



Planet introduction: Border and Marine Monitoring

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About Planet

- Founded in 2010
- 500 employees
- Offices: San Francisco, Berlin and Amsterdam


- Launched >230 satellites
- Largest constellations of earth-observation satellites ever





To image the whole world
every day, making change
visible, accessible and
actionable.





Record breaking 88 satellites launched
February 14, 2017: INDIA
48 Additional Satellites
July, 14 2017: KAZAKHSTAN

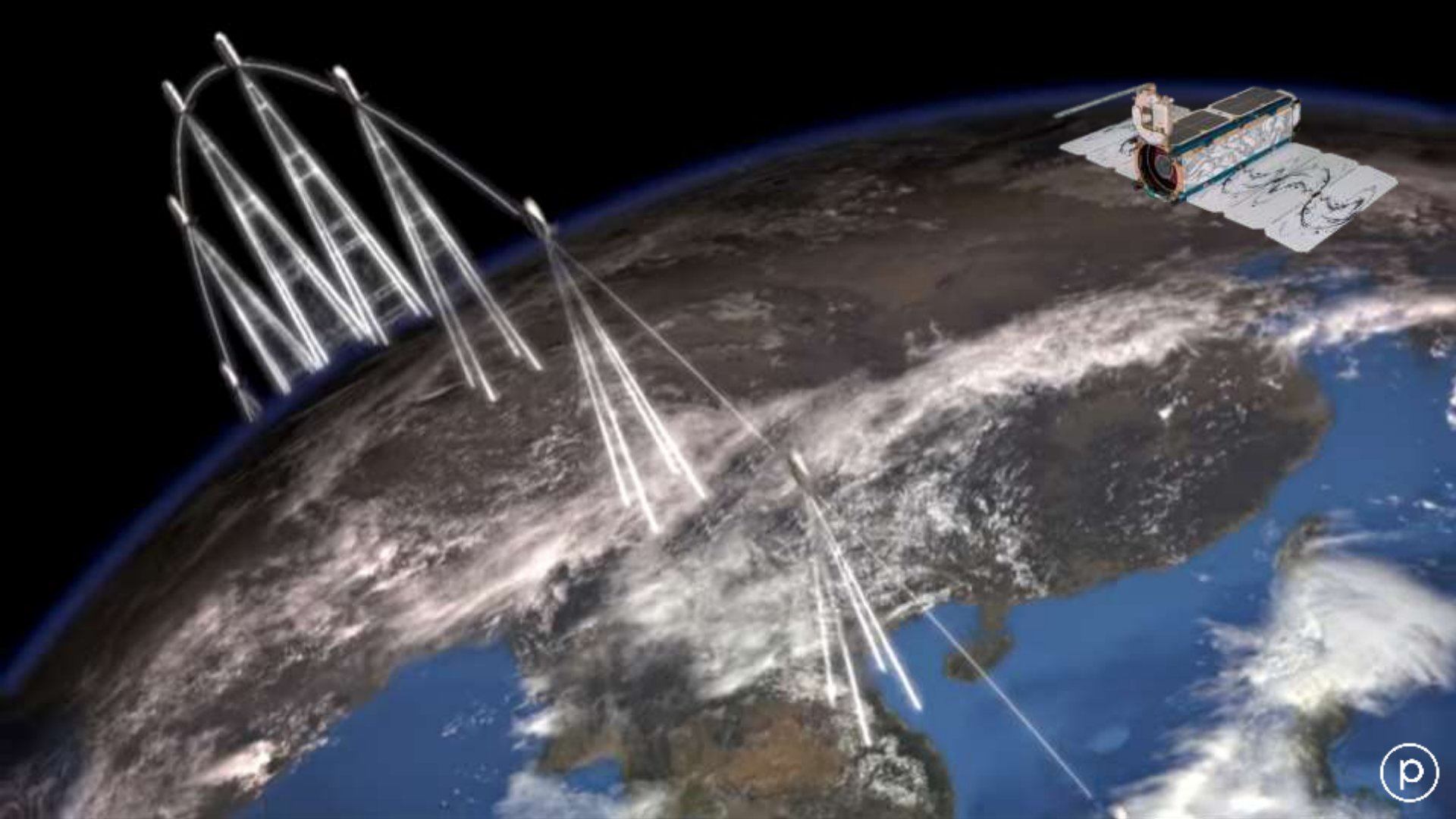
Lift-off from the Dhawan Space Centre in Sriharikota, India. Image: ISRO.

