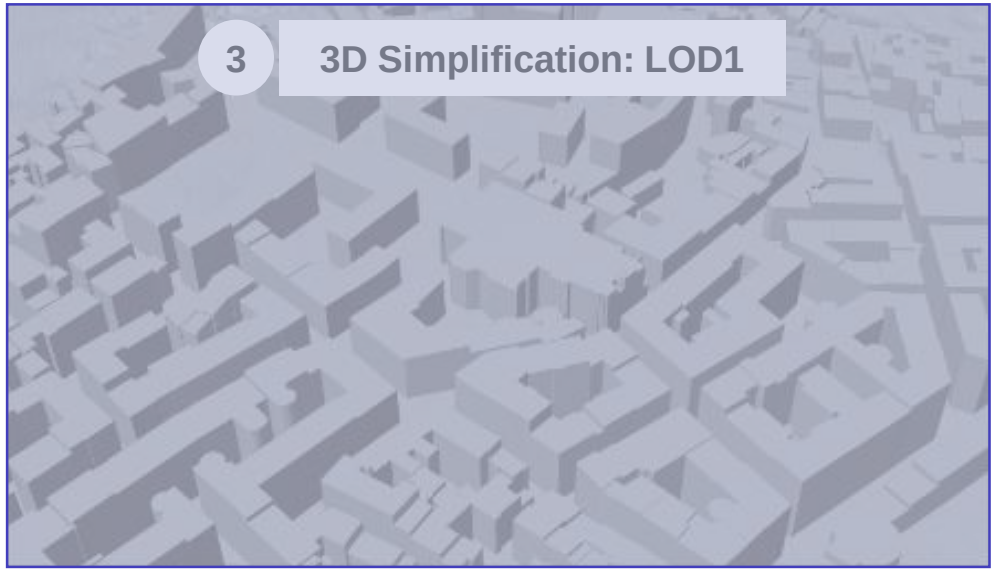


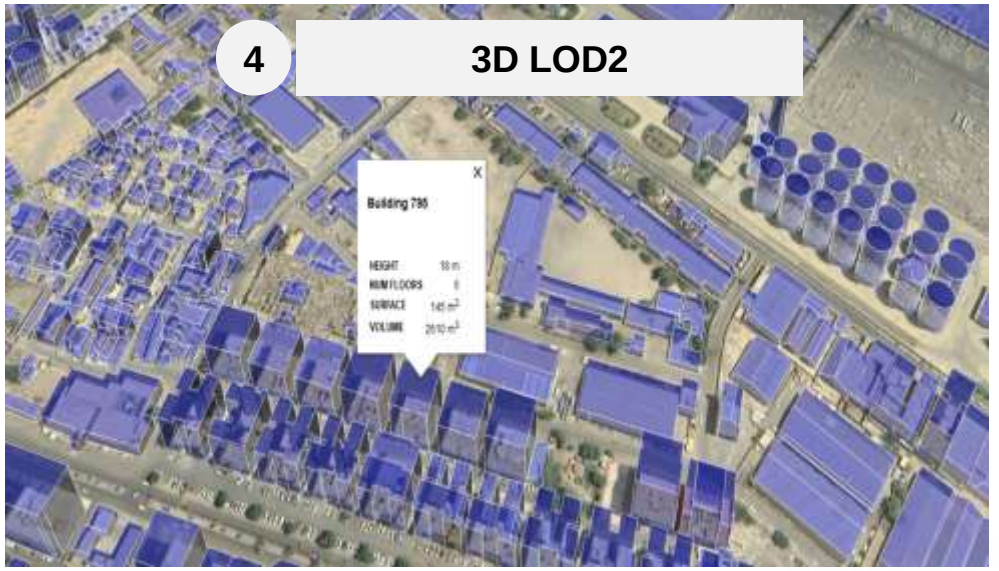
Image acquisition

**City / area of interest**







# LOD2 Representation from Airbus Satellite Ima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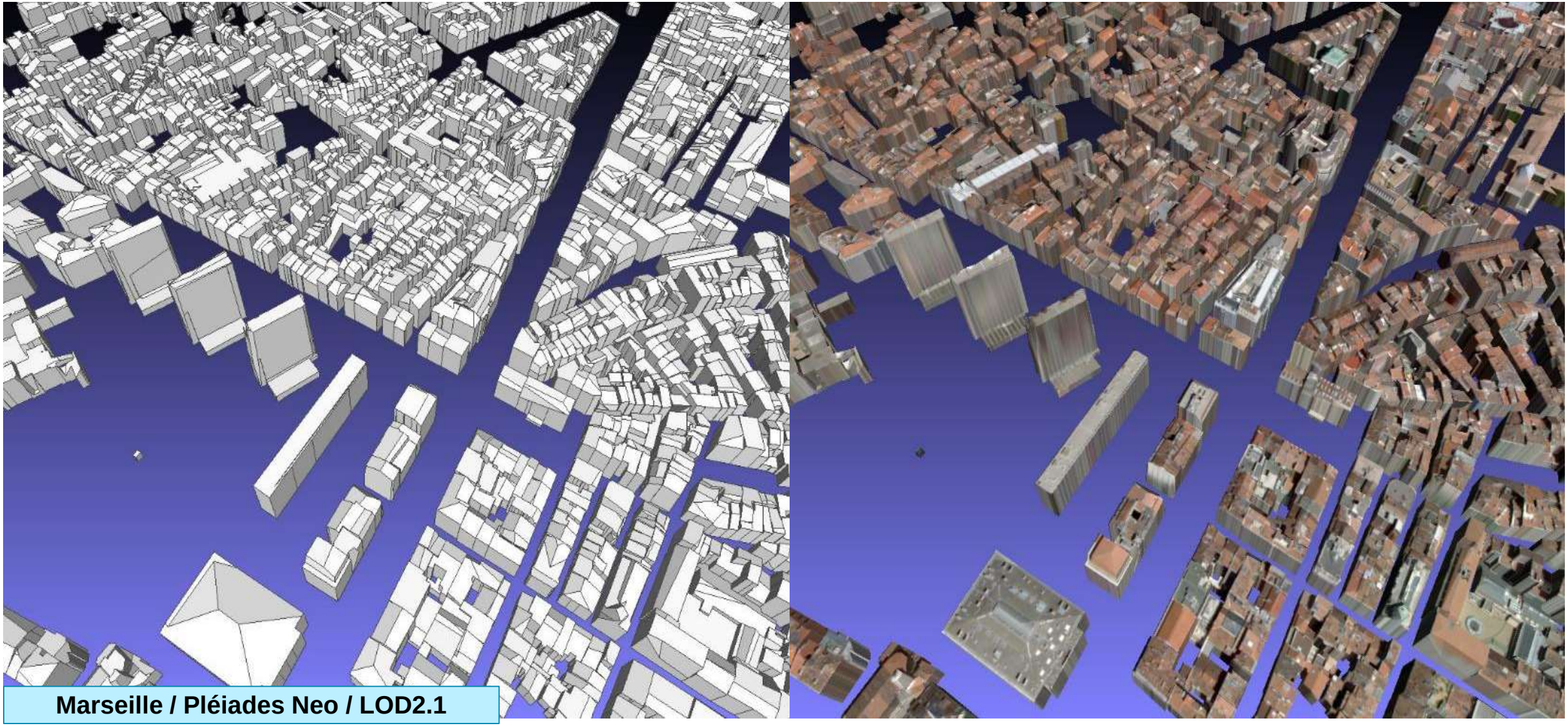
# 3D Digital