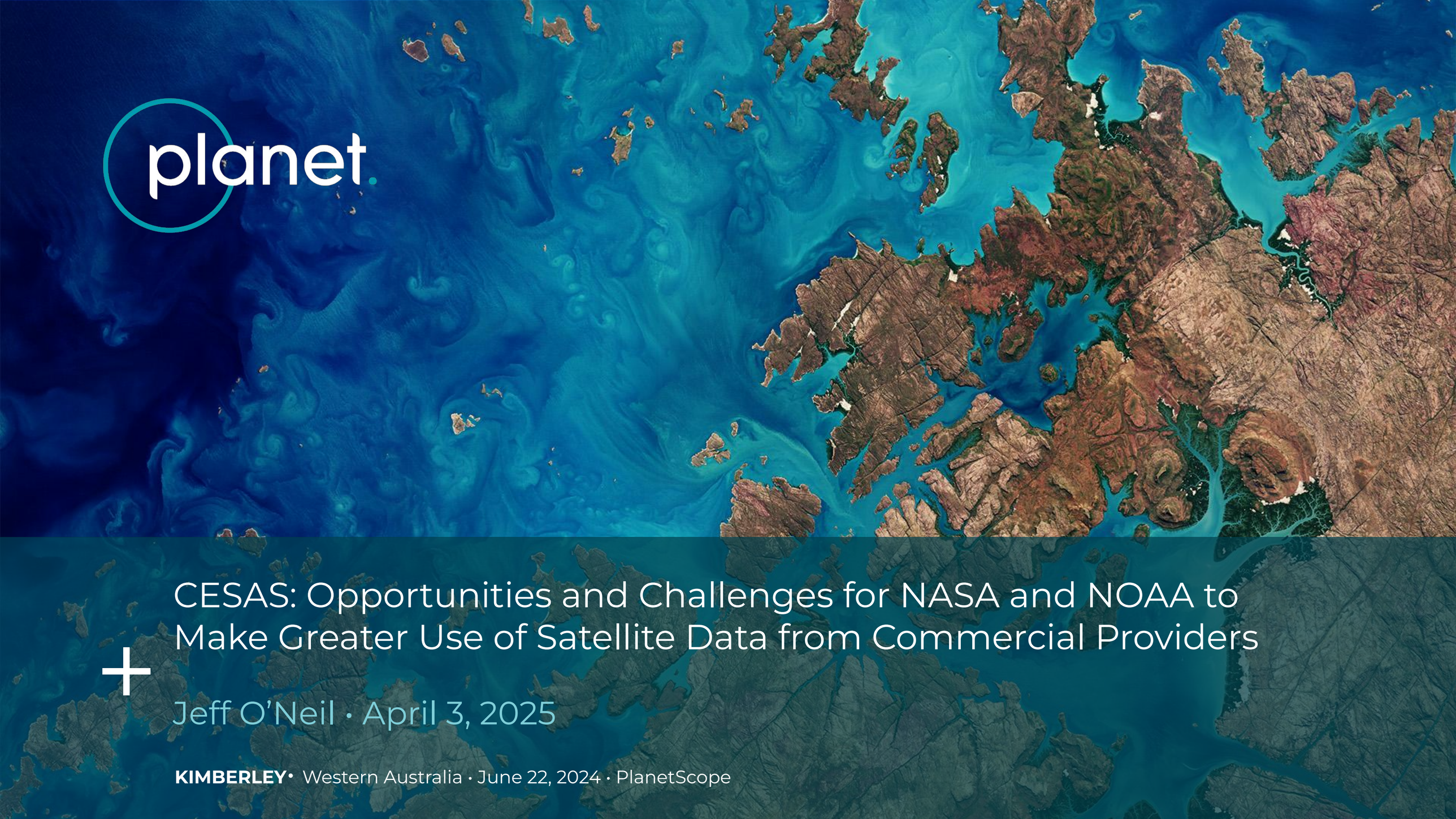


CESAS: Opportunities and Challenges for NASA and NOAA to Make Greater Use of Satellite Data from Commercial Providers

Jeff O'Neil • April 3, 2025

KIMBERLEY• Western Australia • June 22, 2024 • PlanetScope

PLANET'S MISSION

To image the whole world every day and make global change **visible**, **accessible**, and **actionable**.