Total 136 launched this year
170+ currently operational

88 satellites evenly spaced by October = near daily coverage
48 additional satellites evenly spaced by early 2018 = daily coverage

<https://www.youtube.com/watch?v=cvJYSmplzXc>





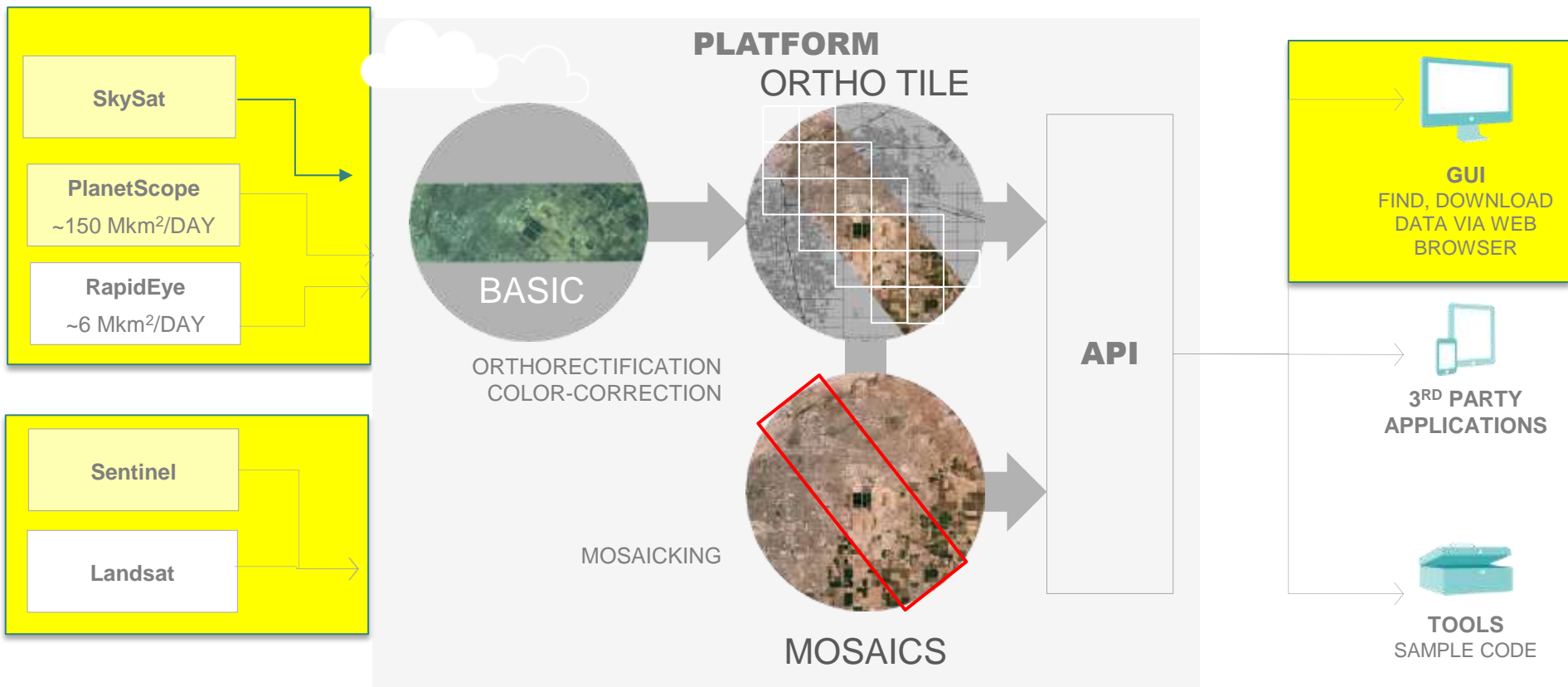
OUR CONSTELLATION

CONSTELLATION	DOVE
Constellation	170+ *
Image capture capacity	>150 million km ² /day
Ground Sampling Distance (GSD)	3-5 m
Pixel Resampled	3.125 m
Spectral Bands	Red, Green, Blue and NIR

* Estimated number of Dove satellites in August 2017 (incl. ISS)



IMMEDIATE ACCESS TO THE DATA



TRADITIONAL APPROACH

- Task each image
- Poor coverage
- No hope in cloudy areas
- Delays to receive data
- Expensive



Planet approach

- No tasking
- Complete daily imaging
- Hope in cloudy areas
- <24 hour access
- Unlimited access to all data
- Low, fixed price (subscription)



WITH GLOBAL DAILY IMAGERY, YOU CAN...

