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WPS205

Advancing the future of space in the cloud

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Aerospace and Satellite Solutions
AWS

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EVP and CTO
Maxar Technologies

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Advancing the future of space in the cloud

Introducing aerospace and satellite (A&S) solutions

How Maxar is applying the cloud in space



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AWS Aerospace and Satellite Solutions

AWS A&S solutions provide secure, flexible, scalable, and cost-efficient cloud solutions to help commercial and government customers build satellites, conduct space and launch operations, and reimagine space exploration

Key benefits:

- Most experience – Building enterprise systems on the cloud since 2006
- Most functionality – More than 175 services to fully support space workloads
- Industry-leading artificial intelligence and machine learning – Drive data to decisions faster
- AWS Ground Station as a service – Get your space data faster
- Largest community of partners – Thousands of system integrators and independent software vendors

Customers want a service experience



Security

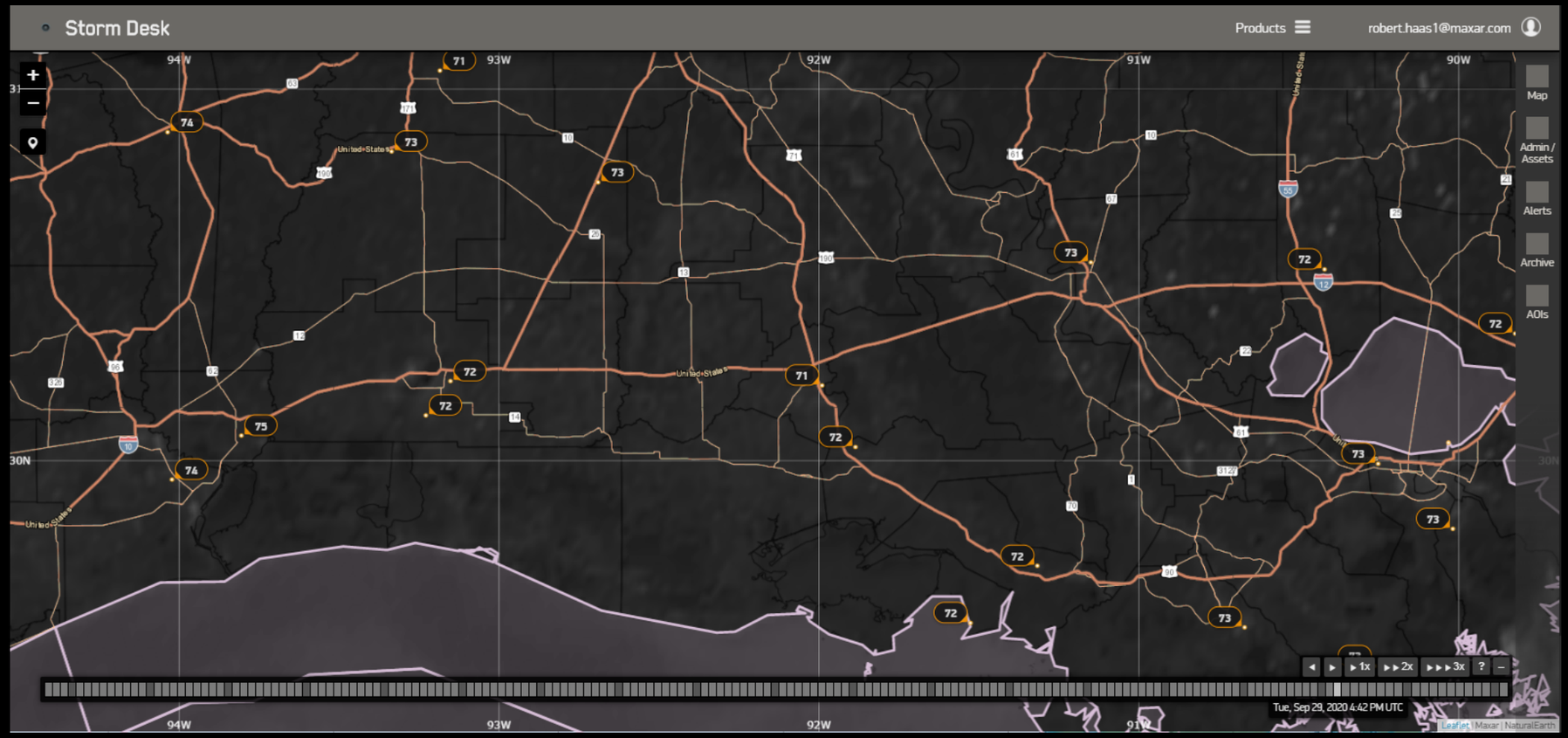
Scalable,
by the minute

Immediate
fulfillment

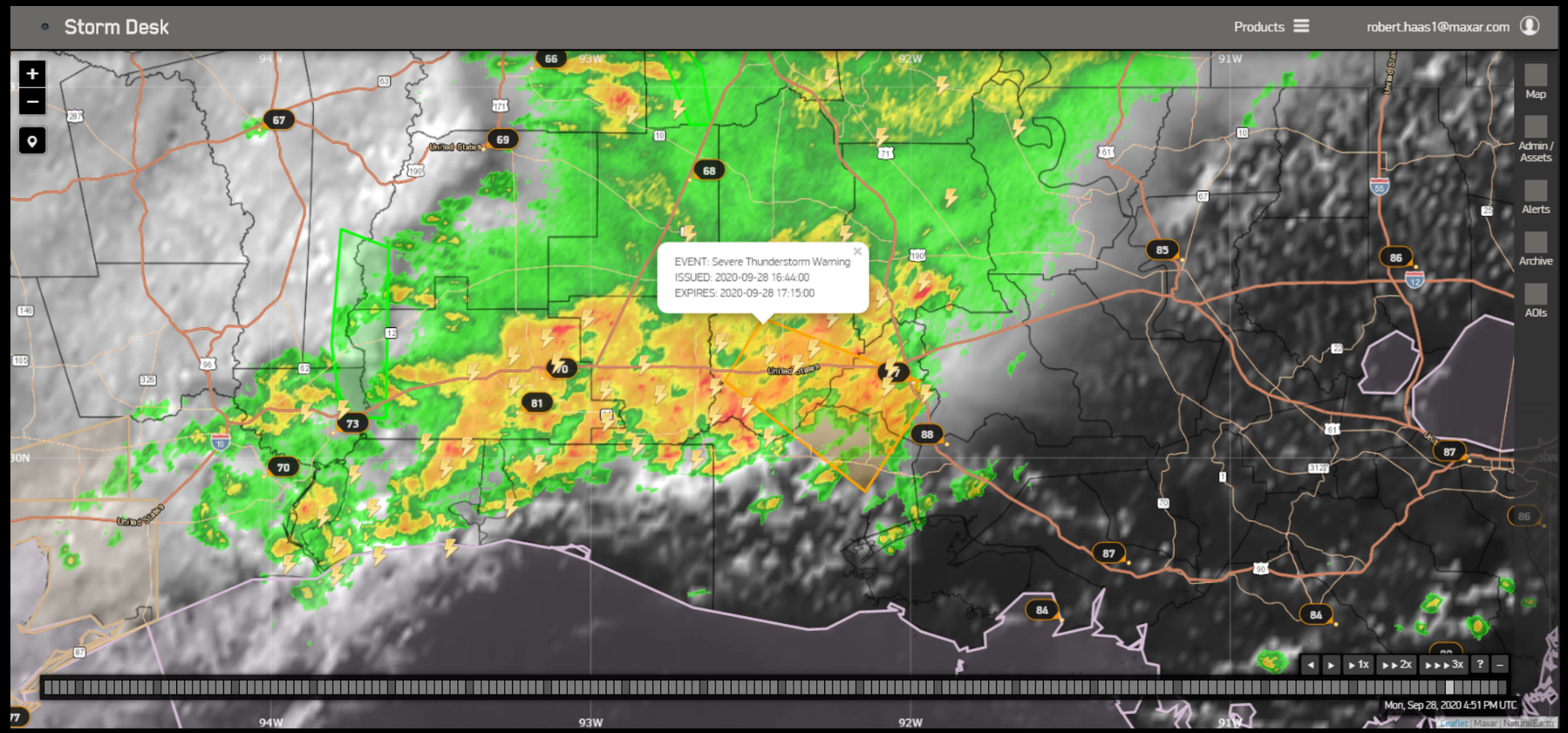
Anywhere,
real time

Low latency

AWS enables the space service experience



AWS enables the space service experience



Applying the cloud in space

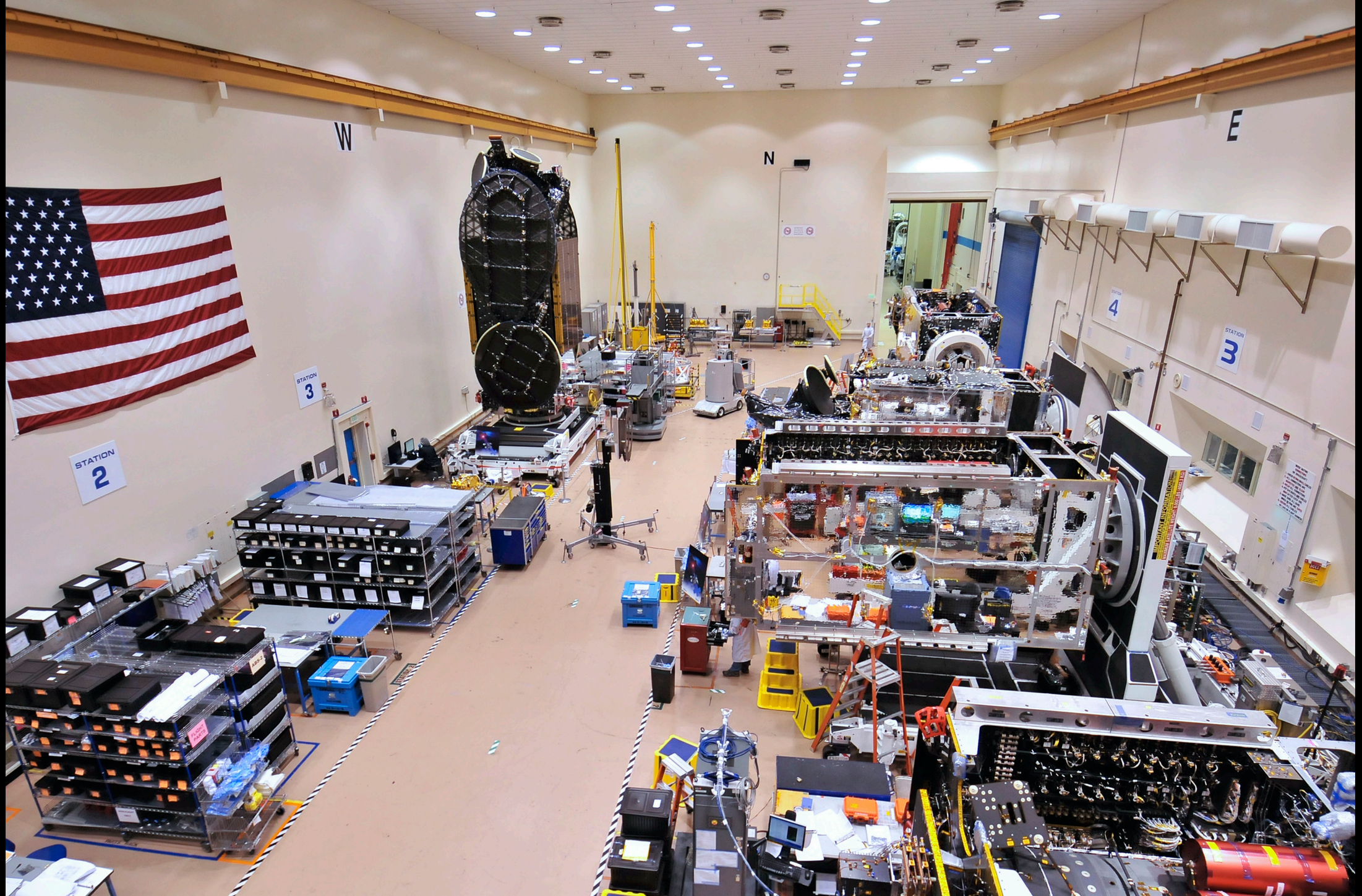


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MAXAR

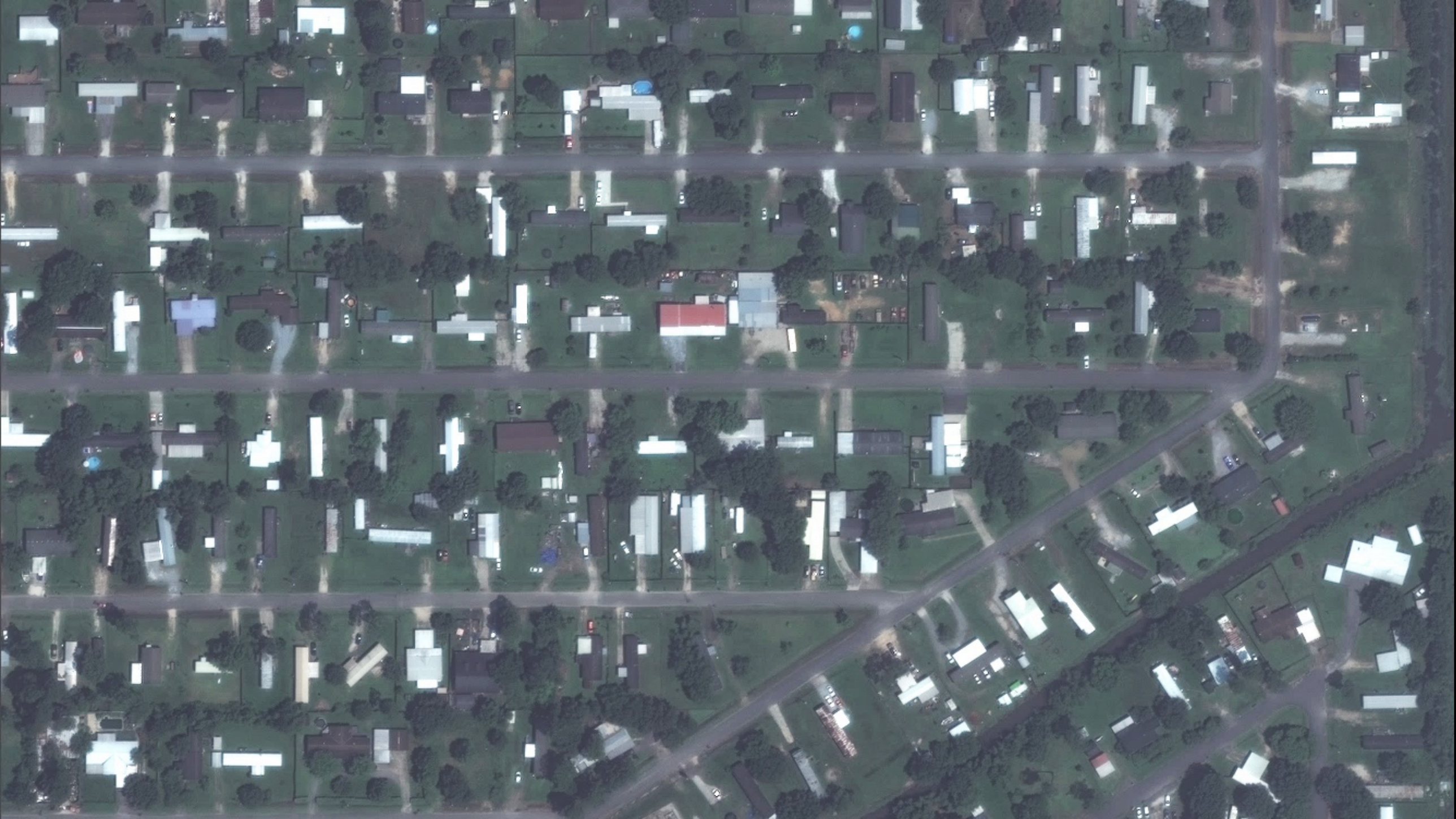


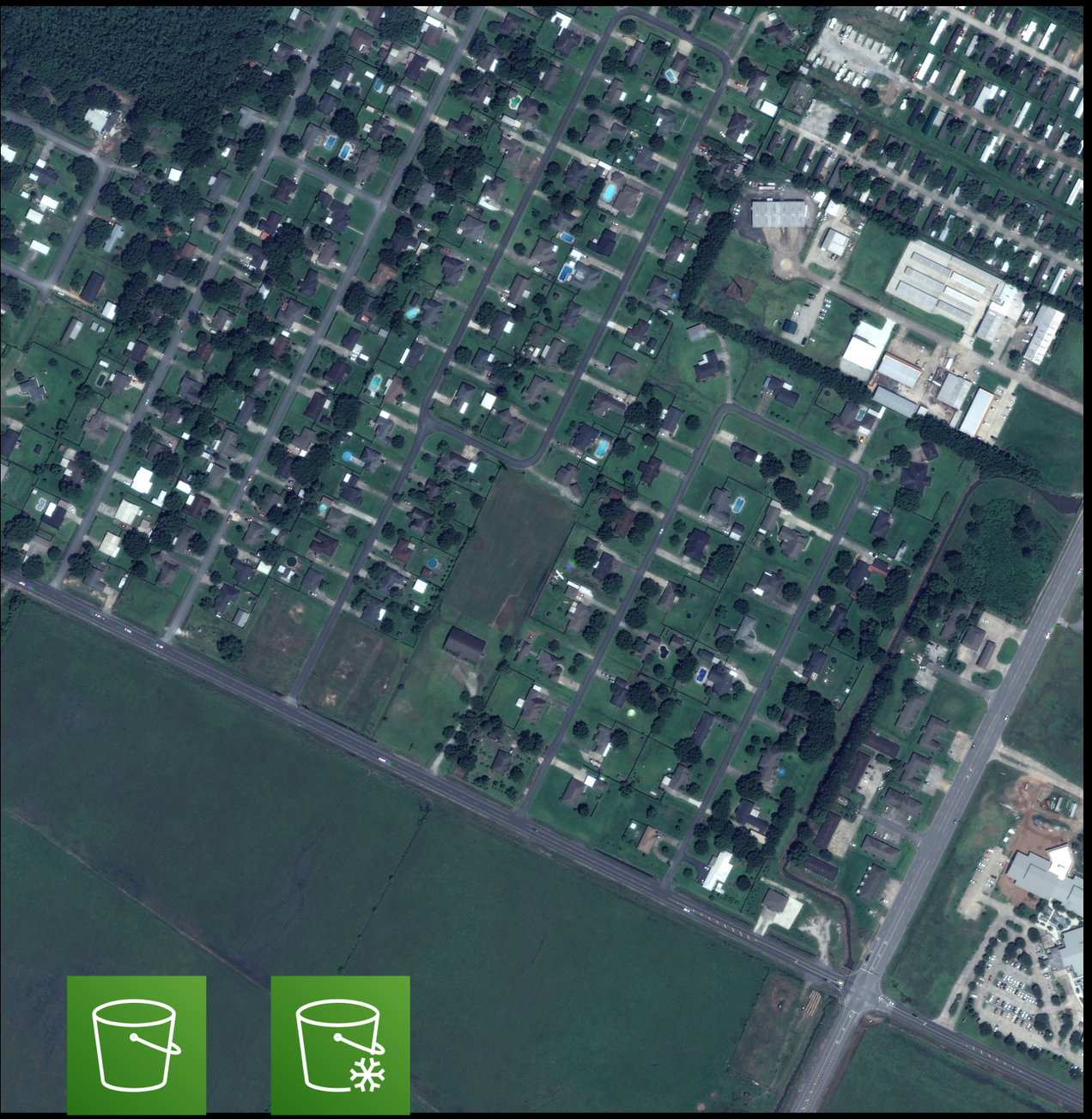

W
N
E
STATION 2
STATION 3
STATION 4
STATION 3

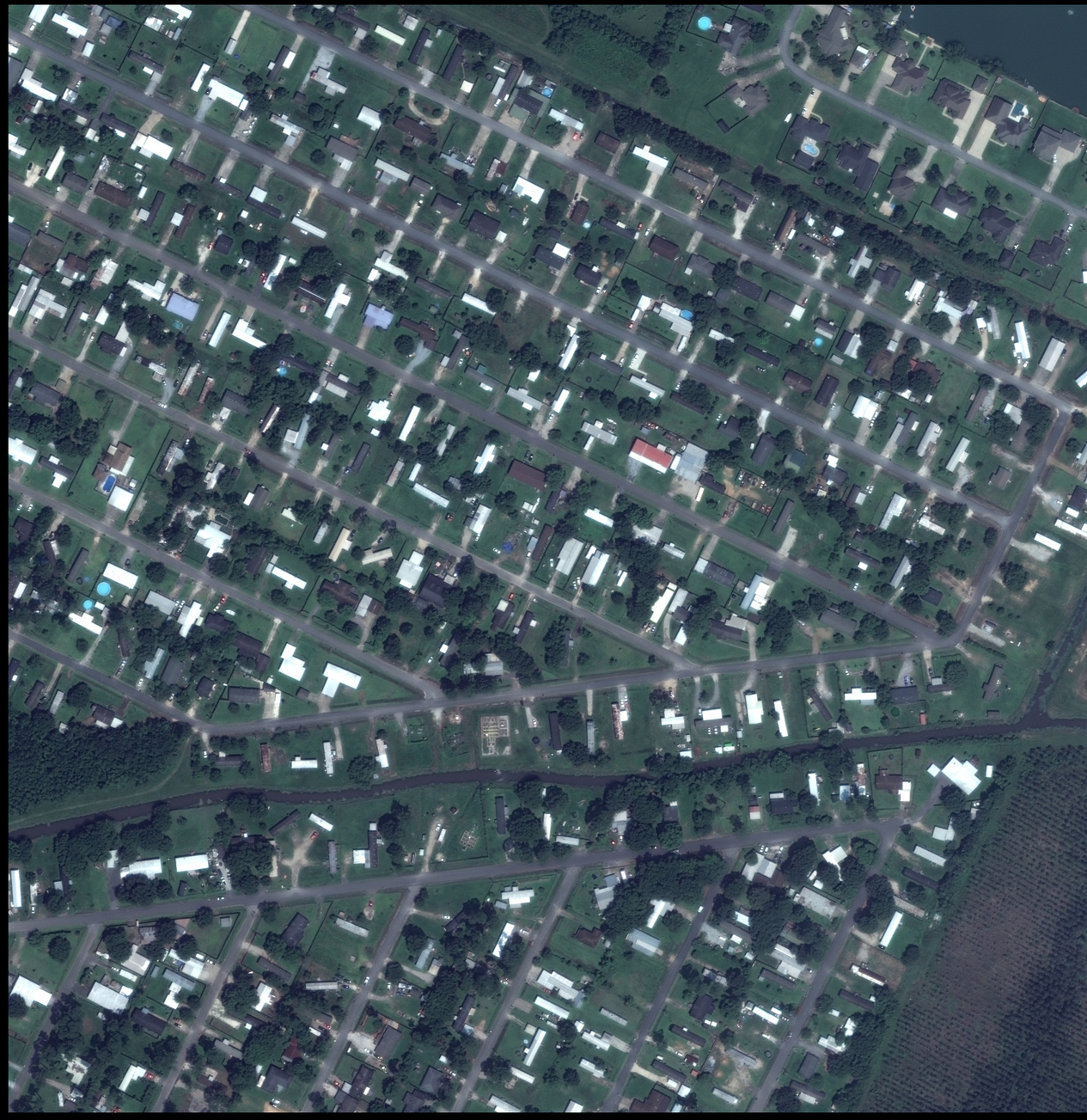
Destruction by Hurricane Laura



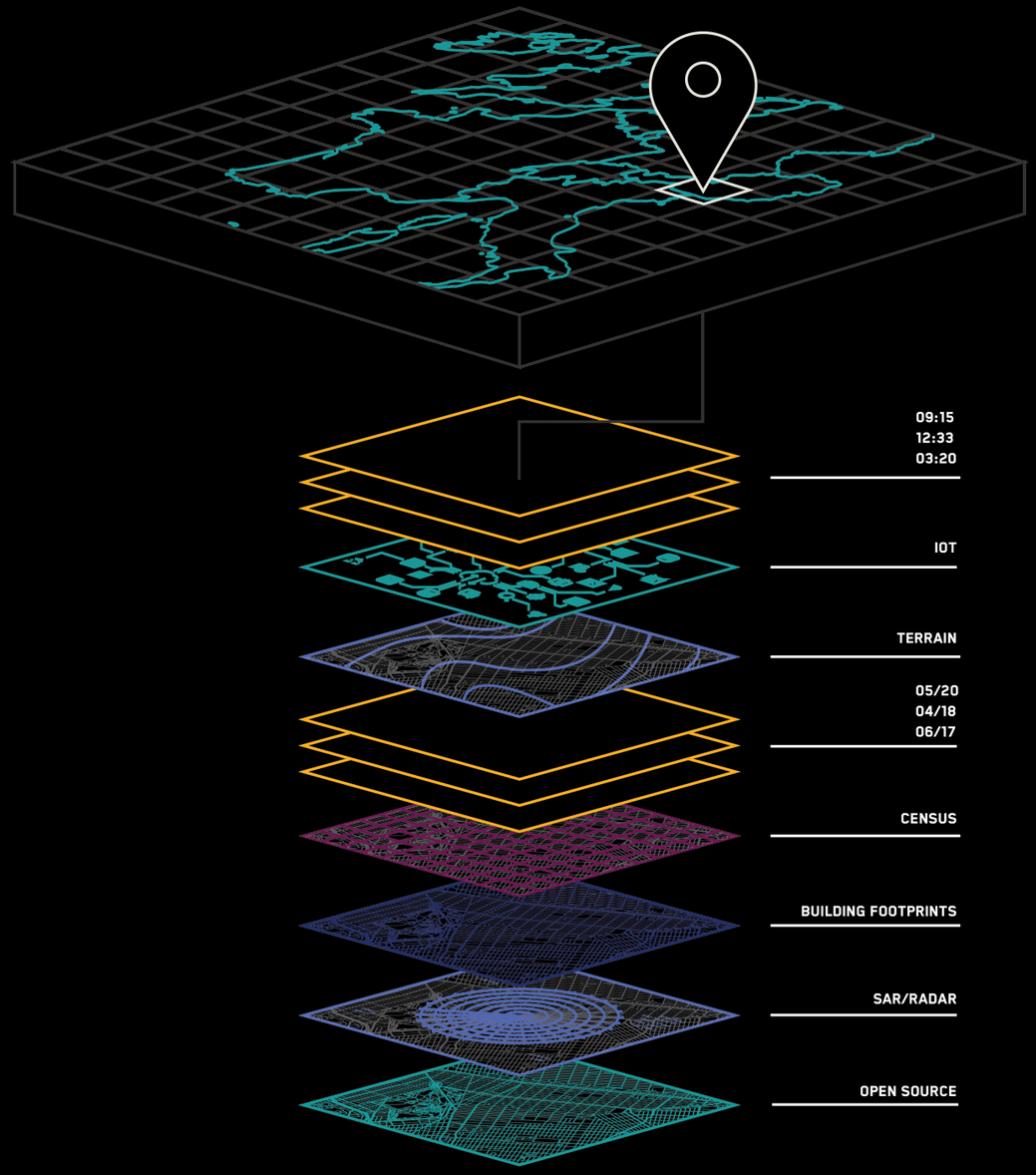




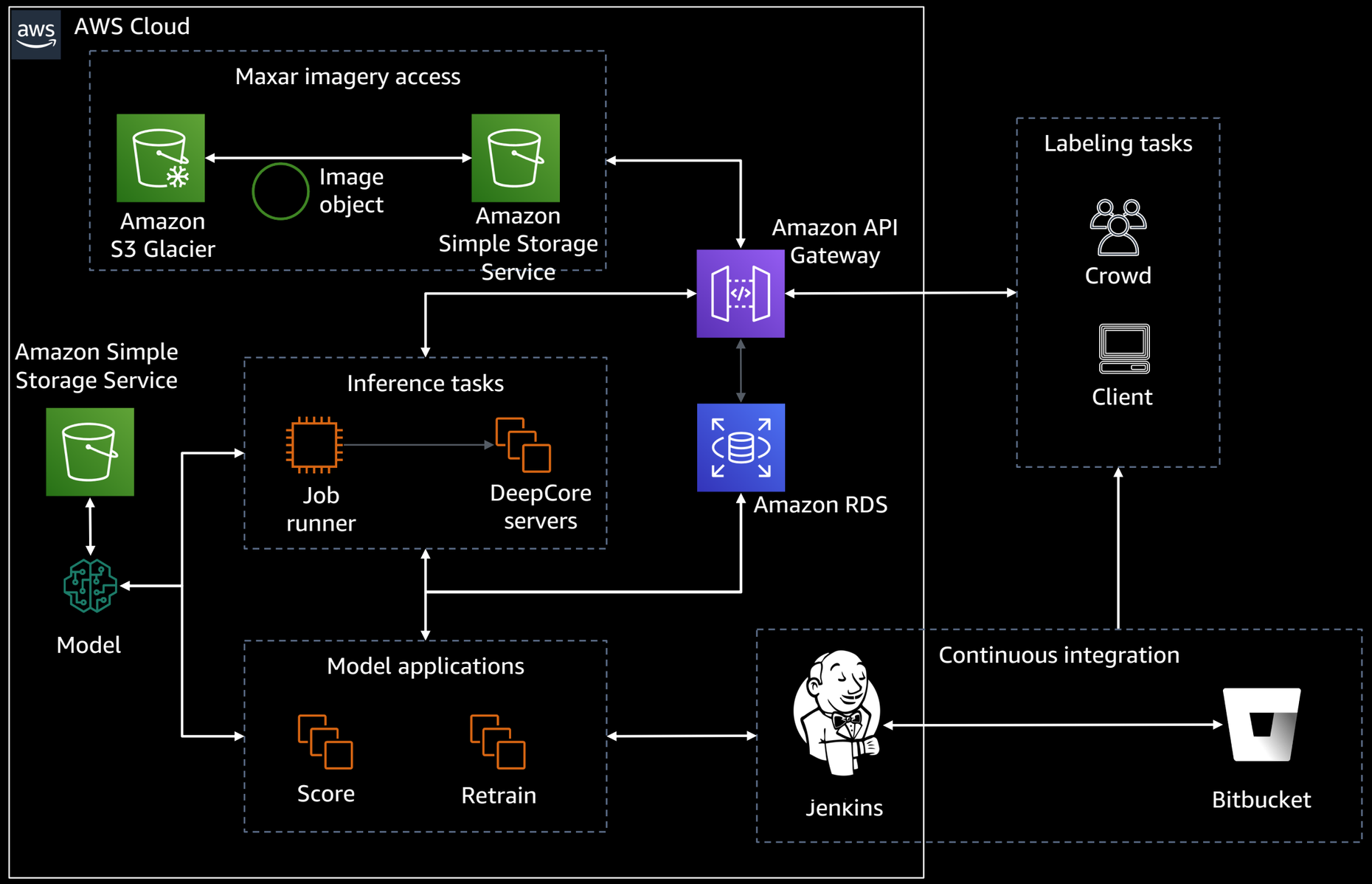


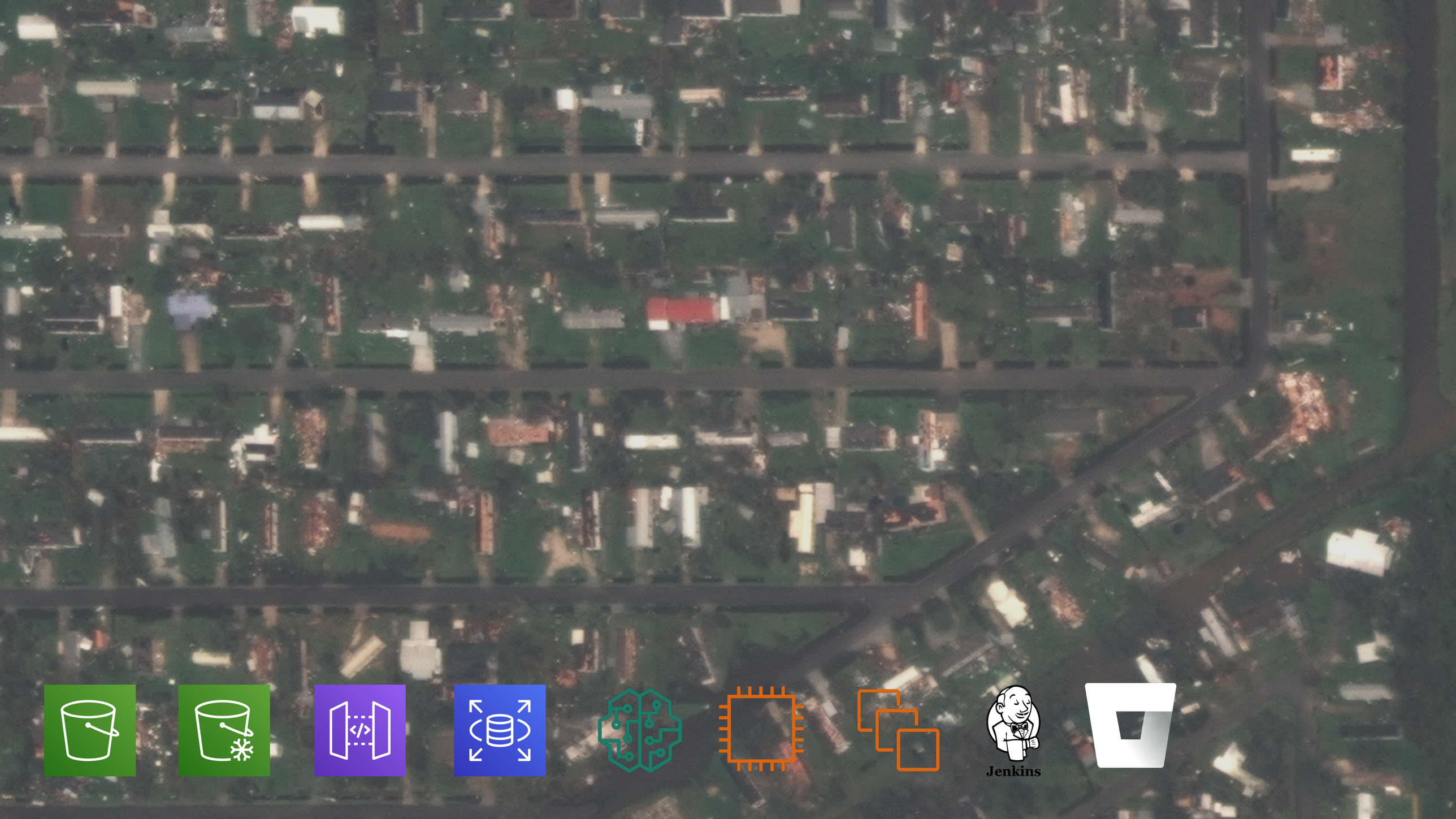


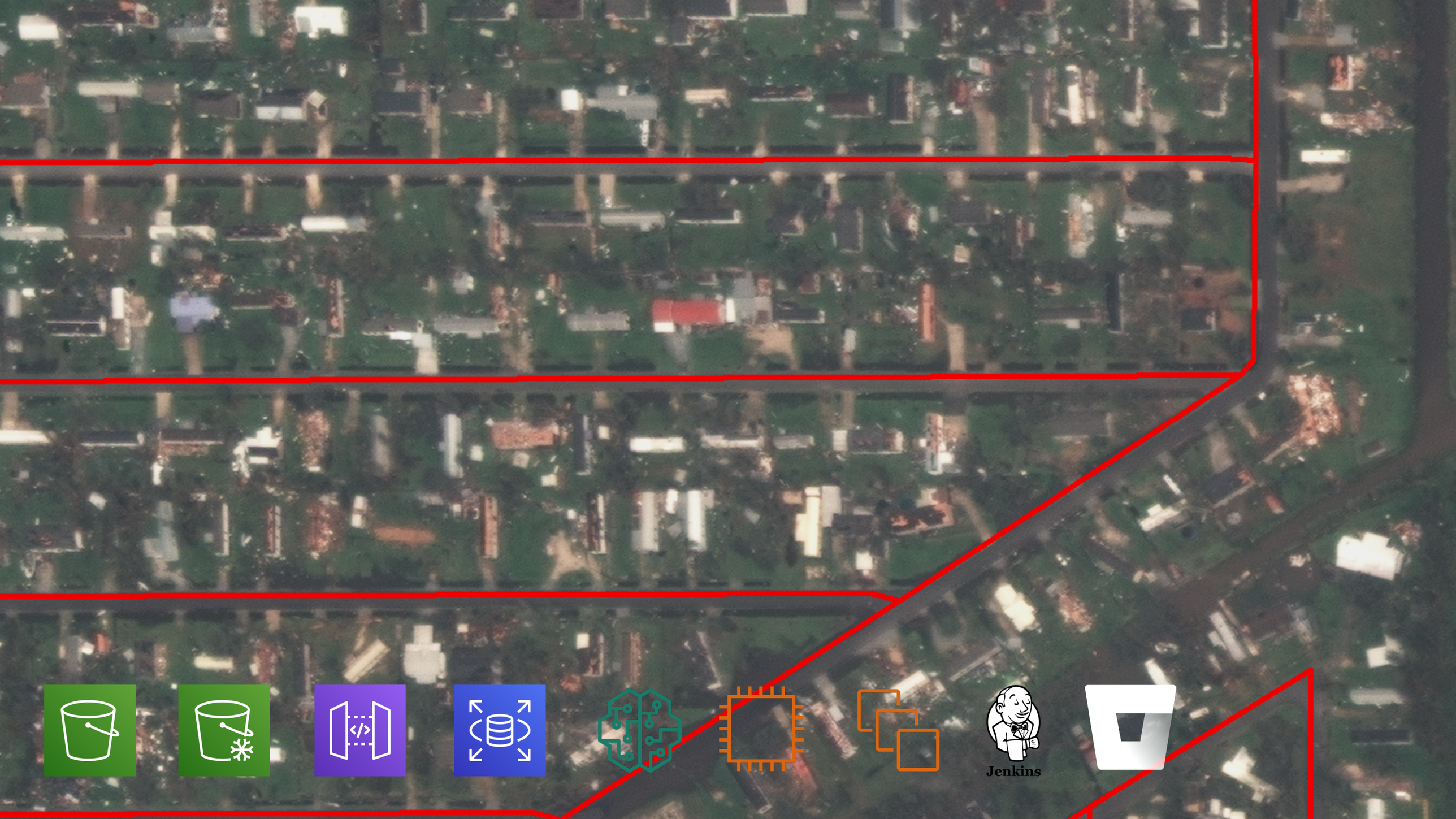
Georeference imagery to The Digital Globe



Maxar's DeepCore architecture




Jenkins

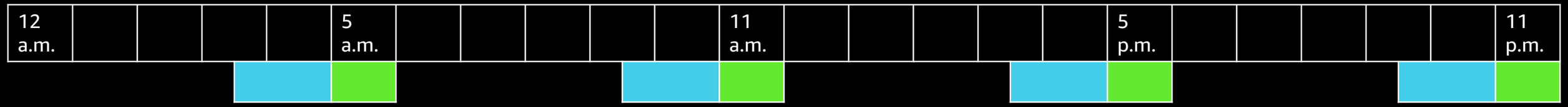

Jenkins


Jenkins



Image credit: NASA

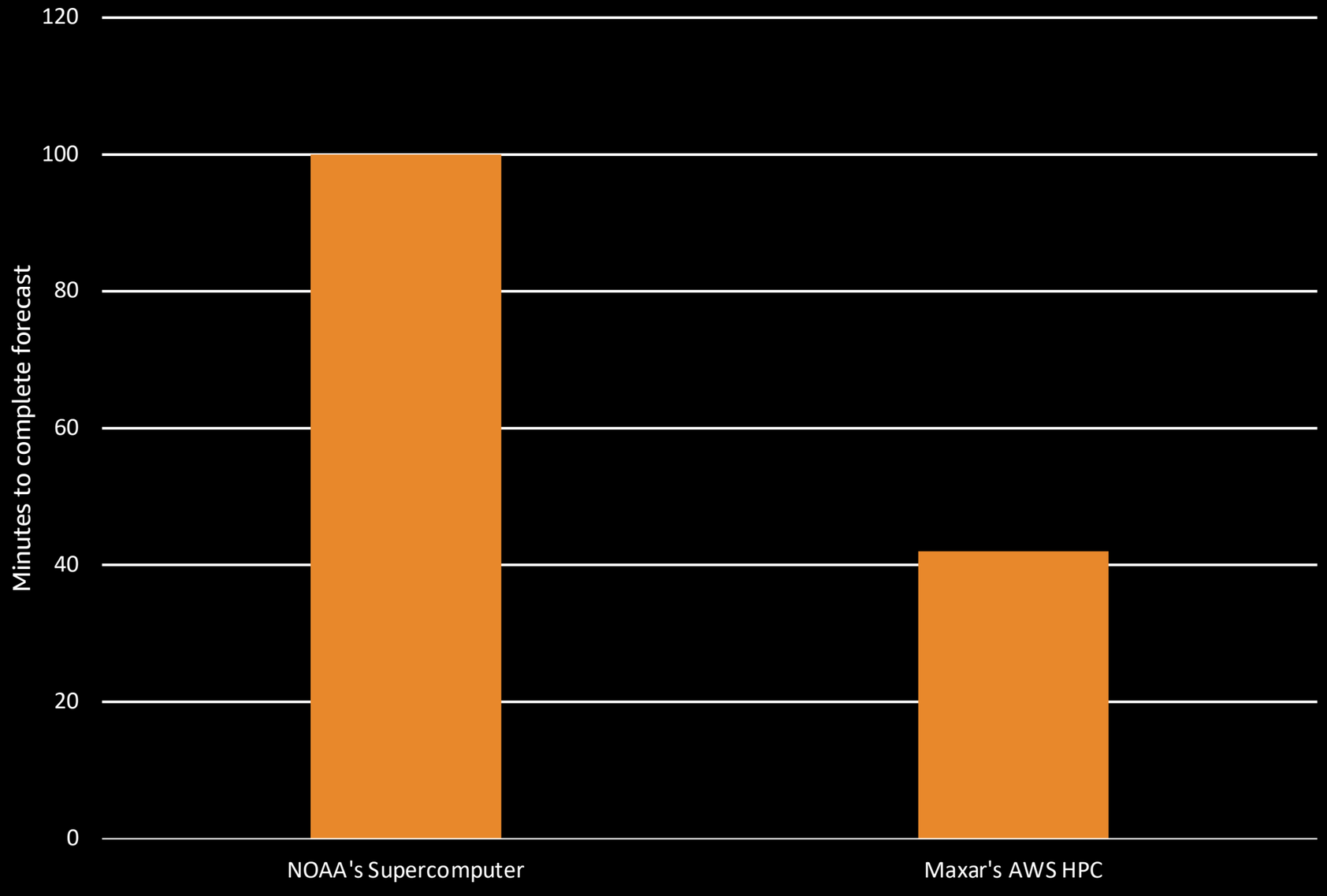
NOAA’s supercomputer generates forecast in 100 minutes