VISIBLE

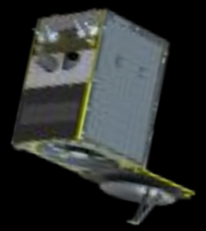
Agile Space Missions

CURRENT CONSTELLATIONS

SuperDove

Always-on Monitoring

- Hundred of satellites
- Up to 300 million km^2 / day
- 8-band
- Unique scanning

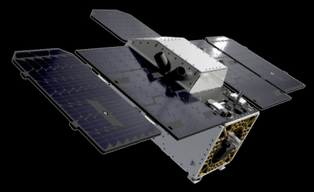


SkySat

High-Resolution Tasking

- ~15 satellites
- 50cm resolution
- RGB, NIR, and Pan bands
- Sub-daily tasking

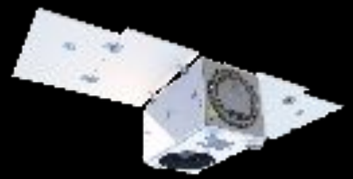
PLANNED FUTURE CONSTELLATIONS



Tanager

Hyperspectral Tasking

- Tanager-1 launched
- 400 - 2500 nm
- ~400 5nm bands



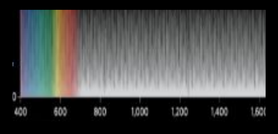
Pelican

Very High Resolution Tasking

- Initial fleet of up to 30 satellites[1]
- 30cm resolution
- Pan + 6 RGB+NIR bands
- Up to 30 revisits/day

[1] Does not include initial 2 demonstration satellites planned for FY'24.

Advancing Innovation through NASA Partnership

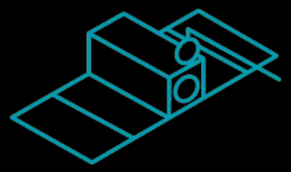


HYPERSPECTRAL INSTRUMENT

- **NASA JPL designed the imaging spectrometer** on Tanager-1 for the Carbon Mapper Coalition
- **Tanager** data will help track point source methane emissions globally
- **Carbon Mapper** will release a digital public good using this data

COMMUNICATIONS RELAY

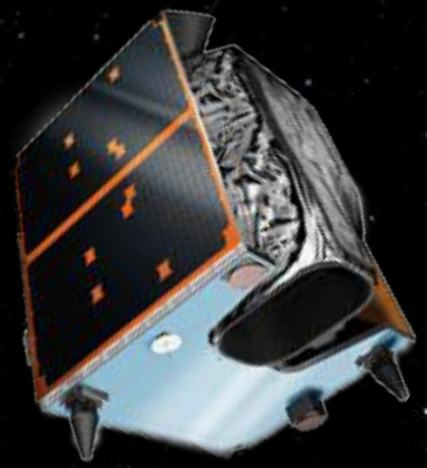
- **Planet is part of NASA's Communications Services Project (CSP)**
- **Demonstrating real-time space-to-space connectivity** from LEO satellites with SES and Telesat for in-space communication solutions
- **CSP aims to replace NASA’s TDRS satellites**, supporting Earth-observing missions



PLANETSCOPE SURFACE REFLECTANCE PRODUCT

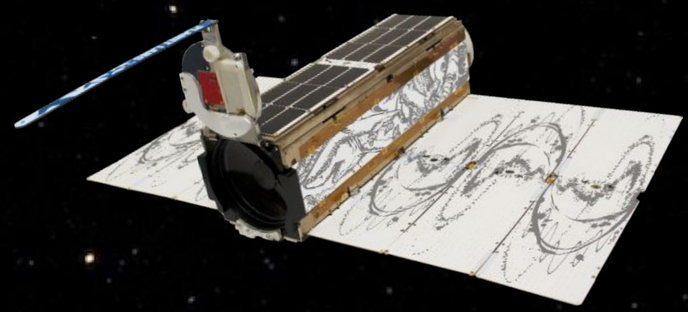
- **NASA & ESA** provide water vapor, ozone, and aerosol data for PlanetScope’s atmospheric corrections
- **MODIS** on Terra and Aqua satellites ensures reliable surface reflectance scenes
- **Data integration supports Planet's on-demand data pipeline** across its satellite constellation

Planet Data Available through CSDA



RapidEye Archive

Federally-funded researchers can access the entire global archive of PlanetScope 3.7m imagery with a 30-day latency period, and the full RapidEye 6 m imagery archive, spanning from 2009 to 2019, for scientific research purposes.