Twin of the Earth from Satellite Imagery

## 3D CAD compiled and ready for simulation



Marseille / Pléiades Neo / LOD2.1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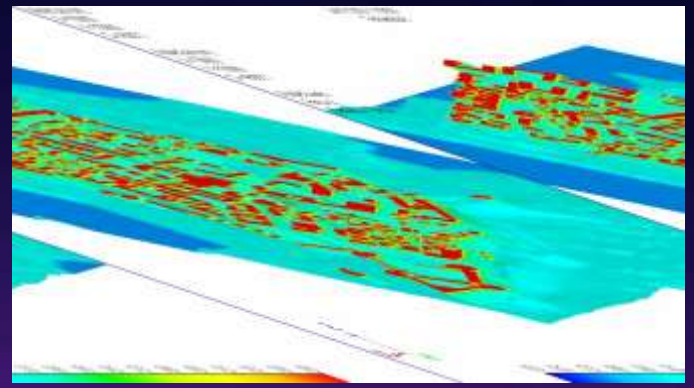
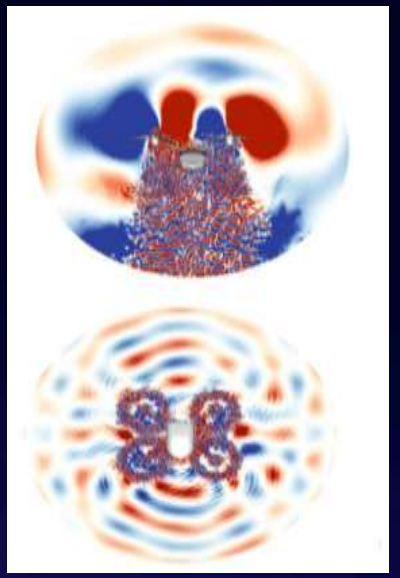
# Already operational simulations:

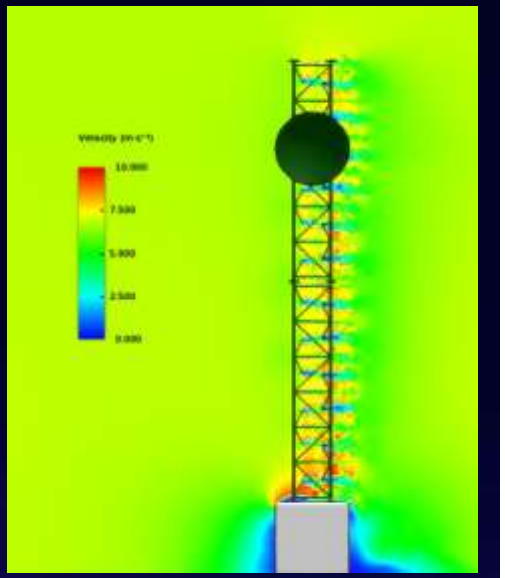


Heat sinks detection

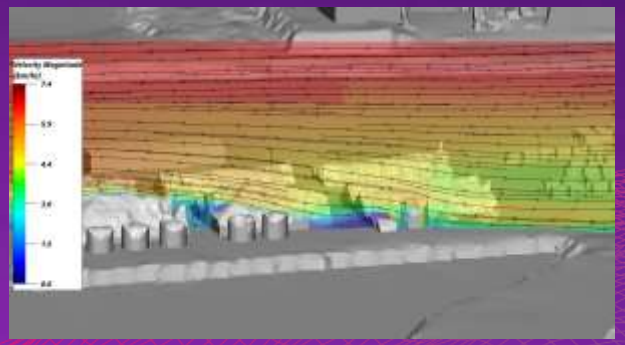
Simulation of agents dispersion



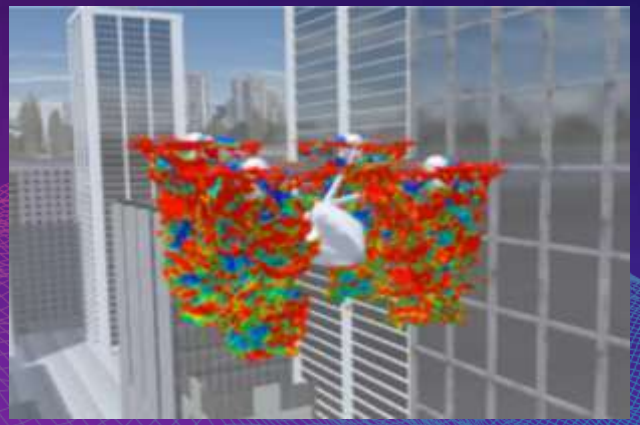
Drones AAC analysis



Antennas resistance to extreme load conditions



Pollutant sensors positioning



City effect on drones performances

Community noise simulations

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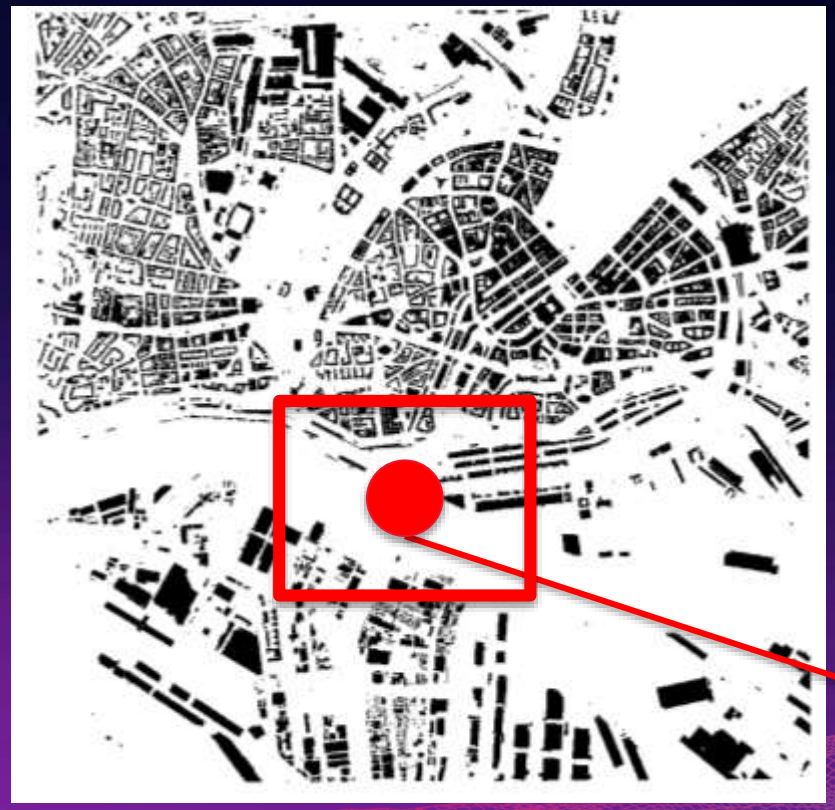