- Improve Situational Awareness Everywhere, Everyday
- Monitor Critical Infrastructure and Assets
- Immediate, Accurate Response with Near-Real Time Data

**Make better decisions with more complete
and timely information**



**WITH PIANDT SAME-DAY IMAGERY,
YOU CAN...**



Disaster response and asset monitoring

- Situational awareness
- Before and after Monitoring of Disasters
 - Are roads open
 - Are houses going to be flooded
- Monitor Critical Infrastructure and National Assets



Pattern of life: what is normal

Donetsk



TYPHOON LIONROCK FLOODING

North Korea

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These fields lie along the Tumen River, which forms the border between North Korea and China.

August 17, 2016



TYPHOON LIONROCK FLOODING

North Korea



Flooded Fields

Typhoon Lionrock brought heavy rains and flooding to northeastern North Korea. According to the state news agency, 15 people were missing in the wake of the floods.

September 6, 2016





SHANDONG AIRCRAFT CARRIER DALIAN, CHINA

DALIAN SHIPYARD

Shangdong Aircraft
Carrier under construction



APRIL 2016



12



23



26



27

MAY



17

JUNE



20

DALIAN SHIPYARD



Dry dock filled



APRIL 2016



12

MAY



23



26



27



17

JUNE



20

DALIAN SHIPYARD



Ship launched



APRIL 2016



12



23



26



27

MAY



17

JUNE



20

DALIAN SHIPYARD



Carrier docked,
dry dock empty.



APRIL 2016



12



23



26



27

MAY



17

JUNE



20

DALIAN SHIPYARD

New construction begins



APRIL 2016



12



23



26



27

MAY



17

JUNE



20



Ports and airports

- Monitor activity
- Detect change
- Observe patterns of life
- Look anytime, anywhere, everywhere



SHIP COUNTING

Sydney, Australia

SHIPS IN PORT

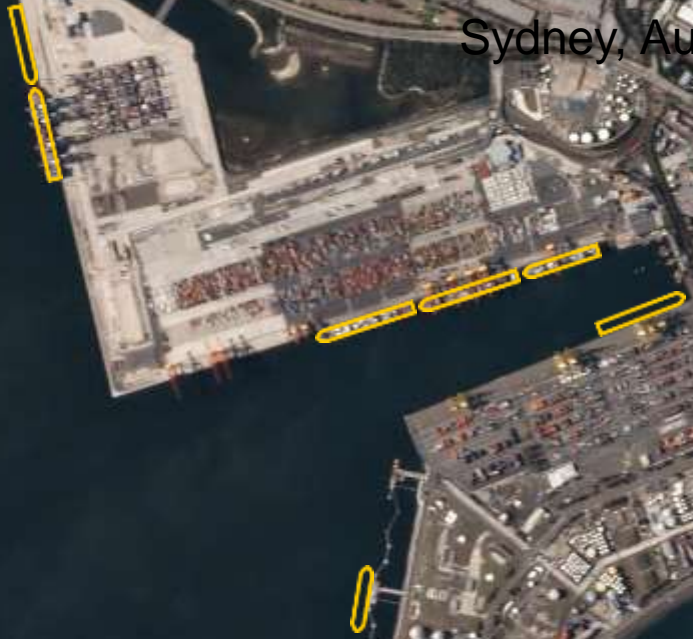
- Tanker
- Medium Container Ship
- Large Container Ship

January 2017 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



SHIP COUNTING

Sydney, Australia



SHIPS IN PORT

- Tanker
- Medium Container Ship
- Large Container Ship

January 2017 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



SHIP COUNTING

Sydney, Australia



SHIPS IN PORT

- Tanker
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January 2017 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31





COUNTING AIRCRAFT

Indications and warnings

TASK

Develop a proof of concept showing the ability to count aircraft using PlanetScope data