Dove Satellites PlanetScope

Advancing NASA Research Objectives

CSDA PARTNERSHIP HISTORY

- CSDA vendor since 2018
- Over 1,500 users across 25 federal agencies and 160 universities

HOW RESEARCHERS USE PLANET DATA

- **Complement NASA sensor data** to improve insights into climate and environmental changes
- **Improve empirical research** to better support Earth Science missions
- **Train models on near-daily global data** to improve prediction
- **Fulfill CSDA's mission to advance** Earth Science and support applications of scientific research across agencies

Climate

Disasters

Water

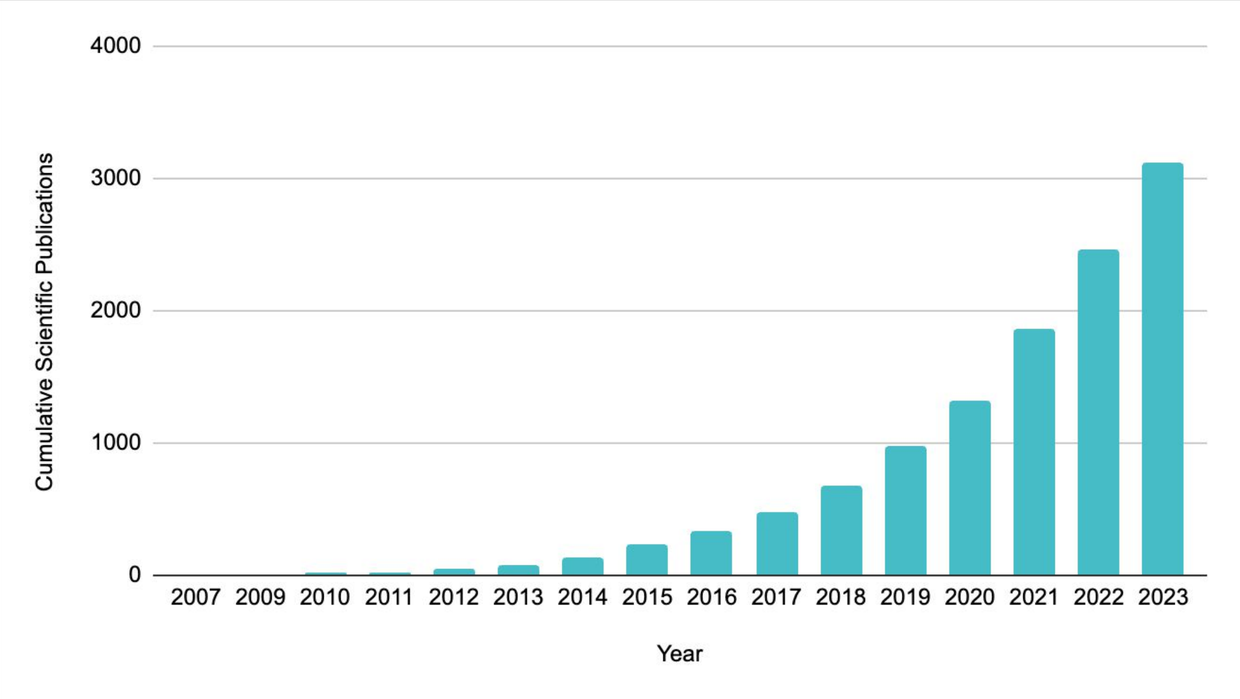
Agriculture

More than three scientific papers with Planet data or tools are published each day