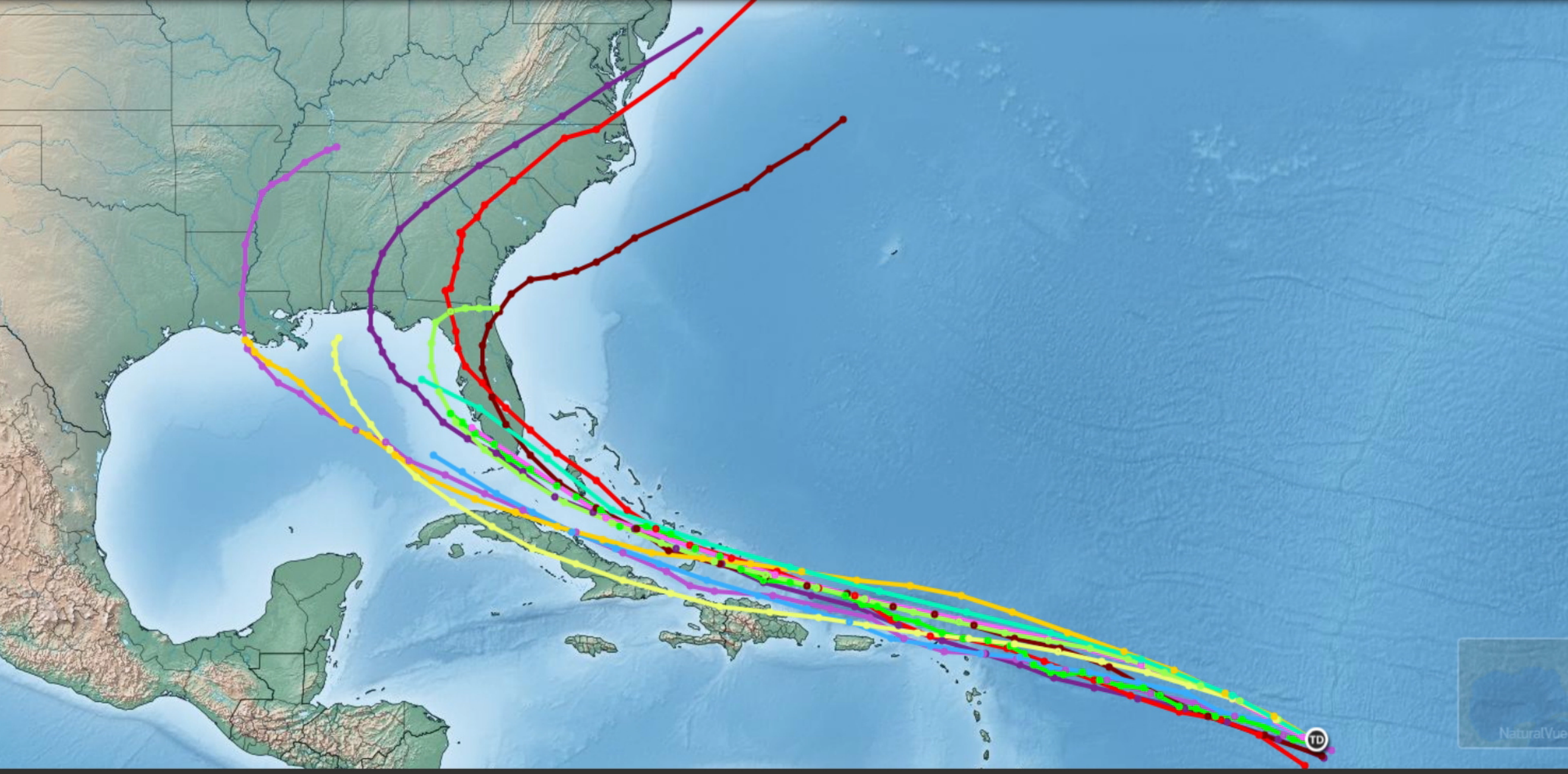


Publish the new forecast at the top of the hour

Time spent generating the new forecast

Maxar’s AWS high-performance computing (HPC) delivers forecast 58% faster

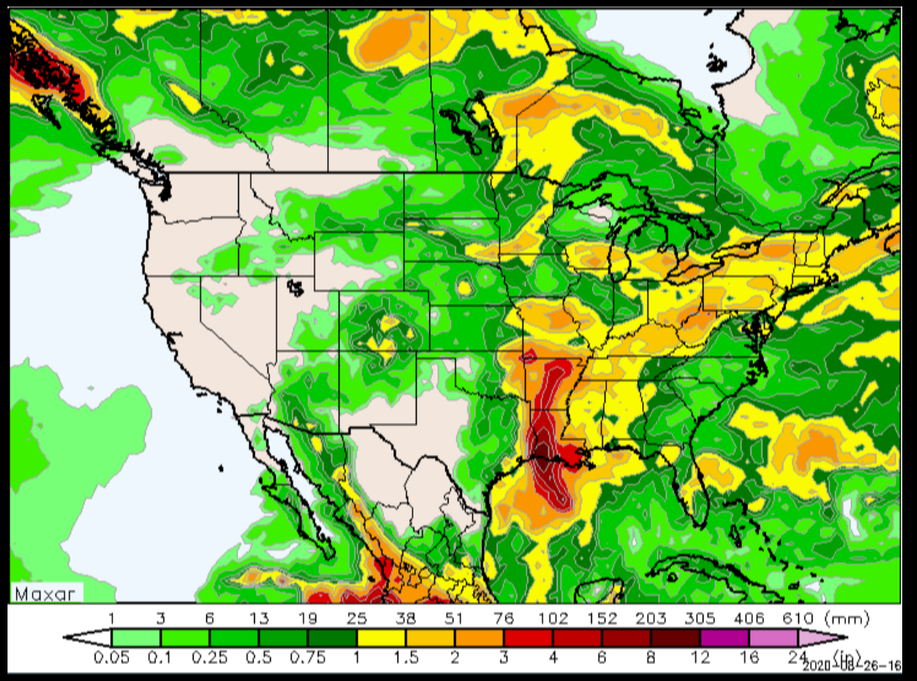




weather desk

MAXAR

Automated FV3GFS workflow within AWS



Trigger

Create cluster

Stack

Trigger

Download data

Data ready

Invocation

Process launch

Process complete

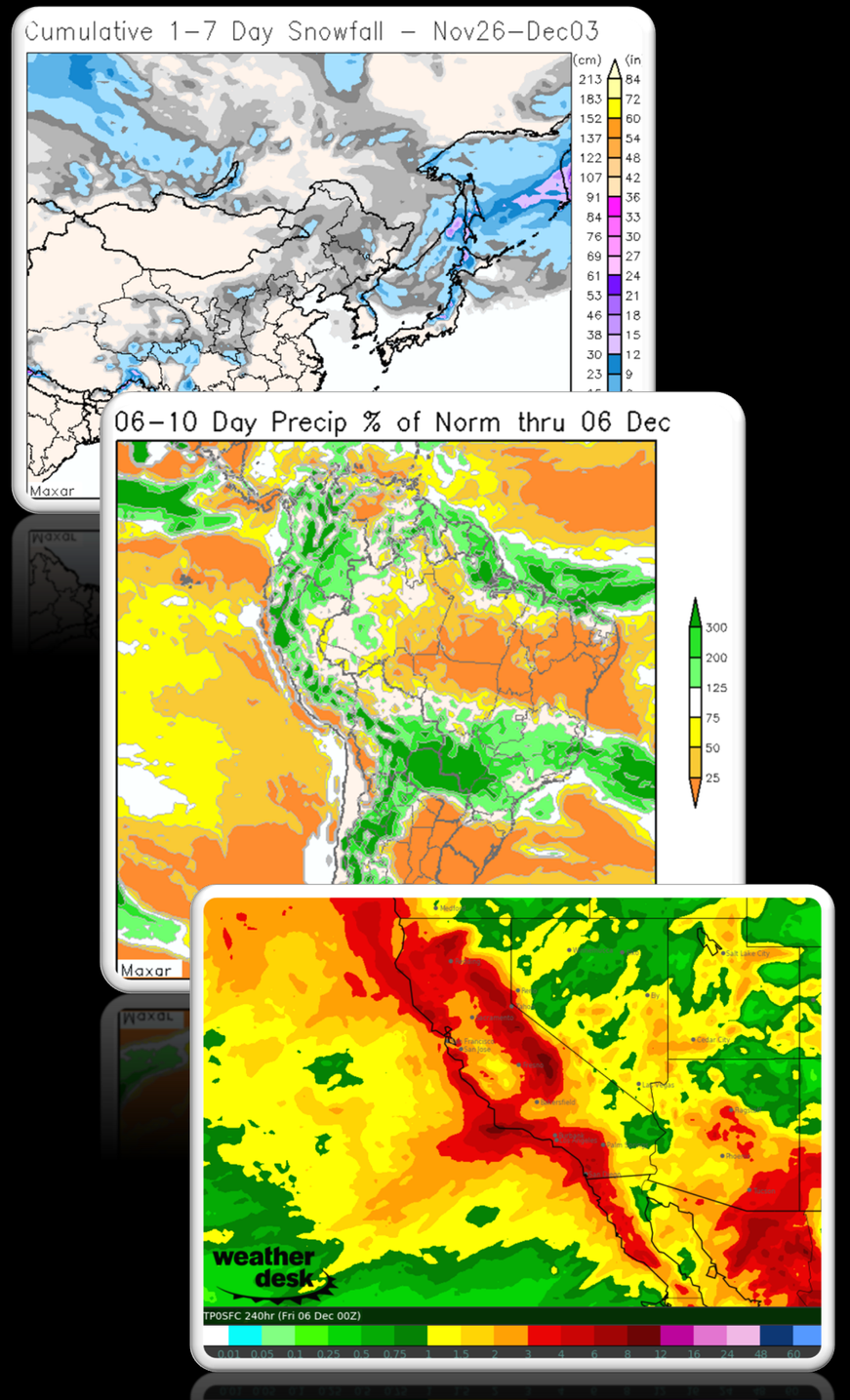
Delete cluster

EMAIL

Notification

Results from the HPC project

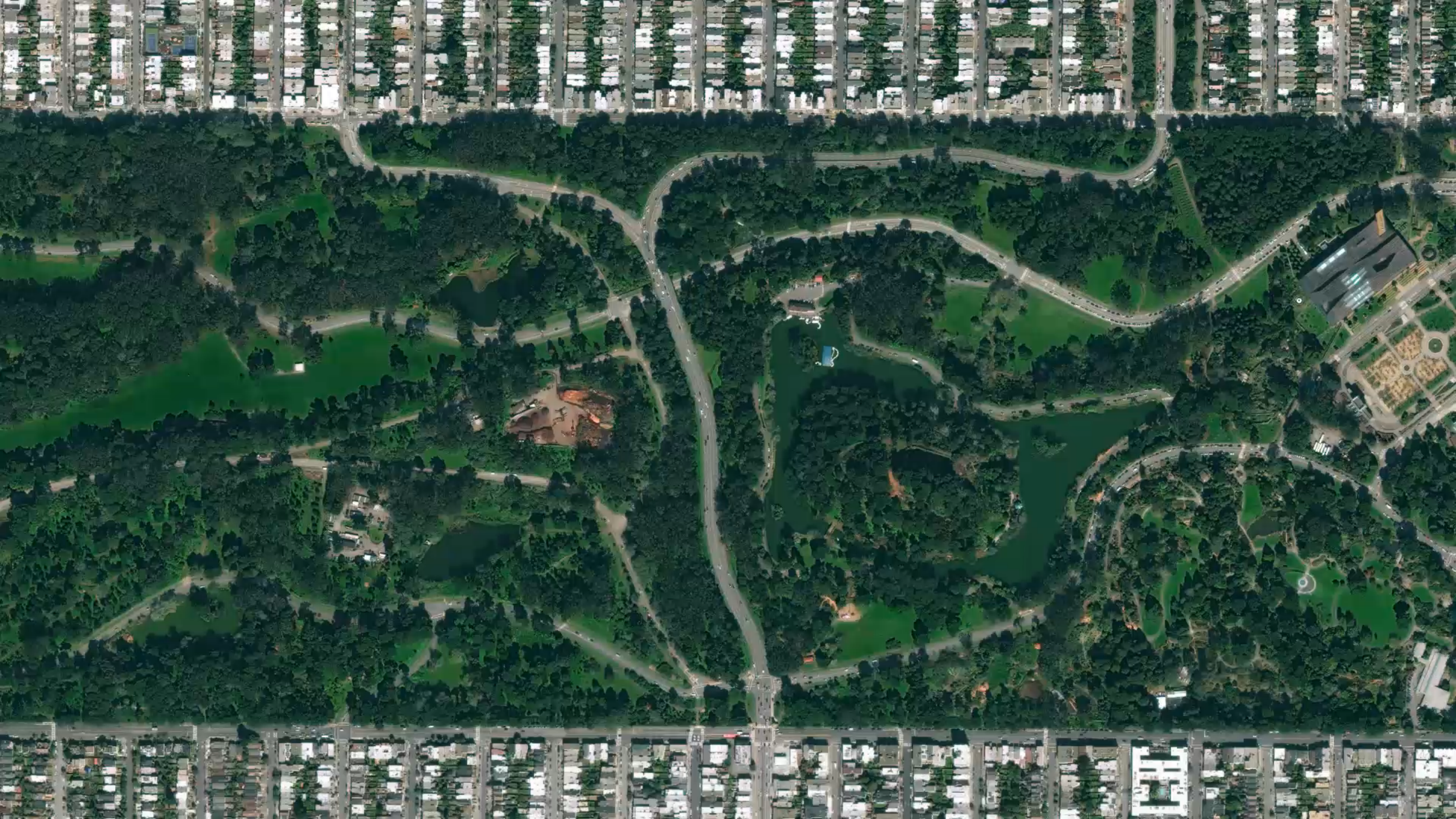
- 58% less compute time
- Less cost than NOAA supercomputer
- Same forecast quality