METHODOLOGY

- Planet engineers selected an area Hong Kong International airport used for parking aircraft as a test case
- Used CV techniques to isolate aircraft pixels in an image
- Took the mean of the R band, thresholded, and counted all pixels below the threshold (aircraft)

RESULTS

- Aircraft are clearly visible and able to be counted using computer vision techniques

NEXT STEPS

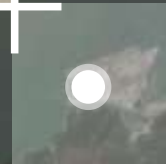
- Apply over all parking areas and extend to multiple airfields





OPPORTUNITY

Setup algorithm to check aircraft counts at all parking areas at multiple airfields to reveal patterns of aircraft movement. Implement alert via text or email when aircraft reach pre-determined low and high thresholds set by users.

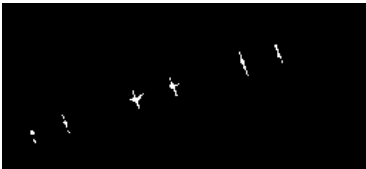




COUNTING AIRCRAFT

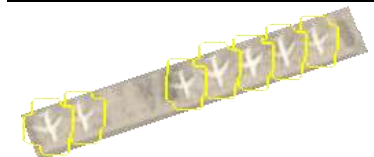
Hong Kong International Airport

02 MAR 2017



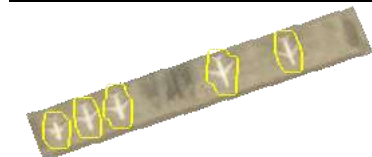
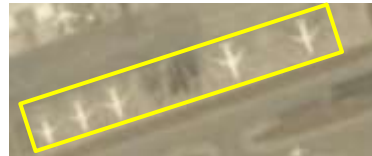
6 of 6 planes detected

05 FEB 2017



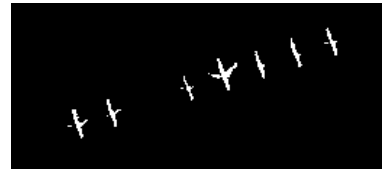
7 of 7 planes detected

12 FEB 2017



5 of 5 planes detected

16 FEB 2017



7 of 7 planes detected



PLANET USE CASE

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Islands, rigs and other assets

- Construction
- Activity
- Change



REEF DEVELOPMENT

Paracels, South China Sea

South China Sea

North Island

Middle Island

2016

Nov

9

Feb

15

Mar

6

12

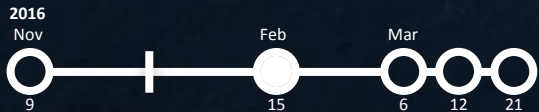
21



REEF DEVELOPMENT

Paracels, South China Sea

Clearing 



REEF DEVELOPMENT

Paracels, South China Sea

Clearing



Construction

2016

Nov

9

Feb

15

Mar

6

12

21



REEF DEVELOPMENT

Paracels, South China Sea

Construction



Dredging



SHIP DETECTION

Paracels, South China Sea



Positive ID

Possible ID





Open water

- Identifying vessels that shouldn't be there.