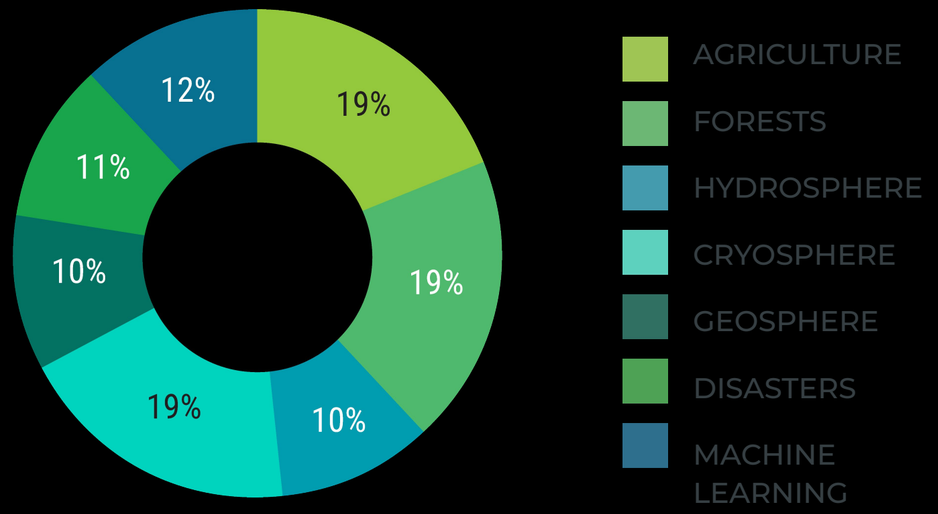
>3,500
PUBLICATIONS IN TOTAL

- **Rate is now > 3 per day**
- Publications are Earth-system wide and cover a variety of Earth and social science use cases

CUMULATIVE PUBLICATIONS



A DIVERSITY OF SUBJECT MATTER AREAS[1]



[1] Subject matter by common title keywords from database of papers using Planet data or products through end of June 2022.

Optimizing Wildfire Recovery

Planet | Michigan State University | NASA

Climate and land use changes are driving more frequent and intense wildfires, yet publicly available satellite data lacks the resolution to accurately map smaller burn areas. Paring high resolution imagery with AI leads to a breakthrough in fire mapping from space.

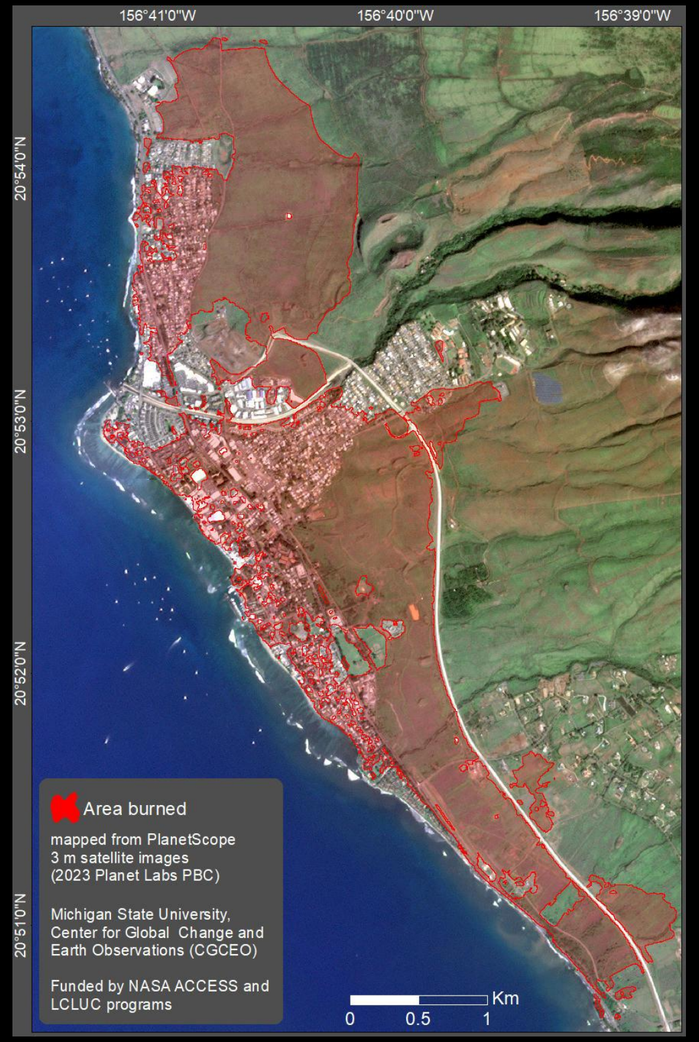
Challenge: Lack of timely detailed maps of burned areas as drier conditions increase during longer and more active fire seasons.