- Applicable to other weather models



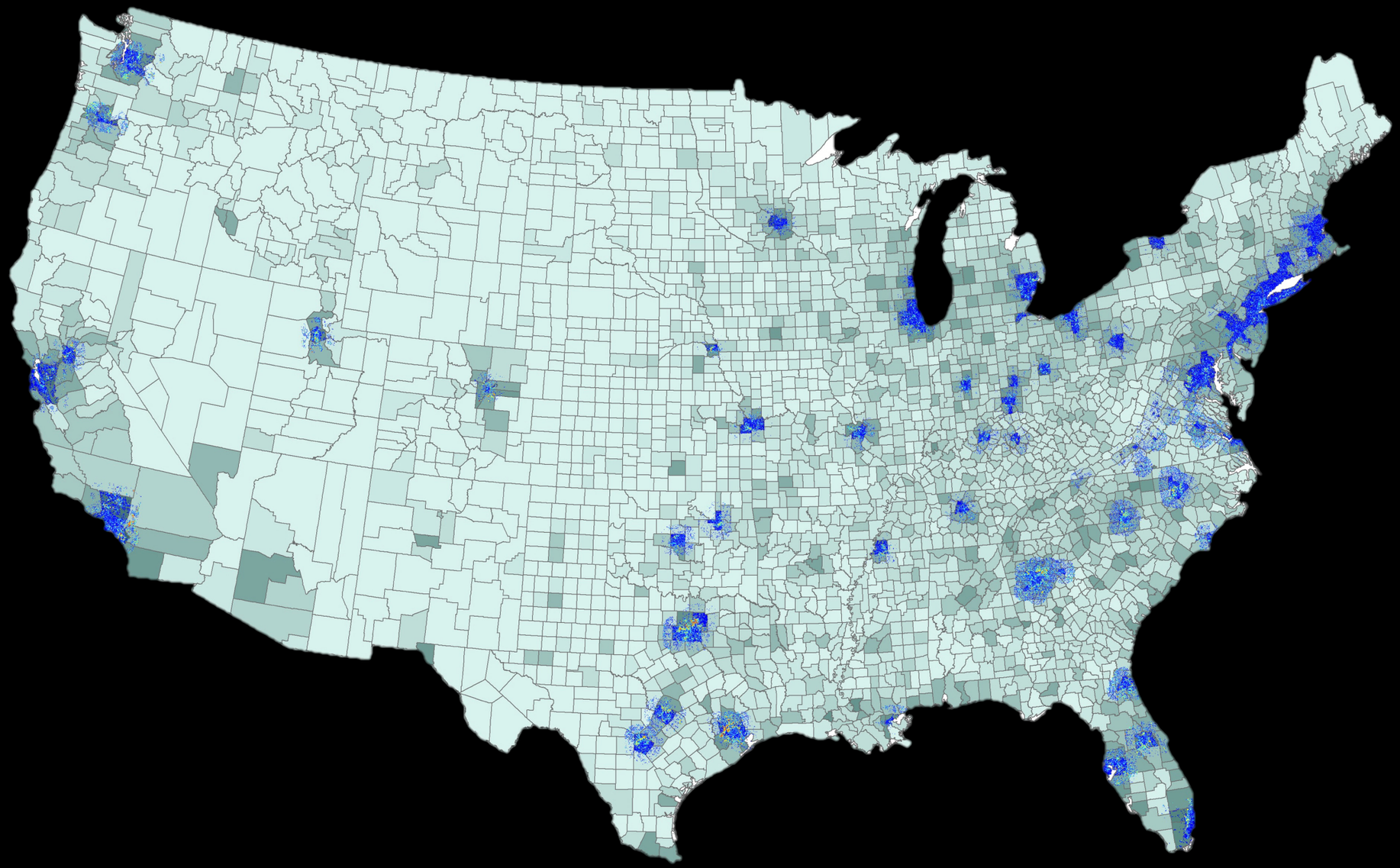
Maxar’s HPC solution delivers forecast 58% faster



- Publish the new forecast at the top of the hour
- Time spent generating the NOAA forecast
- Time spent generating the Maxar HPC forecast



Most frequent change occurs where most people live



Population density (persons/mi²), 2018
>50,000
1,000
0.03

Change density (%)
100%
50%
10%

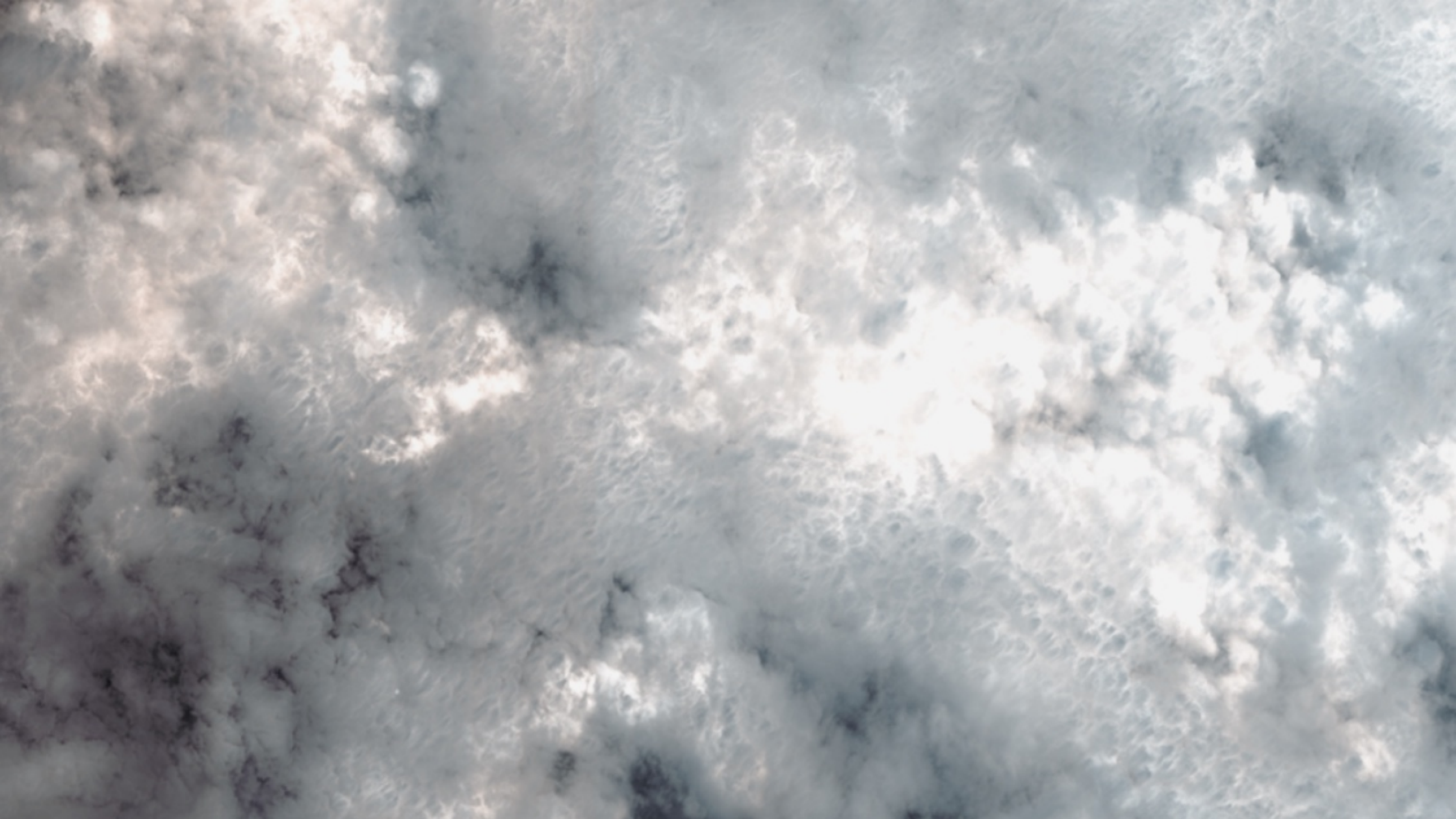
The world's population is concentrated

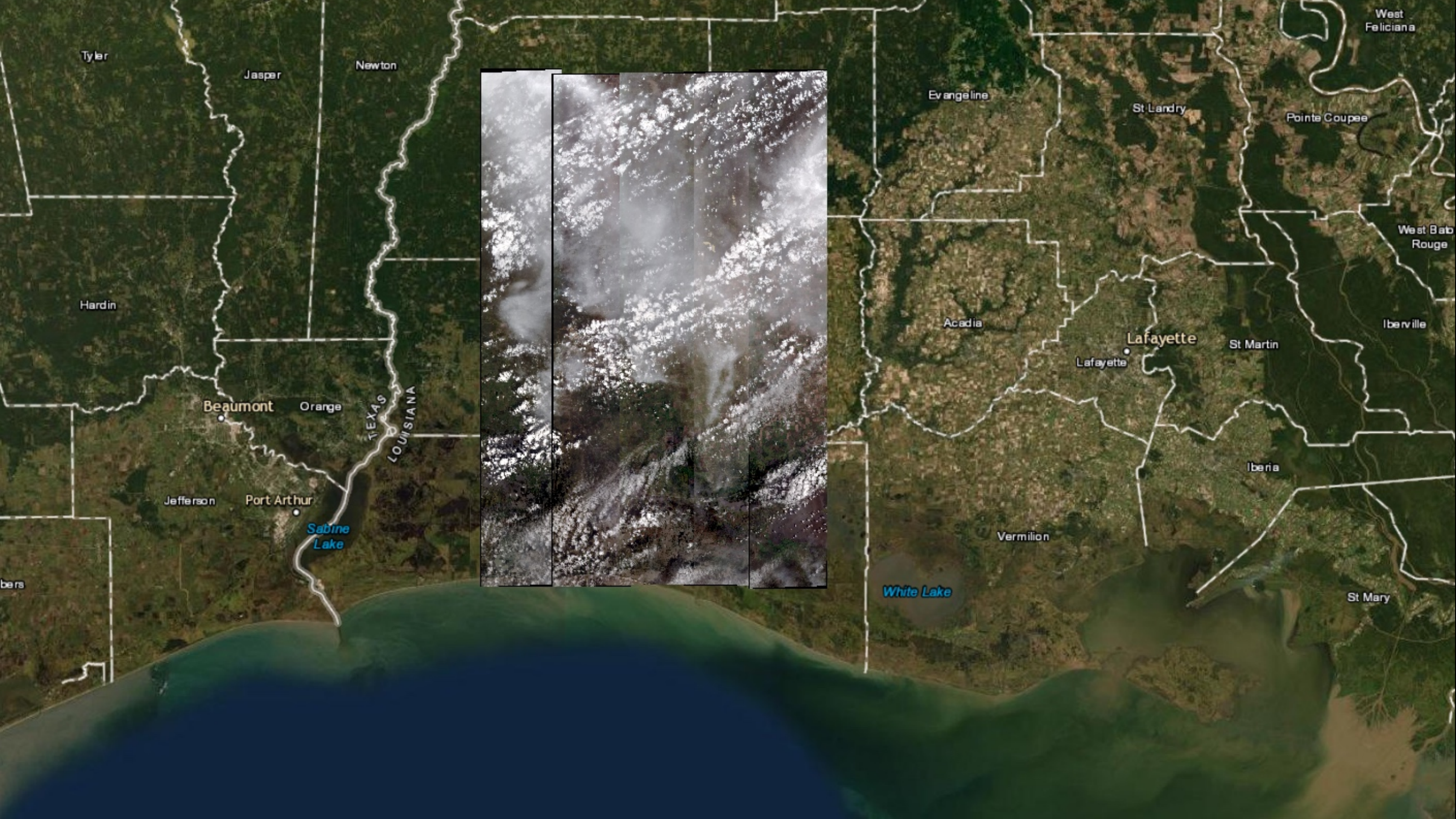
~8% of land is considered populated

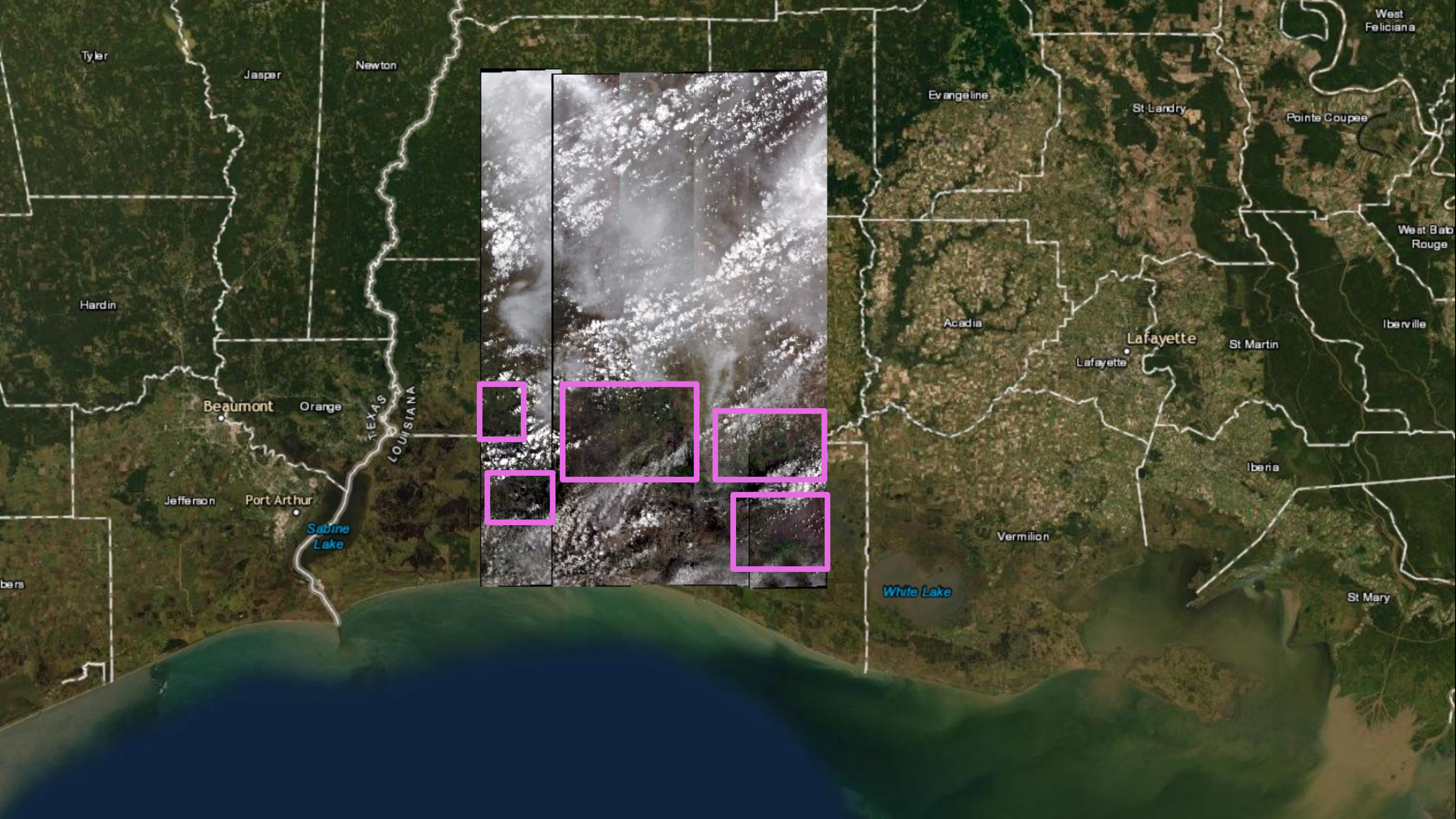
>50% of population lives on **<1%** of land