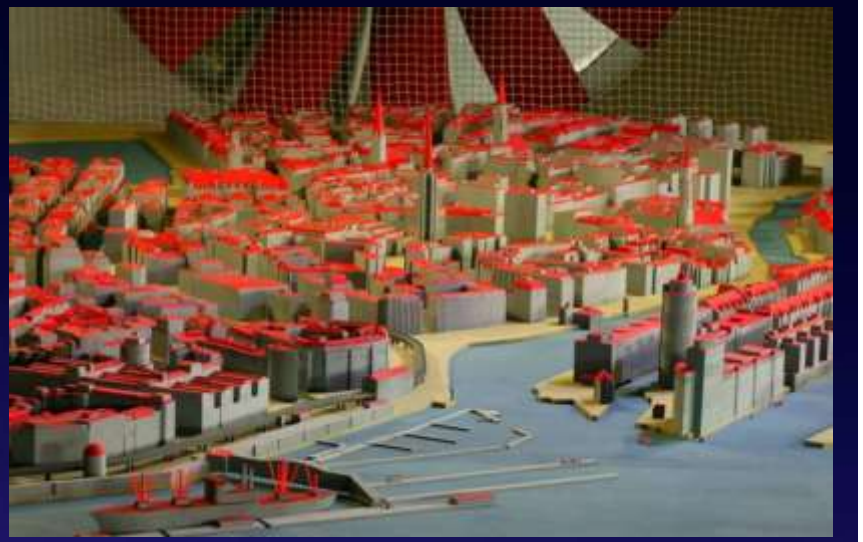
# HAMBURG : Correlation Case - Continuous and Puff



Twin for digital simulation



Wind tunnel Mock-up simulation

- COST ES1006 experiment replication
- Domain size: 4000m * 4000m
- Simulation time : 75 minutes (continuous case)

**Gas source :**

- Punctual source (1m diameter cylinder)
- **Continuous case: Q = 0.5 kg/sec (60min)**
- **Puff case: 51 kg in 31 seconds**
- Gas: SF6; $C_d$=1.5$^{e}$-05 m$^2$/sec