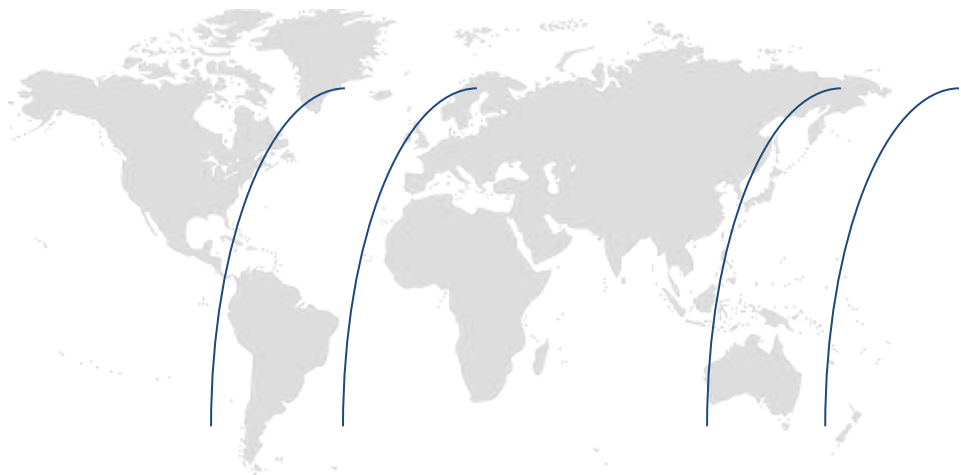


- **PLANET OPEN WATER MONITORING CAPABILITIES**

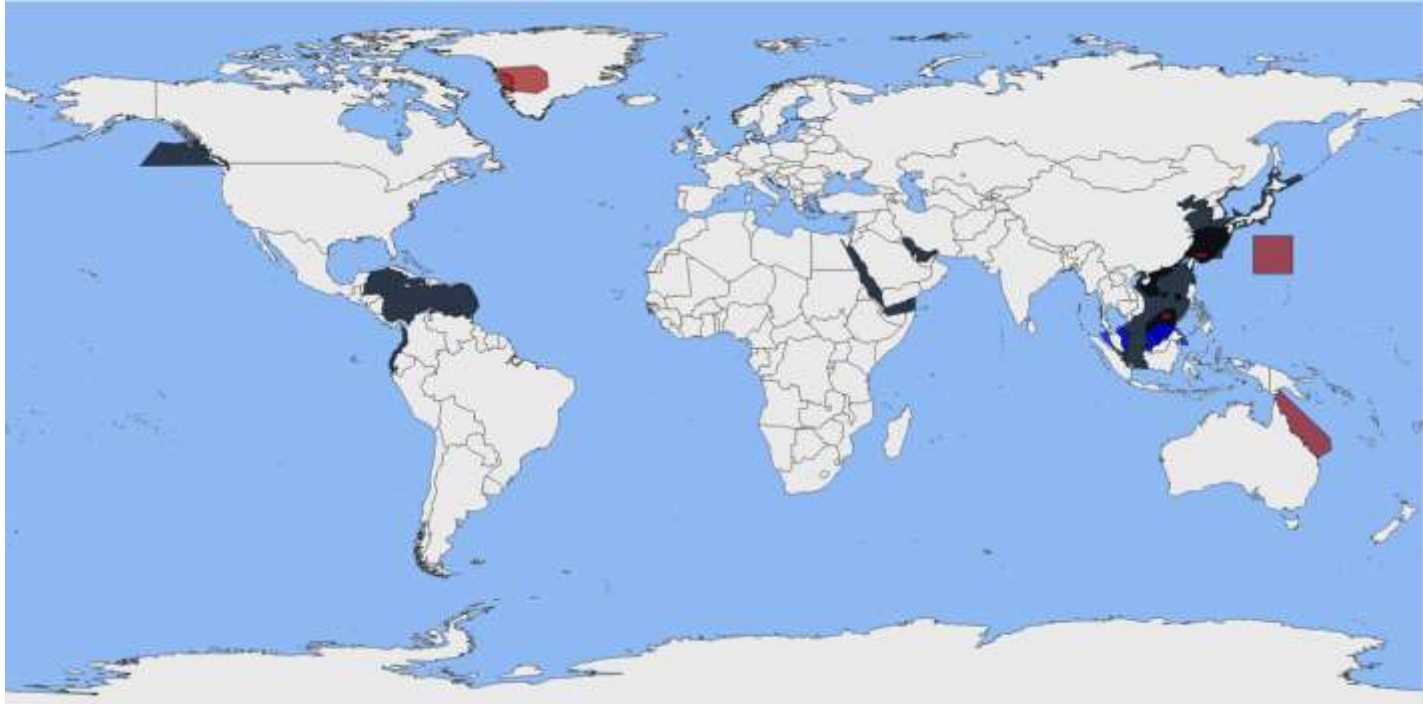
Planet is now able to **collect and deliver** imagery collected over **open ocean areas**

New registration and **interpolation techniques** allow for images to have a good level of **geo-referencing accuracy**