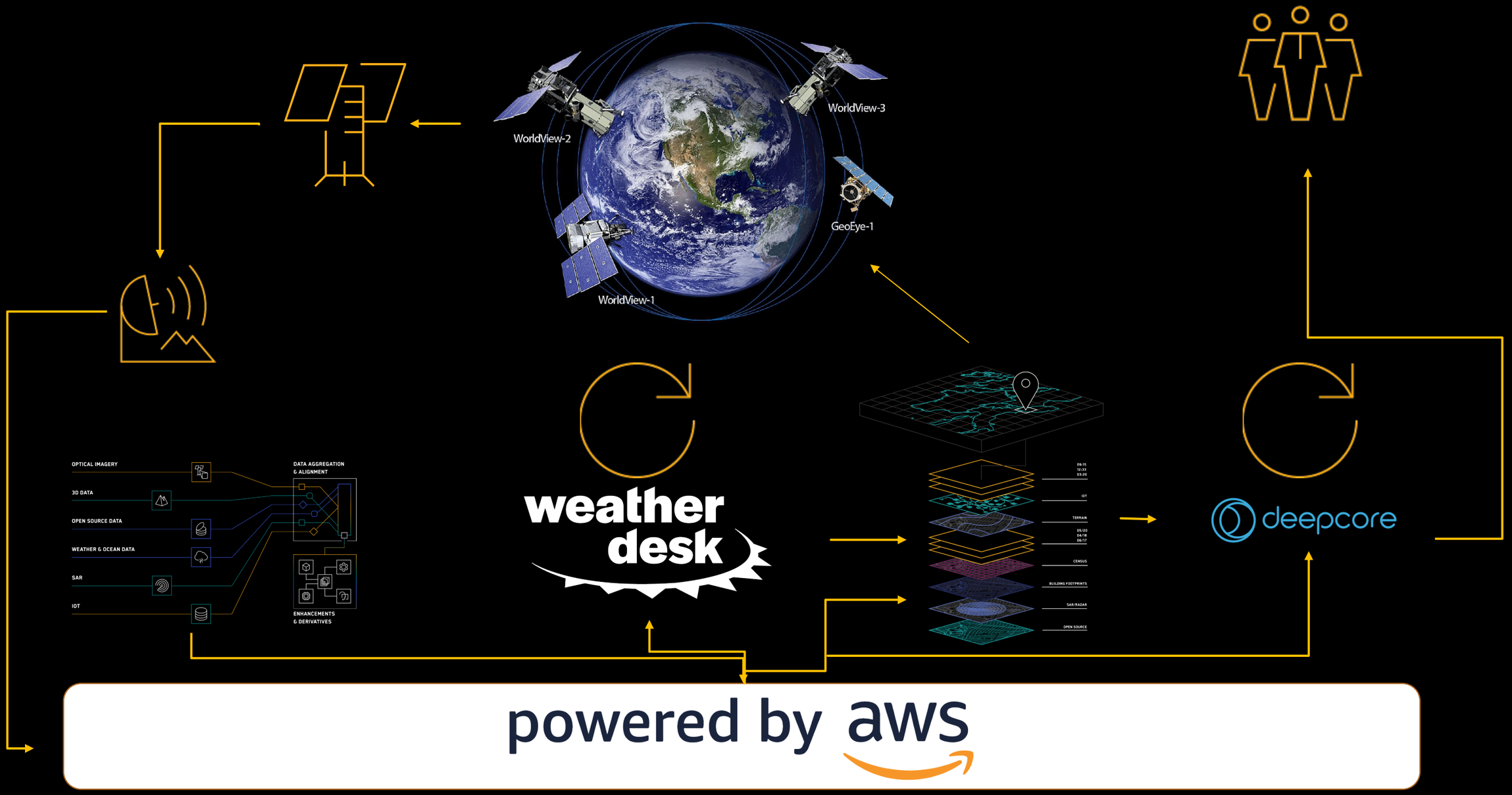
95% of population lives between **±50°** latitude

5% of land drives **95%** of revenue




Tyler
Jasper
Newton
Hardin
Beaumont
Orange
TEXAS
LOUISIANA
Jefferson
Port Arthur
Sabine Lake
Evangeline
St Landry
Pointe Coupee
West Feliciana
West Baton Rouge
Acadia
Lafayette
Lafayette
St Martin
Iberville
Iberia
Vermilion
White Lake
St Mary


Tyler
Jasper
Newton
Hardin
Beaumont
Orange
TEXAS
LOUISIANA
Jefferson
Port Arthur
Sabine Lake
Evangeline
St Landry
Pointe Coupee
West Feliciana
West Baton Rouge
Acadia
Lafayette
Lafayette
St Martin
Iberville
Iberia
Vermilion
White Lake
St Mary


WorldView-2
WorldView-3
GeoEye-1
WorldView-1
OPTICAL IMAGERY
3D DATA
OPEN SOURCE DATA
WEATHER & OCEAN DATA
SAR
IOT
DATA AGGREGATION & ALIGNMENT
ENHANCEMENTS & DERIVATIVES
weather desk
09:15
12:33
03:20
IOT
TERRAIN
05/22
04/18
06/17
CENSUS
BUILDING FOOTPRINTS
SAR/RADAR
OPEN SOURCE
deepcore
powered by aws

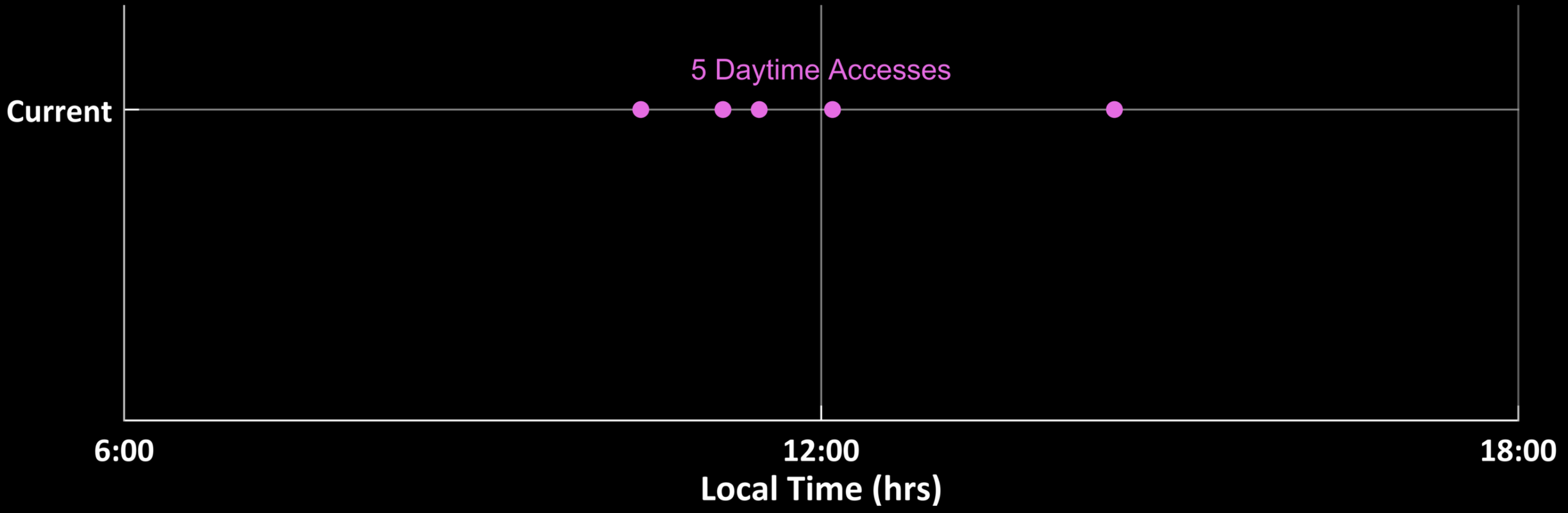




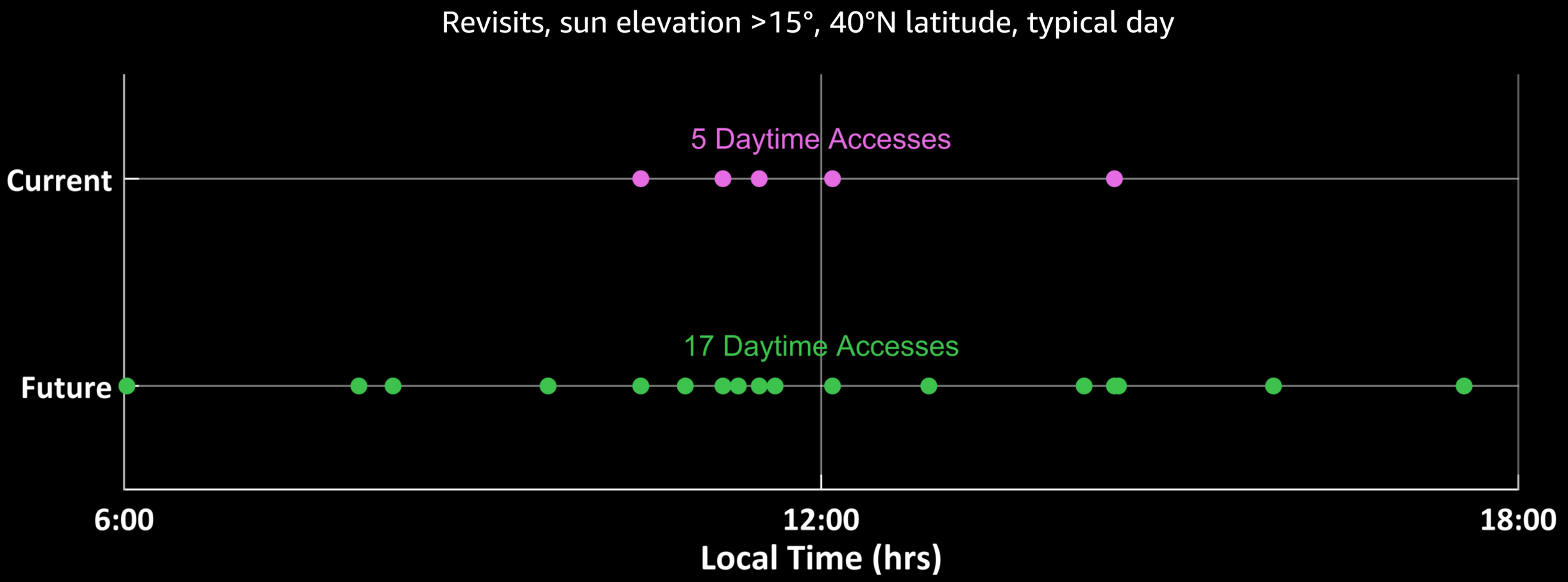


What about when we get frequent looks per day?

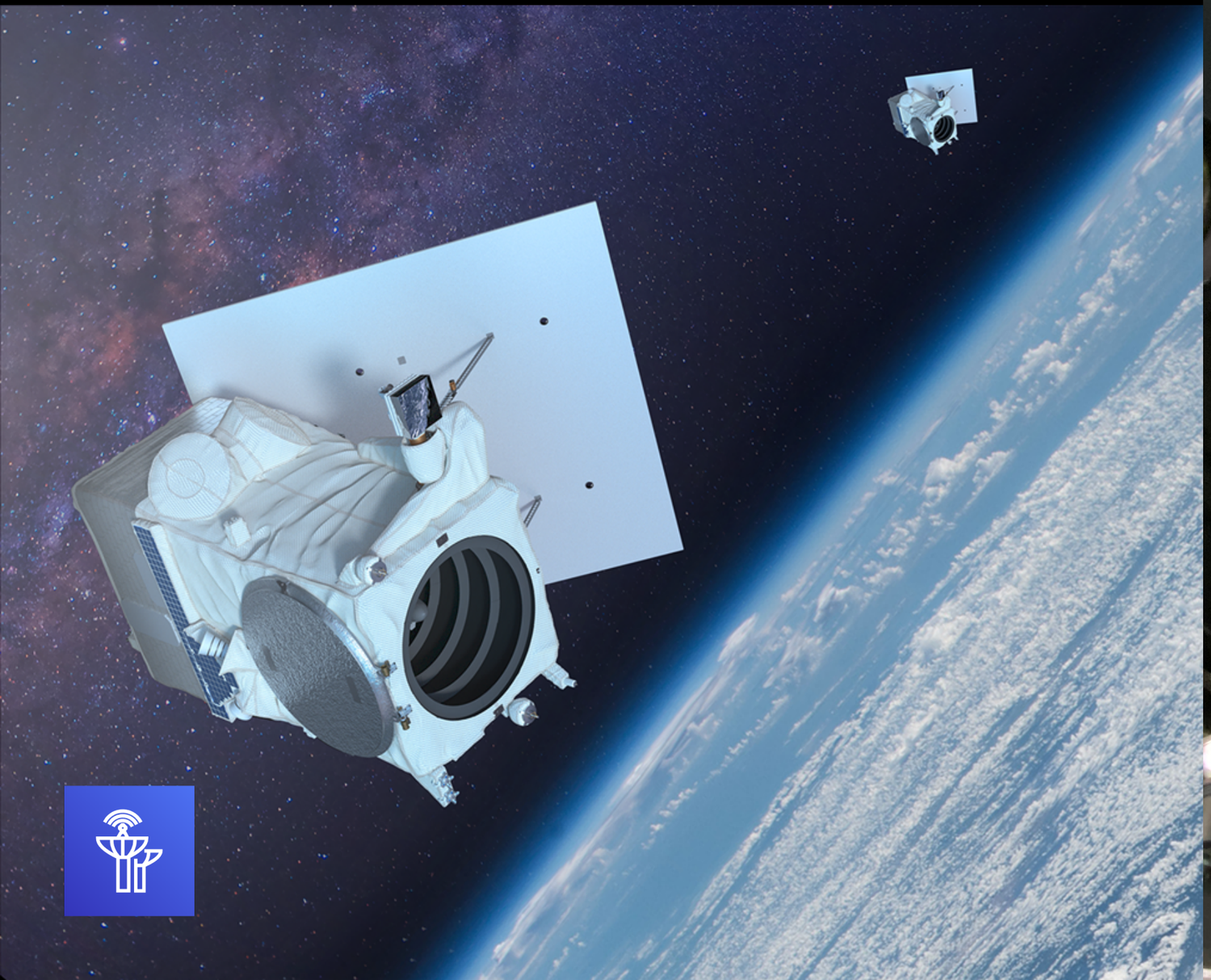
Revisits, sun elevation >15°, 40°N latitude, typical day