Benefits:

- This project demonstrates the importance of AI and Planet data in mapping burn areas and helping to determine postfire remediation ‘in greater detail than ever before’.
- Research like this helps make more cost-efficient decisions to help the rebuilding process after wildfires.
- Additionally, this research can be used to assess future fire risk and model fire behavior to enable and prioritize pre-fire mitigation projects.

Planet Products: PlanetScope

[Article link]



Advancing Oil Spill Response

Planet | EPA | NASA

Oil spills pose severe environmental, economic, and health risks, requiring effective monitoring for timely response. Remote sensing, particularly high resolution satellite imagery, enhances oil spill detection and tracking, filling observational gaps in offshore locations.

Challenge: Traditional oil spill monitoring relies on visual detection and airborne/ publicly available satellite sensors, which often have limitations such as low spatial resolution, sun glint interference, and insufficient observation frequency.

Benefits:

- Increased Observations: Added 86.3 more observation days per year at MC20.
- Higher Accuracy: Improved oil slick detection with better sun glint thresholds.
- Enhanced Spill Response: Strengthened tracking, NOAA reports, and GNOME modeling.
- Future Integration: Complements upcoming satellites for better response efforts.

Planet Products: PlanetScope

Article link

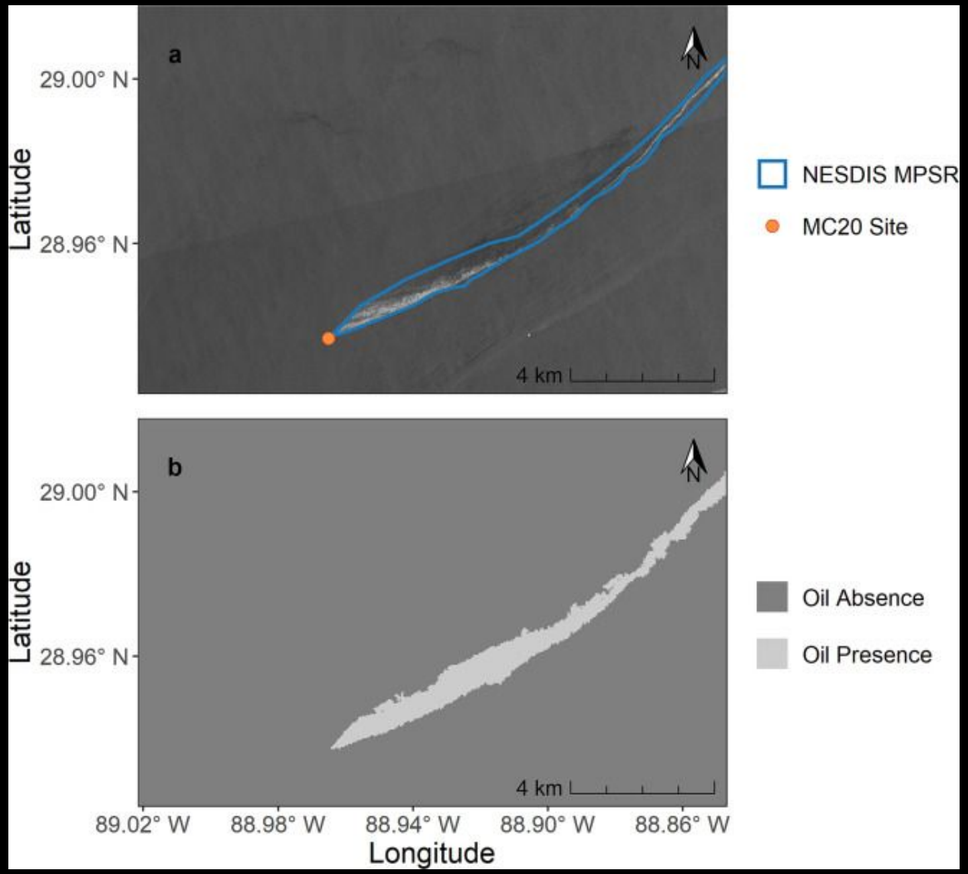


Fig. 3. (a) True color image (© Planet Labs Inc. 2019 all rights reserved) from PlanetScope at the MC20 site on August 6th, 2017, and (b) an example of an image classification via a DCNN using sun glint to detect oil and an independent NOAA NESDIS classification from a coincident marine pollution surveillance report.