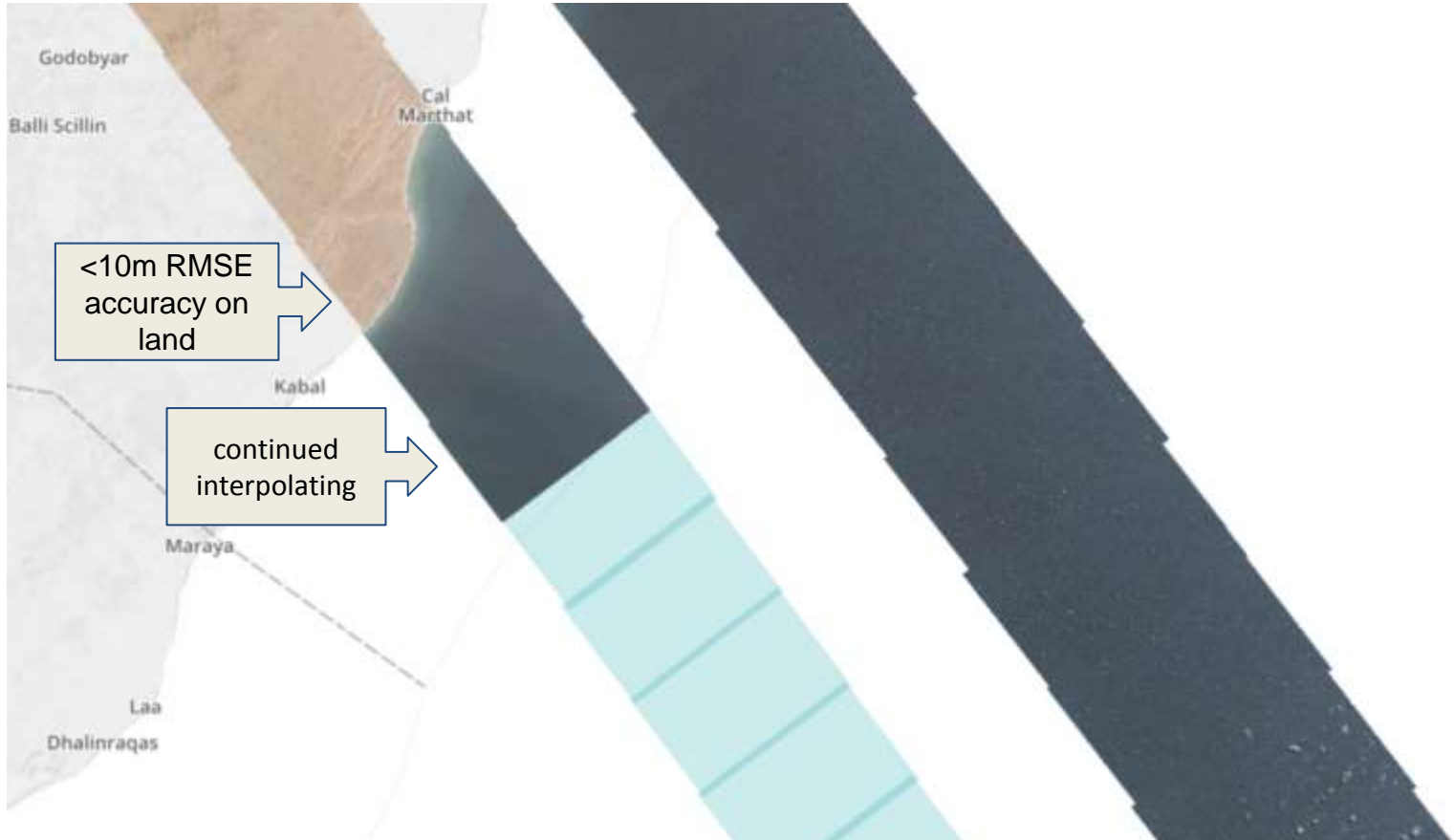
Open-ocean imagery has **standard Planet imagery product specifications** and **delivery methods**



- **OPEN WATER AOI OVERVIEW**



- **OFFSHORE RECTIFICATION**



WITH GLOBAL FREQUENT IMAGERY, YOU CAN...

- Monitor broad areas frequently and detect changes right after they occur
- Keep your geospatial datasets up to date
- Better understand the dynamics of land use & land cover
- Support field operations with very recent data
- Get reliable imagery over cloudy regions

**Make better decisions with more complete
and timely information**



THANK YOU!

**WHAT ARE YOU GOING TO DO WITH
EVERYDAY IMAGERY?**

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