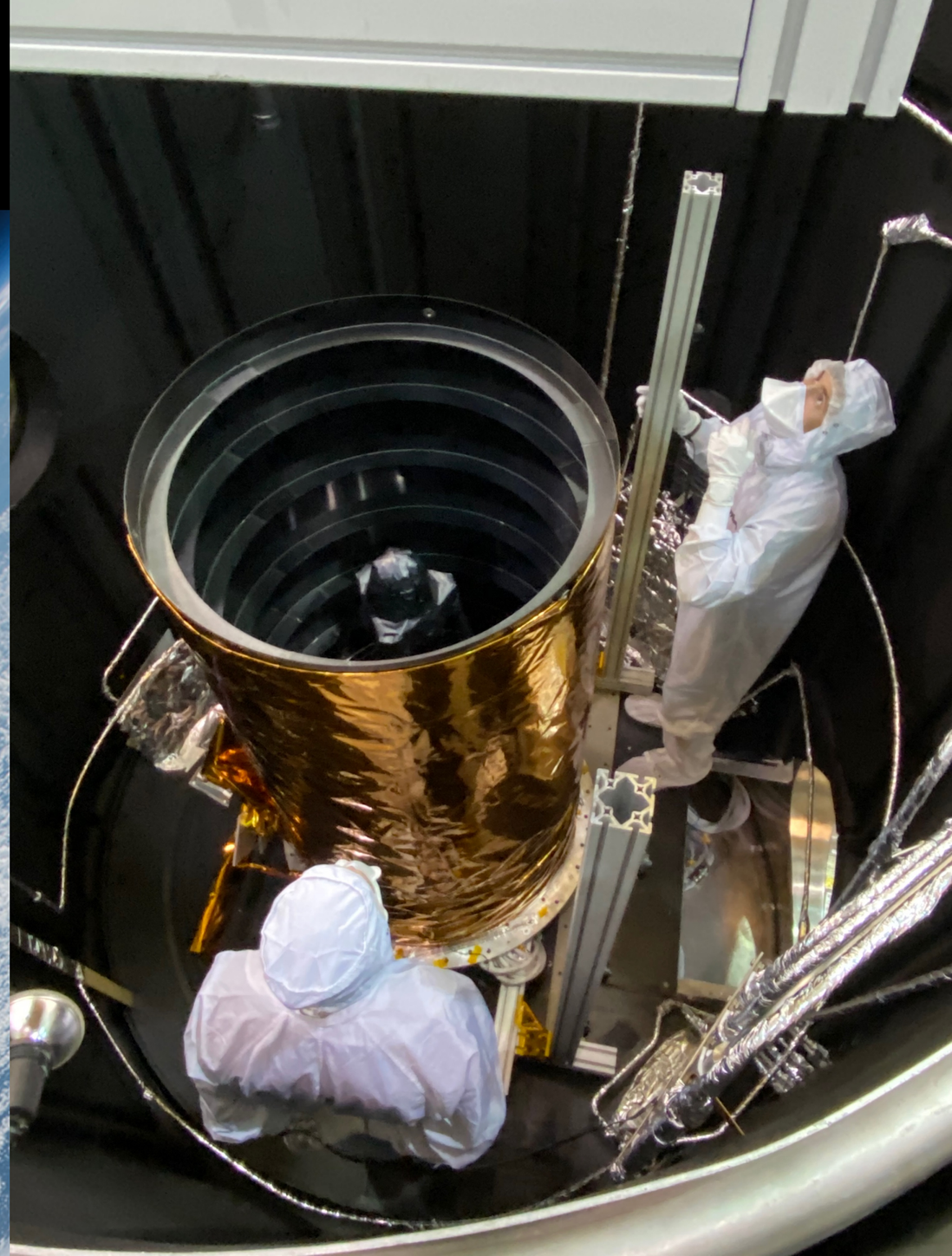


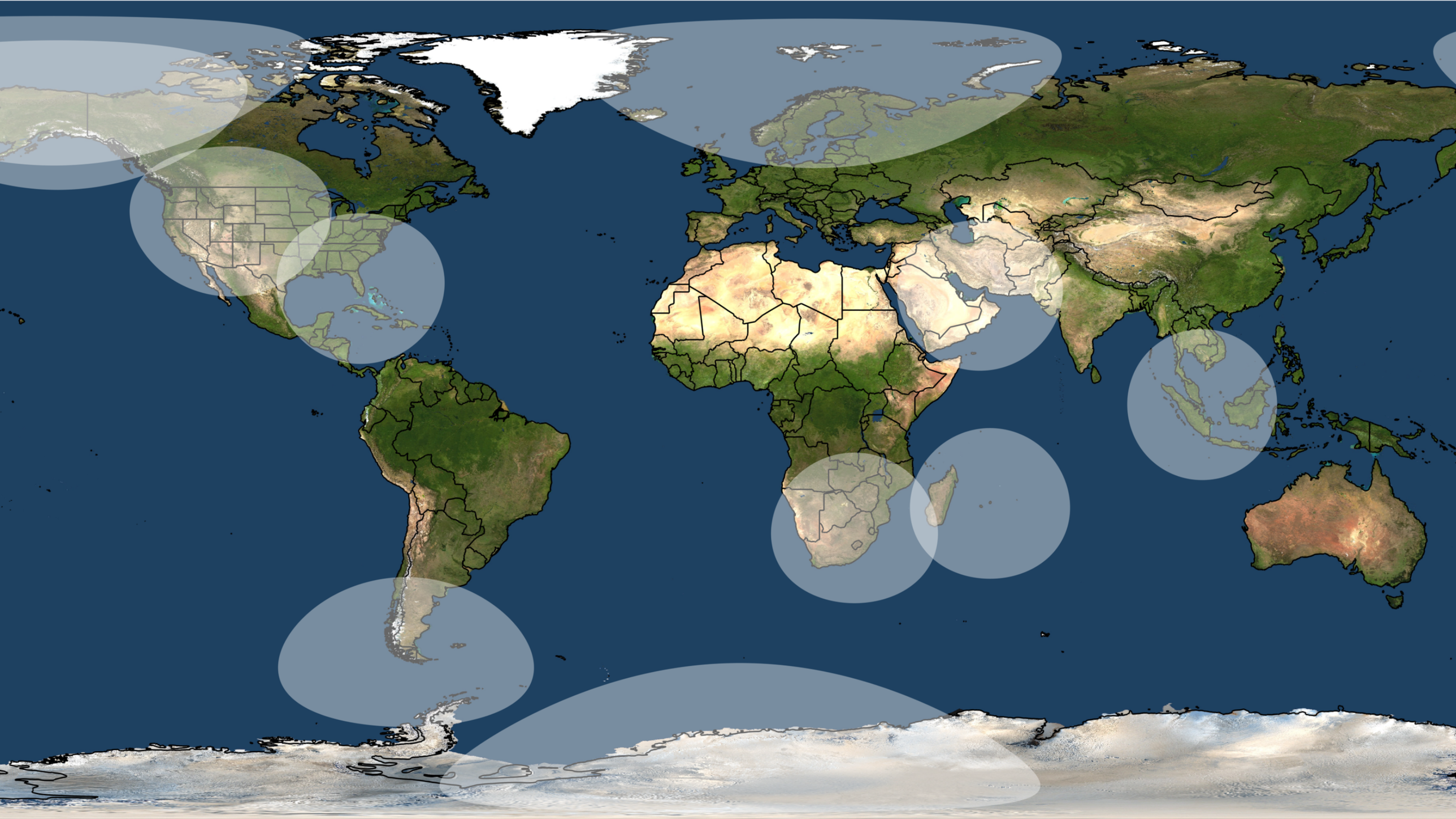
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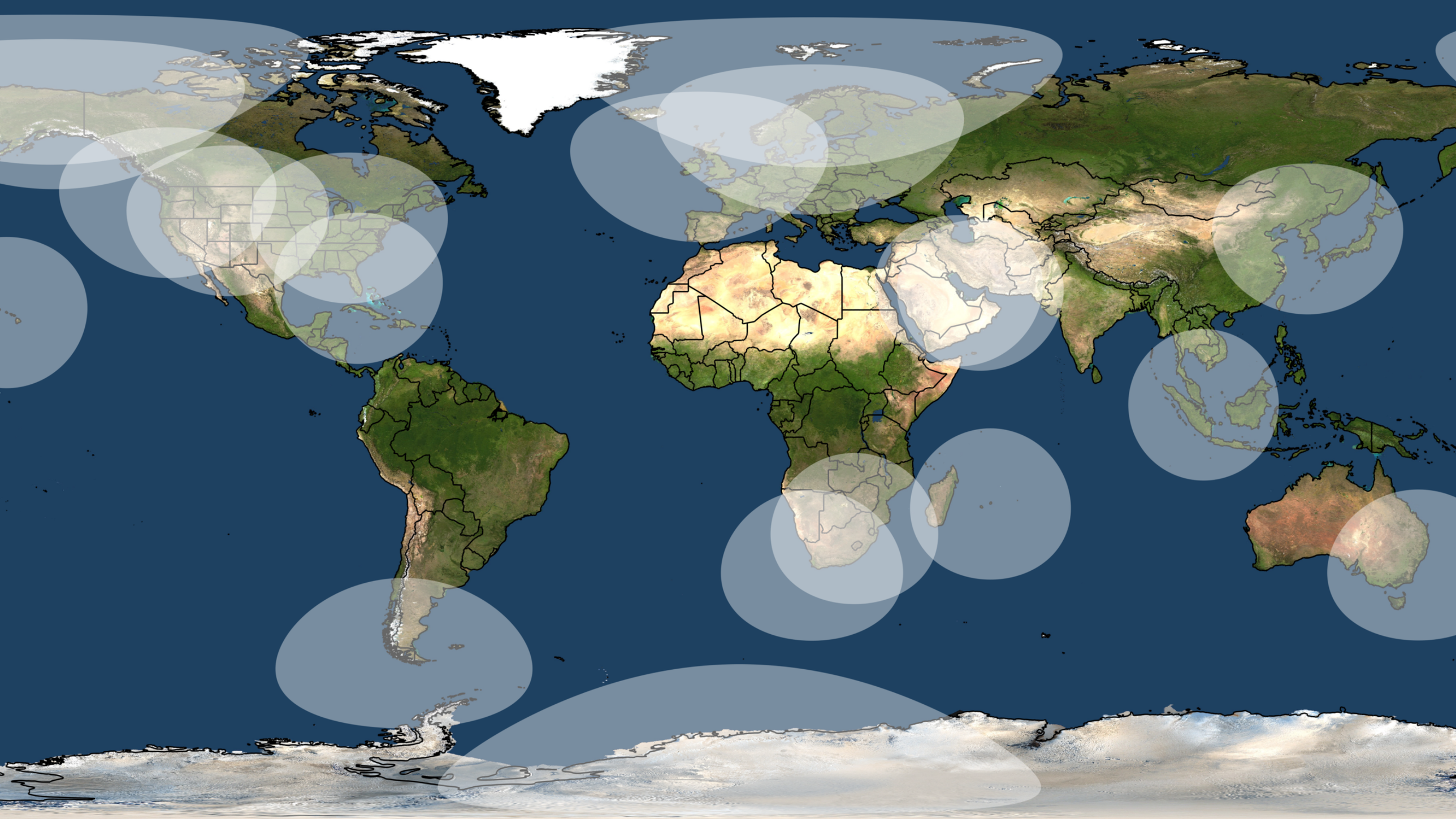


Maxar’s WorldView Legion









Downlink to the cloud in less than 1 minute





Robotic arm for NASA JPL's Mars Insight Lander

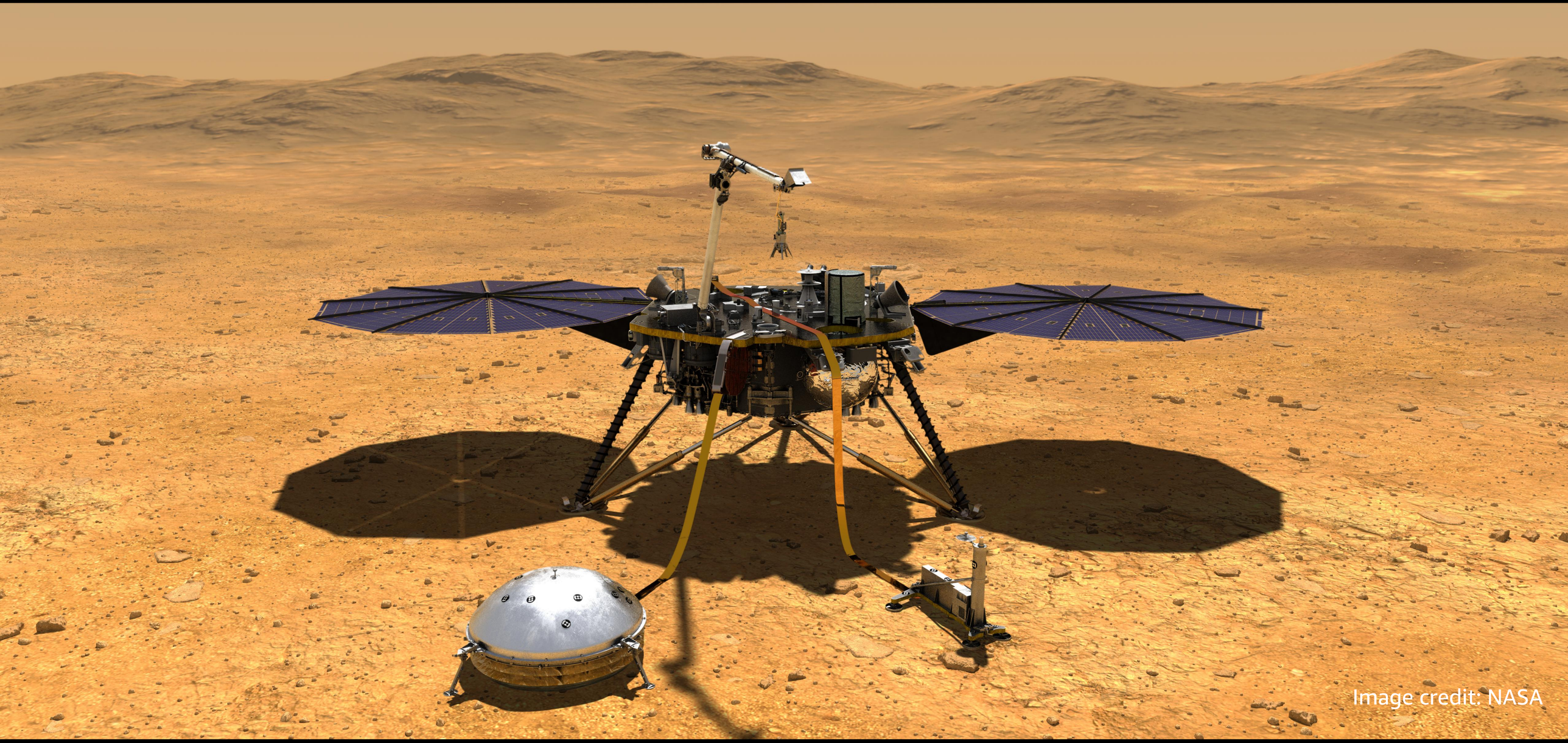


Image credit: NASA



Courtesy: NASA

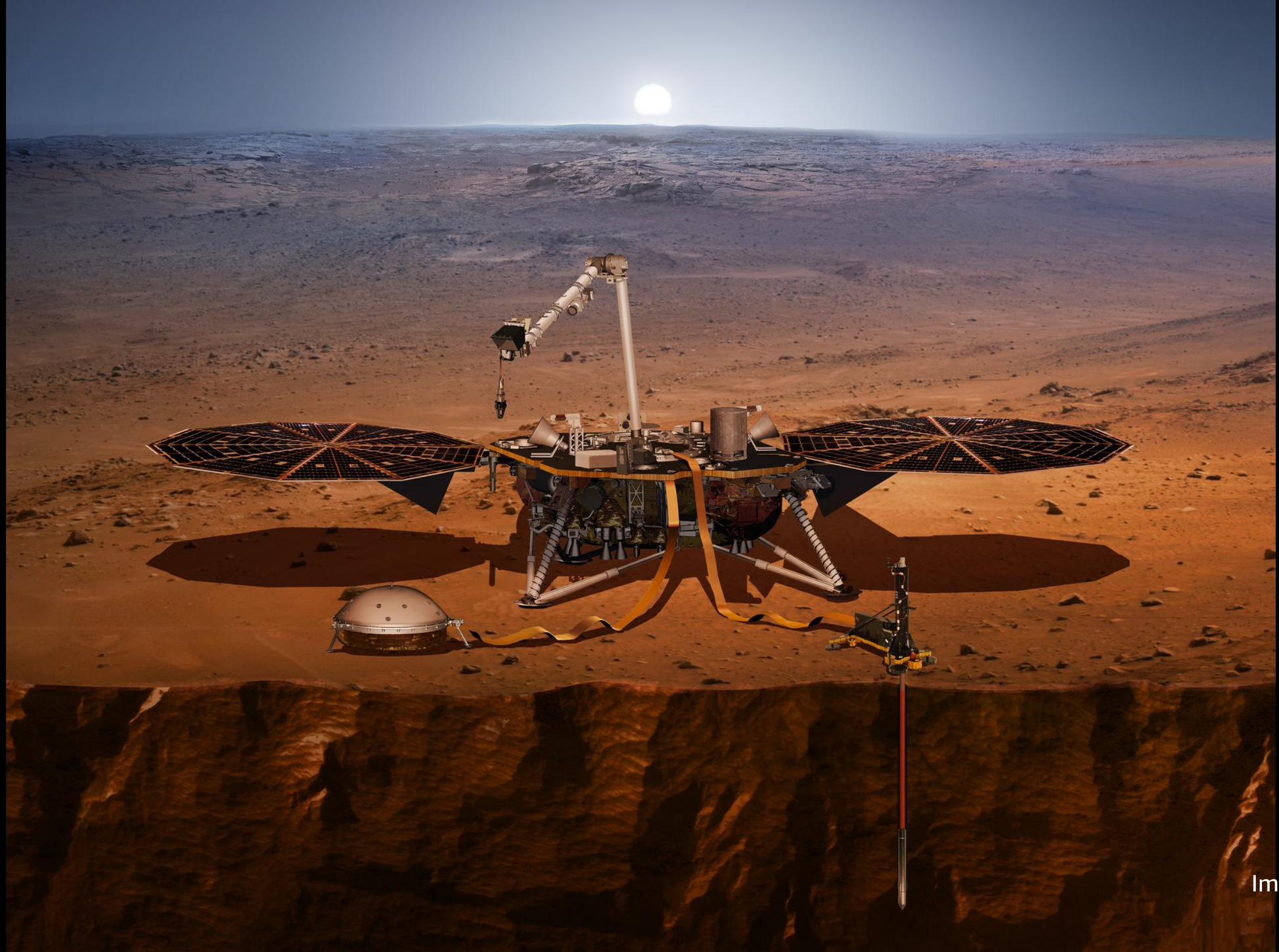
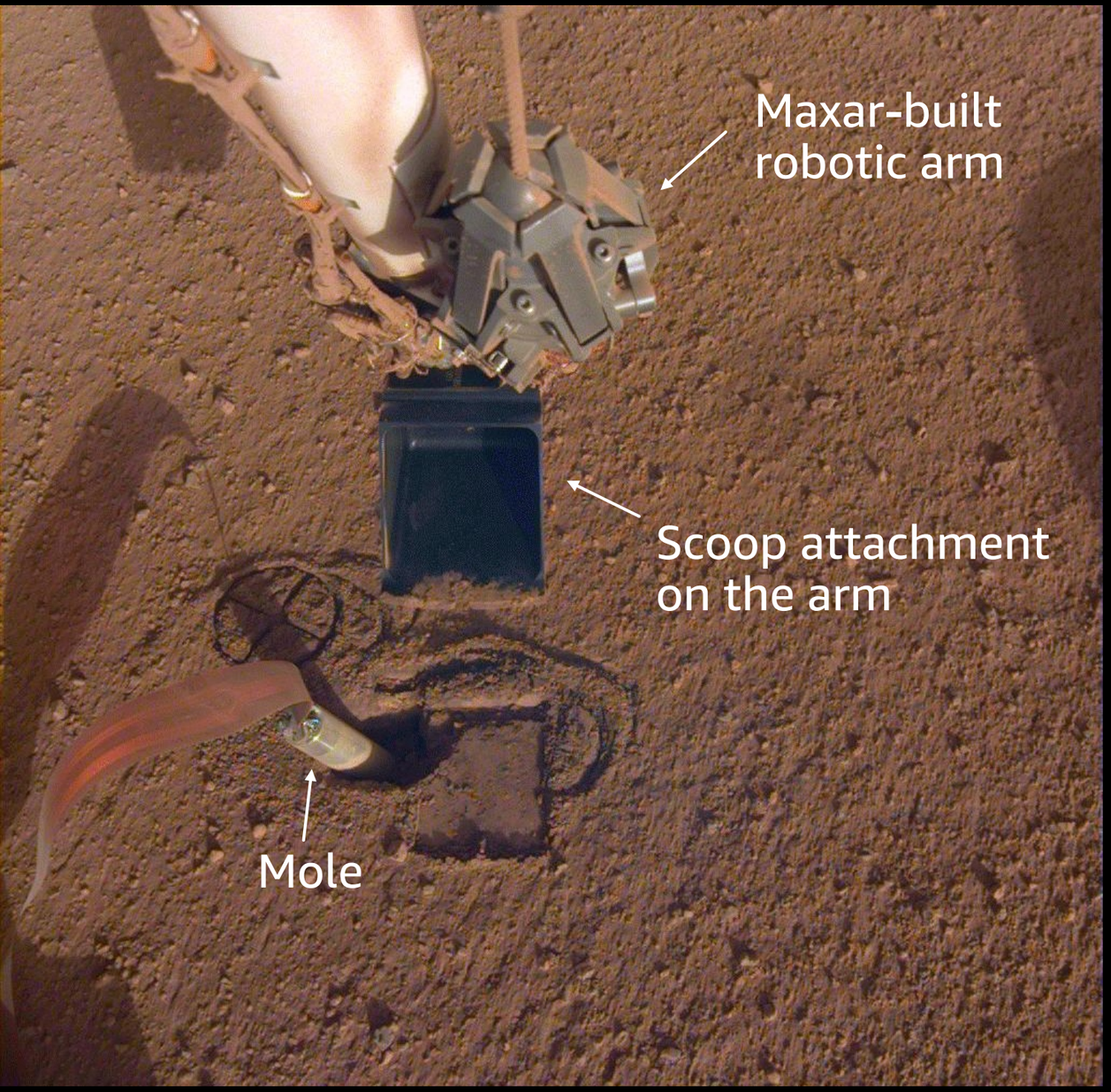