Ensuring US Food Security through Yield Prediction

Planet | University of Maryland | NASA

Accurate crop yield monitoring is essential for food supply management, farming optimization, and risk assessment. Higher resolution satellite data provides field-scale insights that improve agricultural decision-making and forecasting.

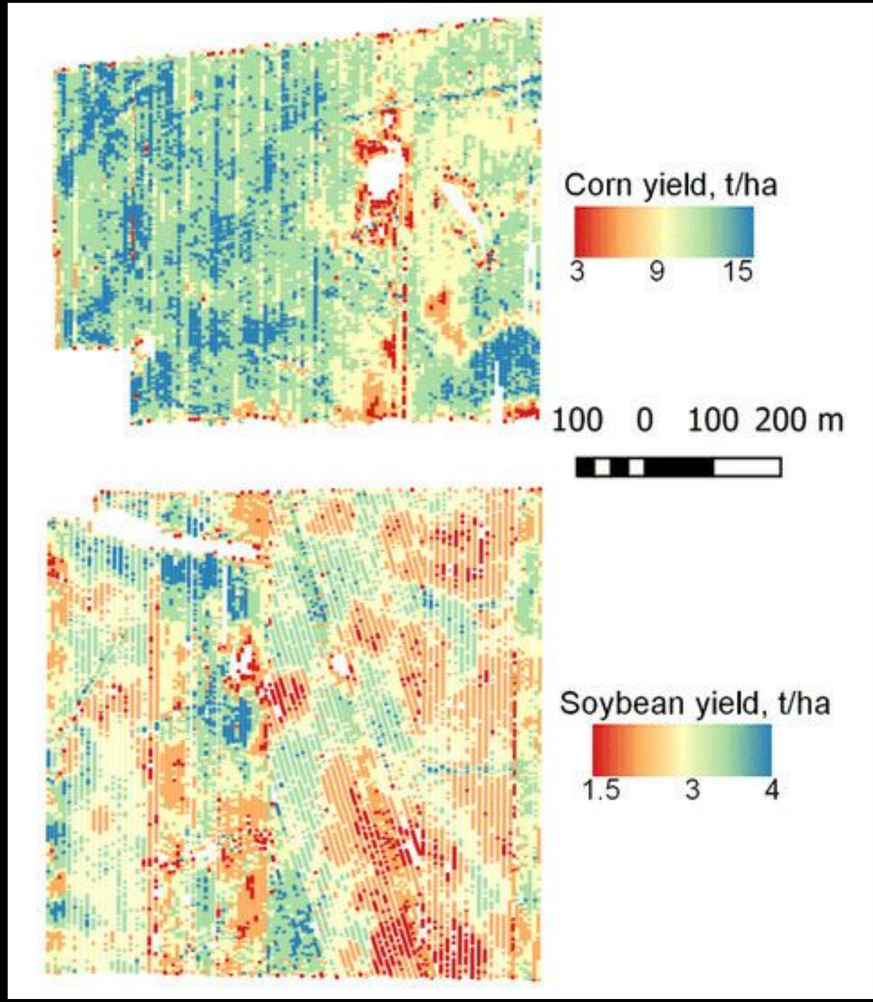
Challenge:
Traditional satellite sensors (AVHRR, MODIS, VIIRS) offer valuable crop yield data but lack the spatial resolution needed for field-level precision in farming and risk modeling.

Benefits:

- Improved Yield Forecasting & Precision Agriculture: Near-daily Planet data with Sentinel-2 and Landsat 8 enable early yield predictions and help farmers optimize management.
- Risk & Future Applications: High-resolution imagery enhances insurance risk models and supports better ground-based sampling and predictive modeling.