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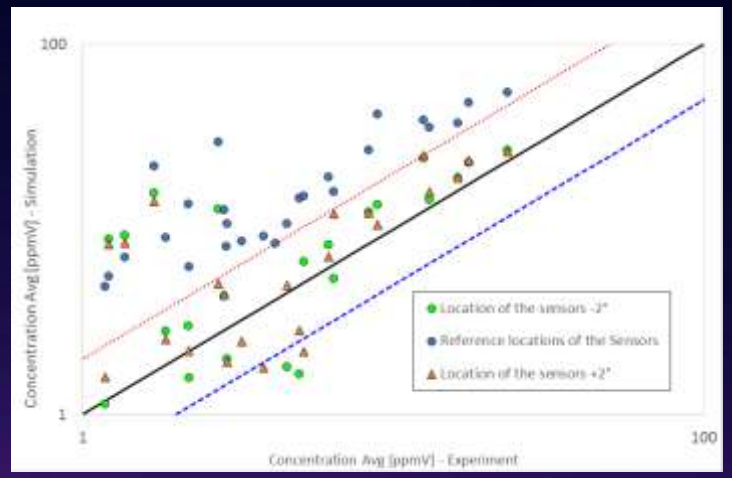
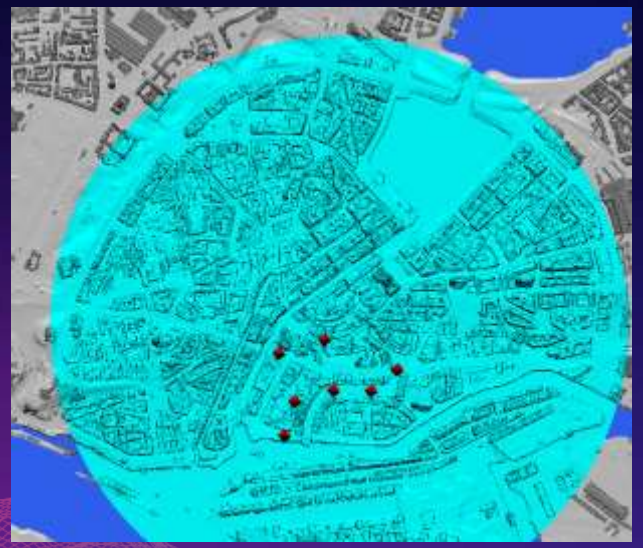
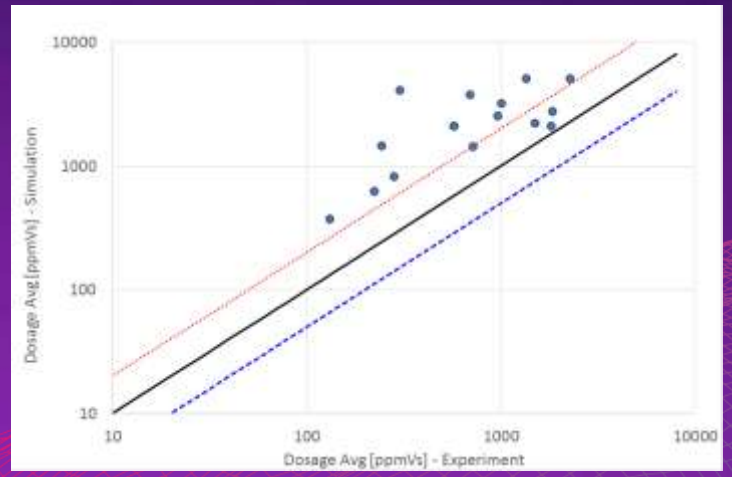
# HAMBURG : Correlation level



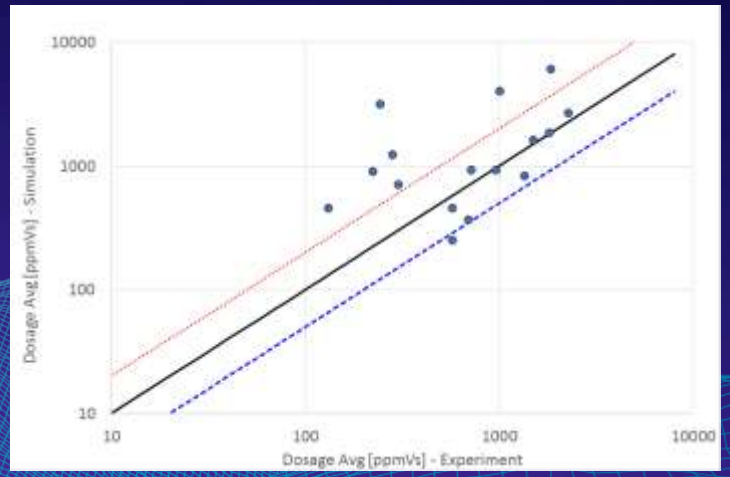

Experiment / CFD Correlation – Continuous case






Experiment / CFD Correlation – Puff case

Setup refinement




Updated Correlation – Puff case

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- **An operational application of the 3D digital twin Earth has been introduced ➔ from satellite to quantitative simulation**

- **This approach can be applied to multiple domains of human activities. It supports decision making by assessing via simulation multiple strategies.**

- **Let’s keep exploring the market by opening new type of simulations and keep improving the process to reinforce our offer.**


Thanks for watching
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