Image credit: NASA



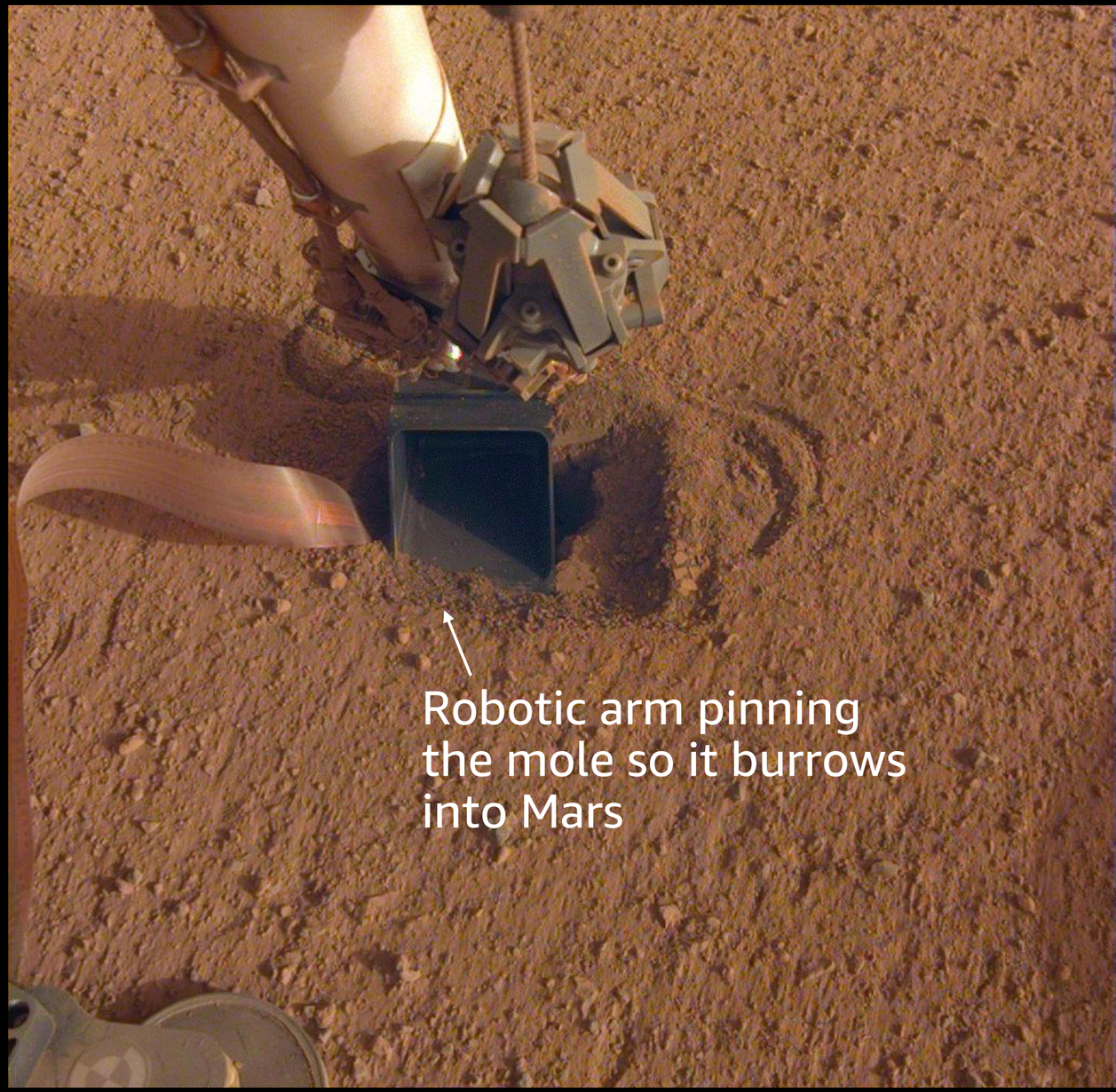
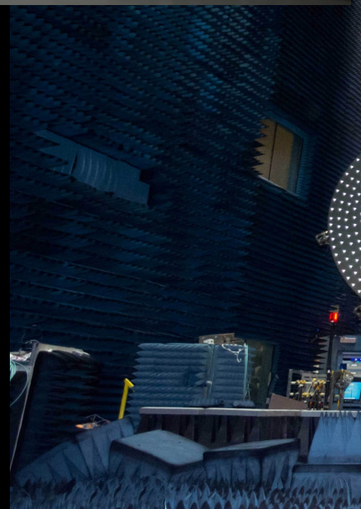


Image credit: NASA JPL


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HAPPY
MAXAR


MAXAR



Power and propulsion element for the Gateway

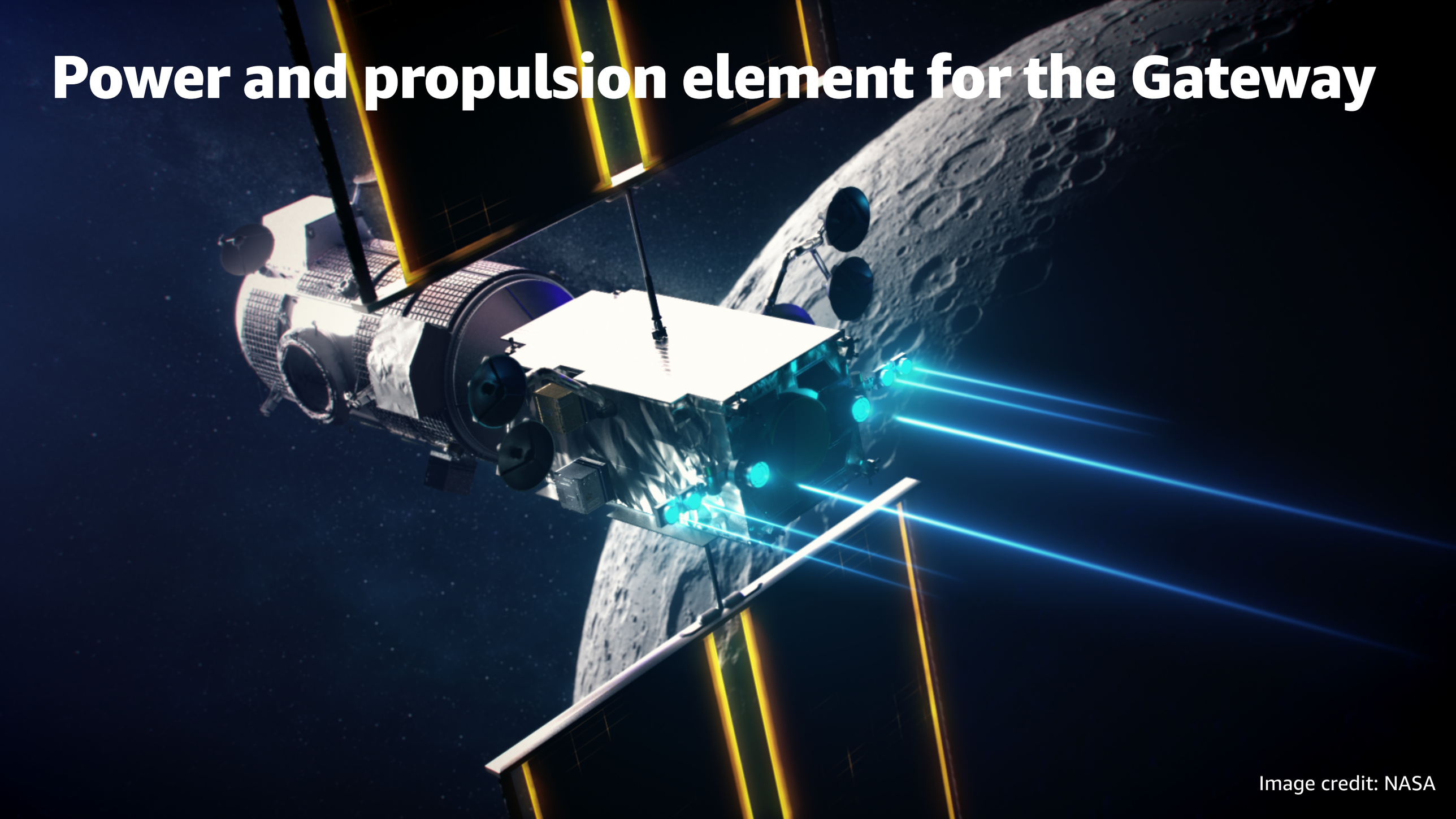
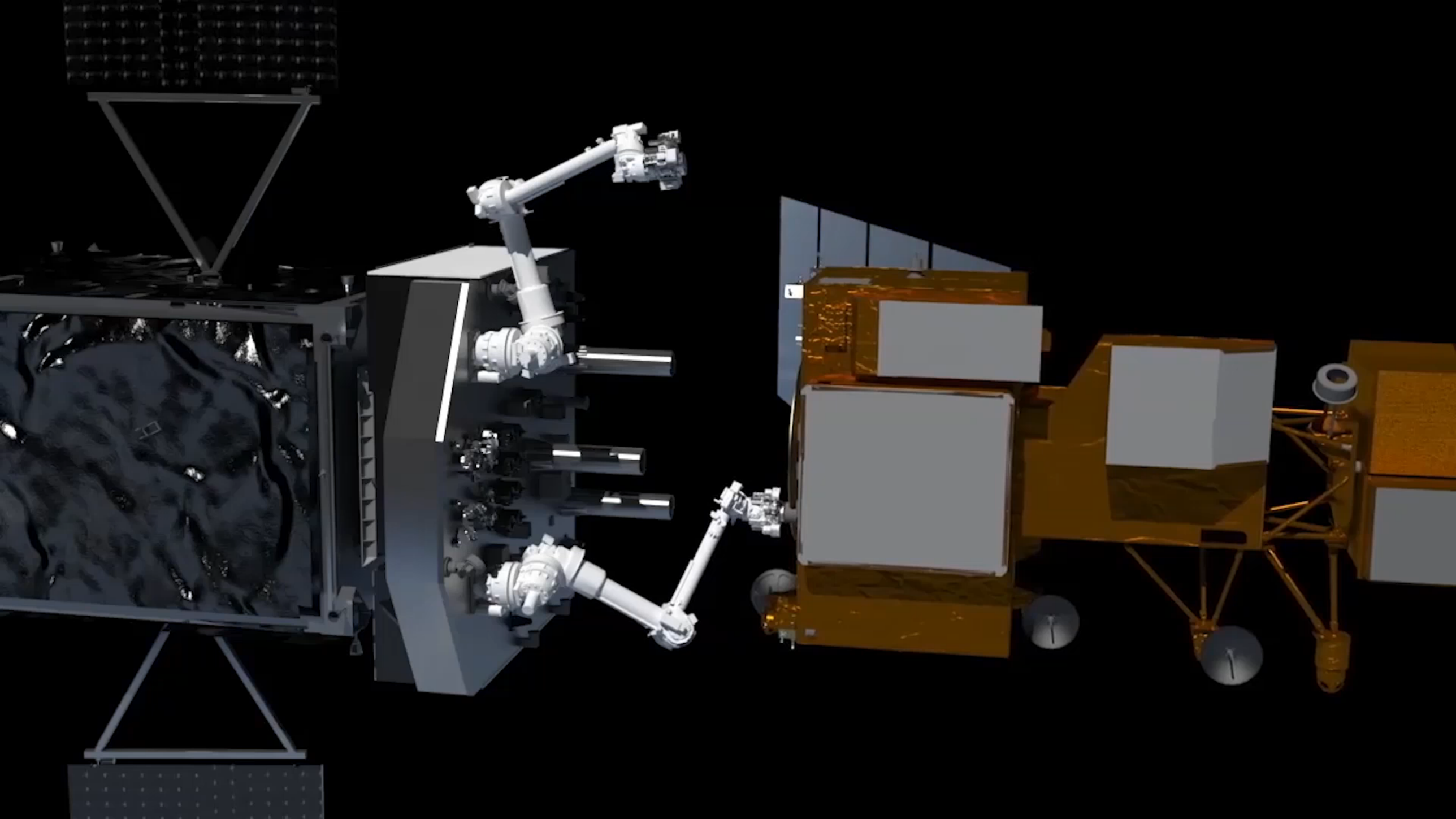