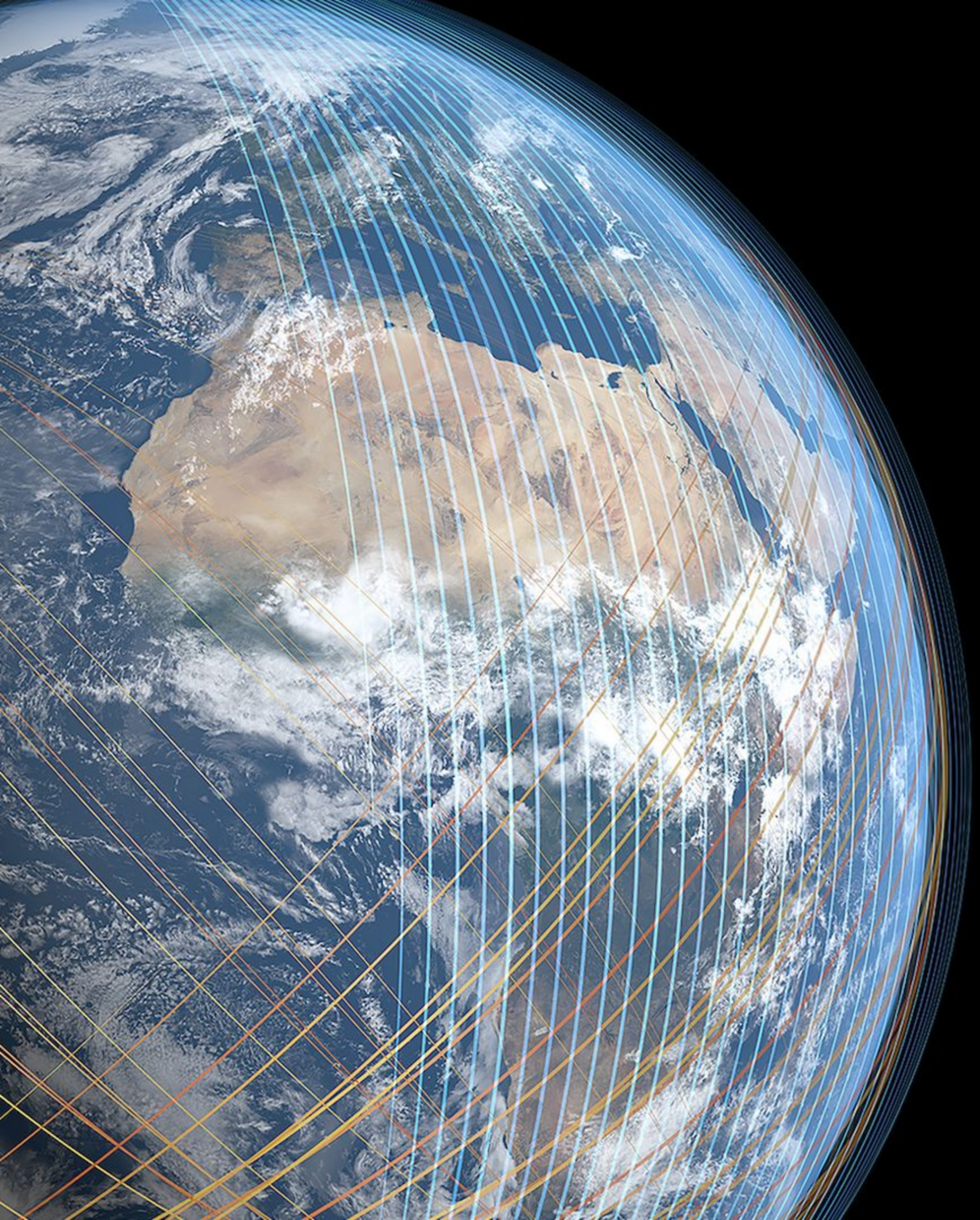
Planet Products: PlanetScope

[Article link]



Opportunities for Further Commercial Partnerships

- Further connecting the research to applications community through tool development, capacity building, and expanding adoption and utility of EO data.
- Continued research on data fusion across phenomenologies, public sector data, and commercial data.
- Enable dialogues with commercial industry to signal demand for new data and help influence future commercial mission or product roadmaps.
- Explore new and successful commercial partnerships to efficiently and cost-effectively support science objectives.



Thank You.

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