Image credit: NASA

OSAM-1 and SPIDER





Sky Muster II

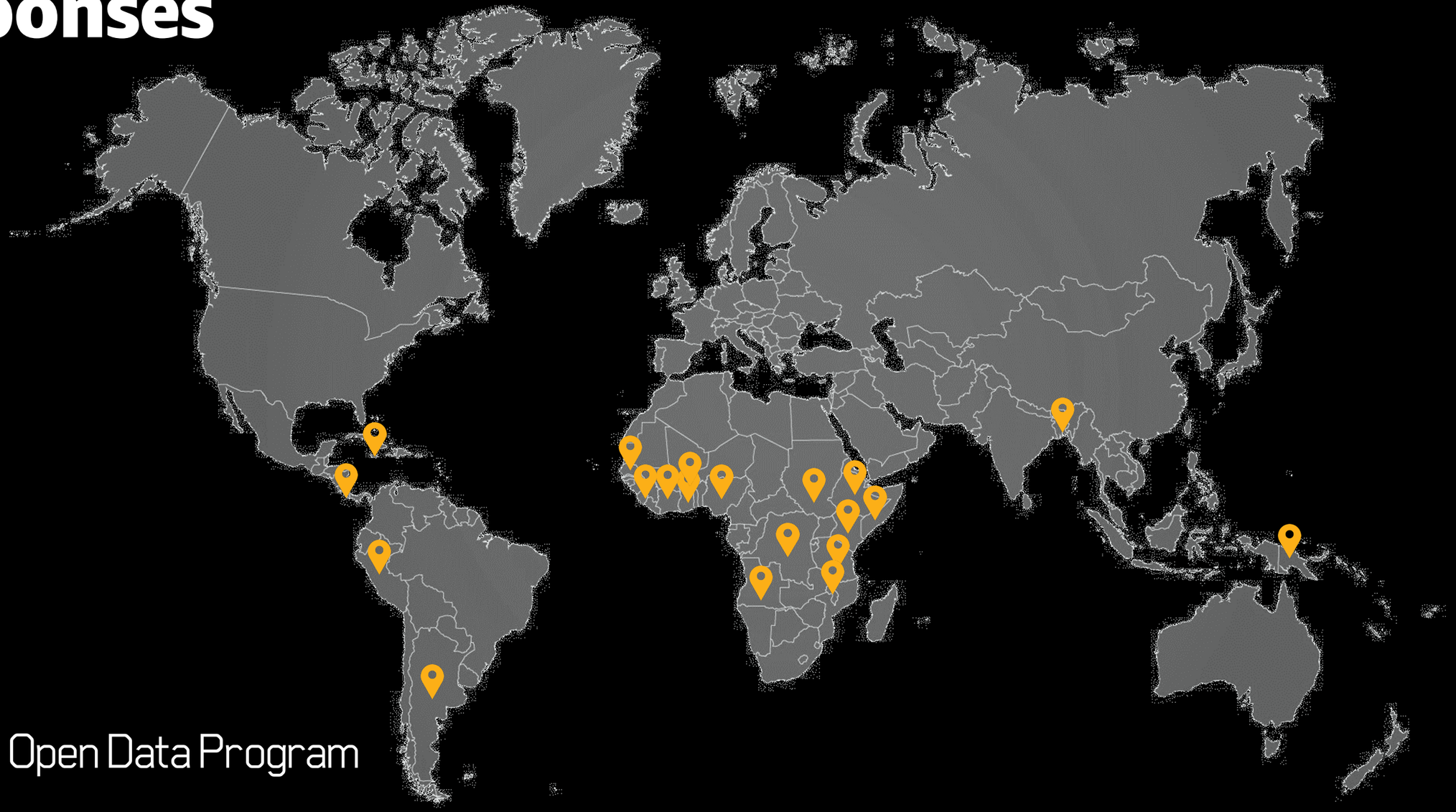


G'day, it's Craig here James, hello buddy
- Hi

Courtesy nbn Australia



Releasing Earth Intelligence for COVID-19 responses



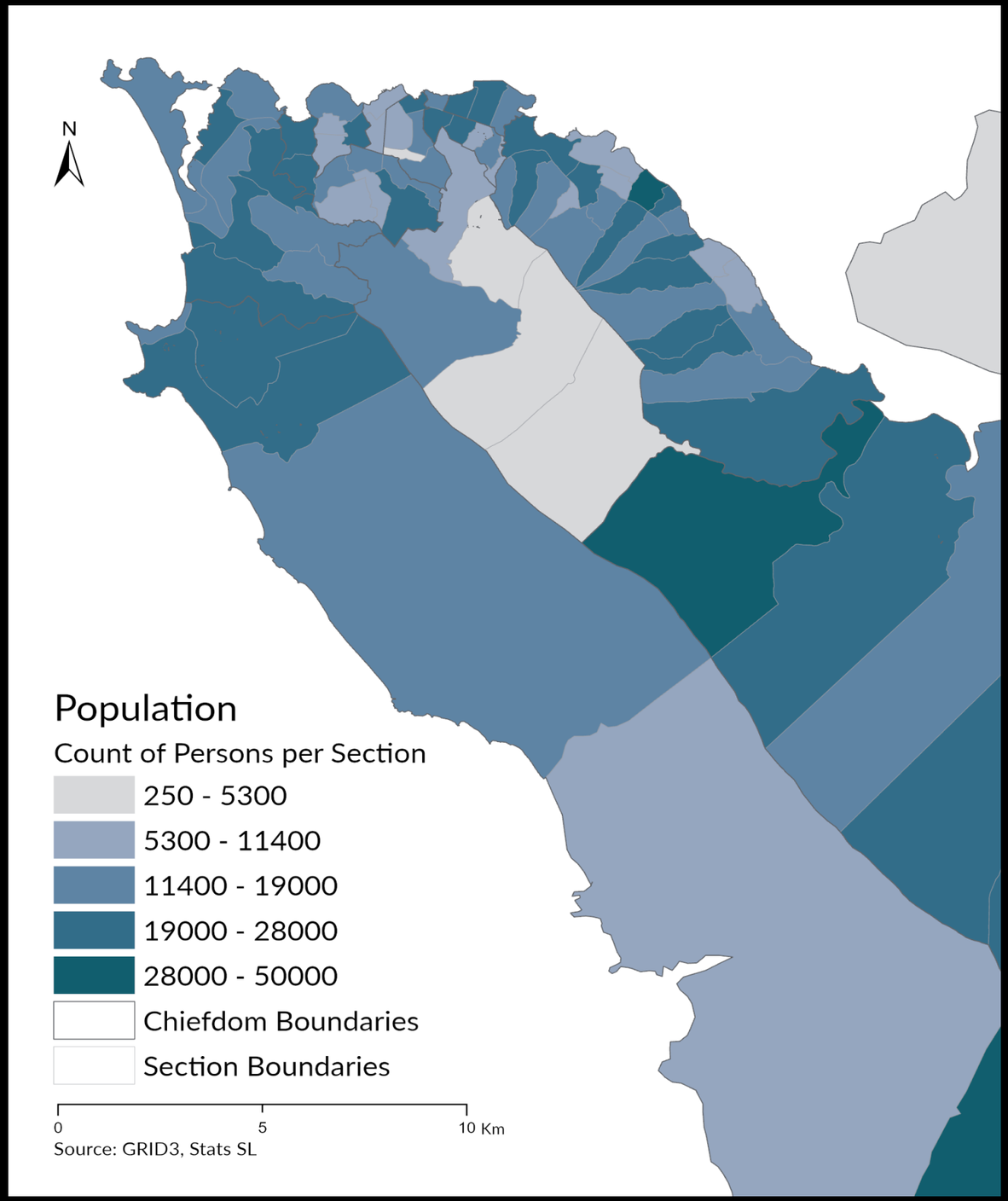
Open Data Program

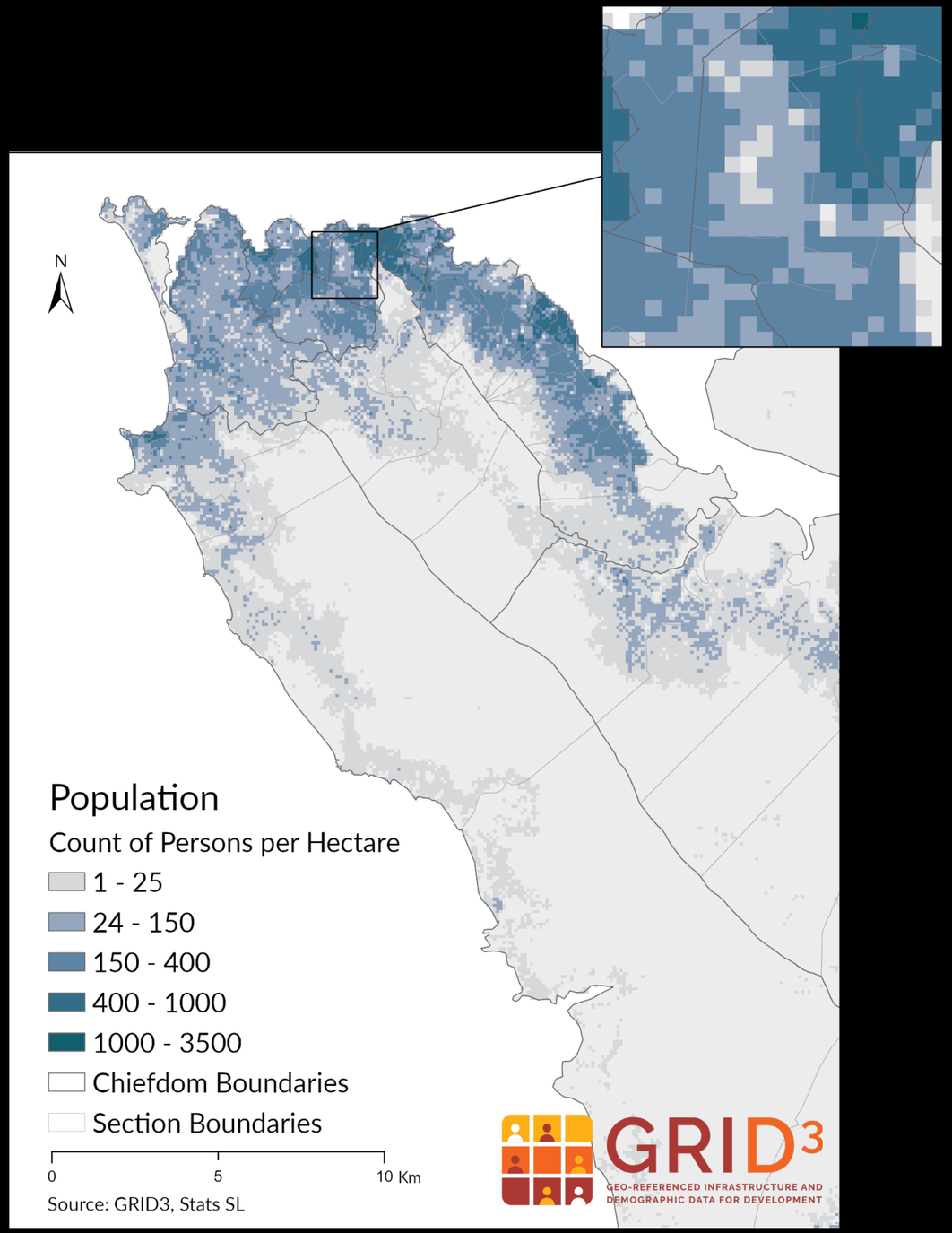




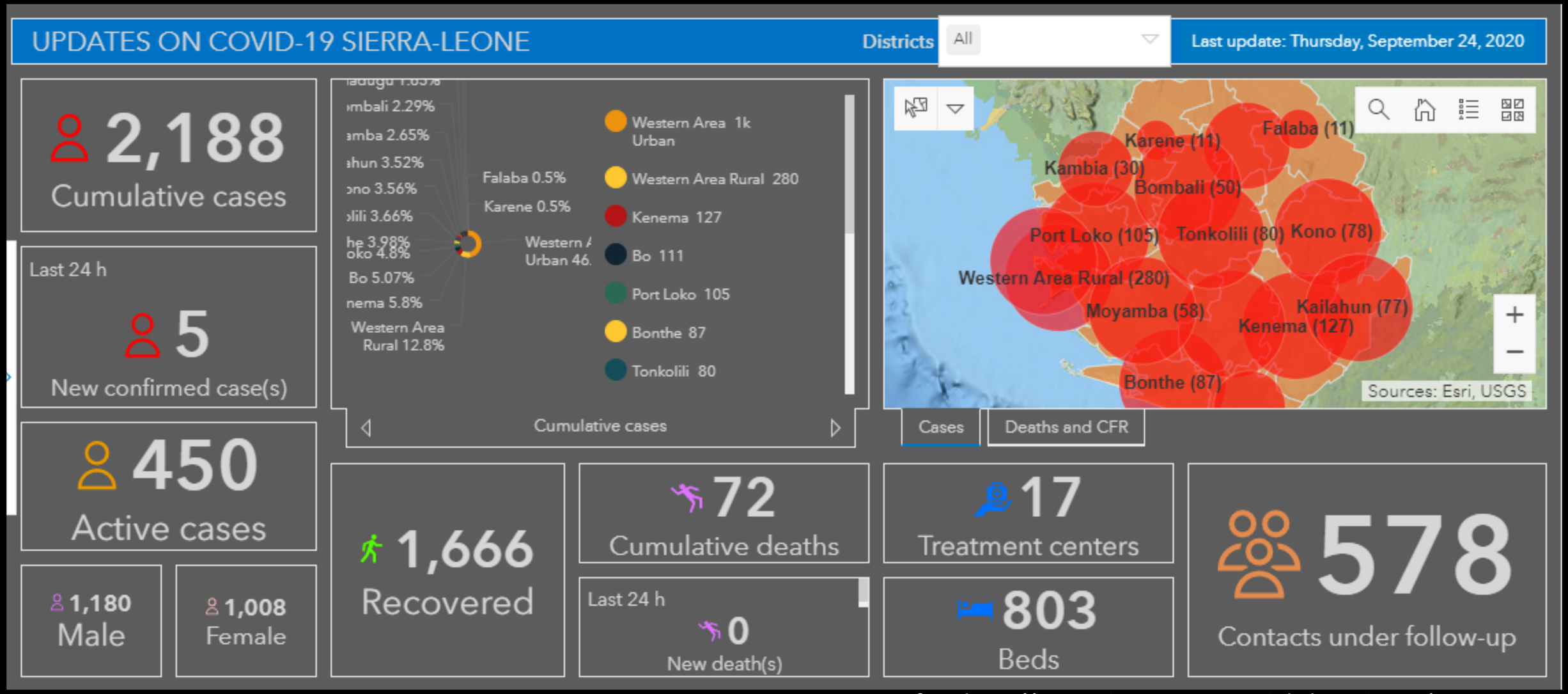
MAXAR esri GRID3 GEO-REFERENCED INFRASTRUCTURE AND DEMOGRAPHIC DATA FOR DEVELOPMENT fraym

Global Partnership for Sustainable Development Data


N
Population
Count of Persons per Section
250 - 5300
5300 - 11400
11400 - 19000
19000 - 28000
28000 - 50000
Chiefdom Boundaries
Section Boundaries
0
5
10 Km
Source: GRID3, Stats SL


N
Population
Count of Persons per Hectare
1 - 25
24 - 150
150 - 400
400 - 1000
1000 - 3500
Chiefdom Boundaries
Section Boundaries
0
5
10 Km
Source: GRID3, Stats SL
GRID3
GEO-REFERENCED INFRASTRUCTURE AND DEMOGRAPHIC DATA FOR DEVELOPMENT

Government of Sierra Leone COVID-19 Response Hub



Data from https://coronavirus-response-moic.hub.arcgis.com/

Countries using Open Data Program data

- Philippines



Credit: NASA Worldview

Countries using Open Data Program data

- Philippines
- South Africa



Countries using Open Data Program data

- Philippines
- South Africa
- Malawi



Countries using Open Data Program data

- Philippines
- South Africa
- Malawi
- Kenya

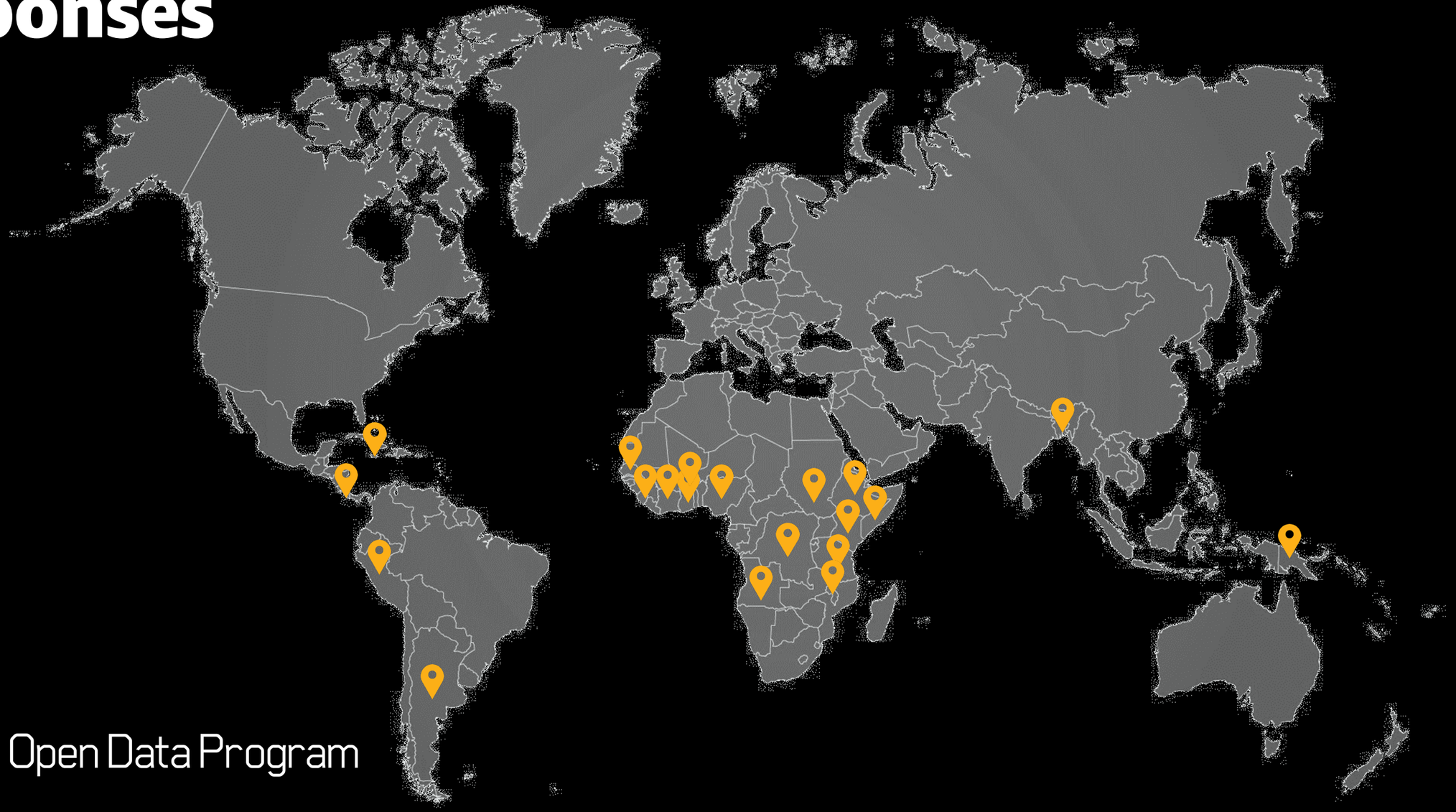


Countries using Open Data Program data

- Philippines
- South Africa
- Malawi
- Kenya
- Bangladesh



Releasing Earth Intelligence for COVID-19 responses



Open Data Program

Key takeaways

- Maxar is applying the cloud in space!
- AWS cloud offers significant value to space enterprises and their data
  - Scalable mission data processing
  - Data analytics storage
  - Machine learning / artificial intelligence
  - Satellite product and data dissemination

Thank you!



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