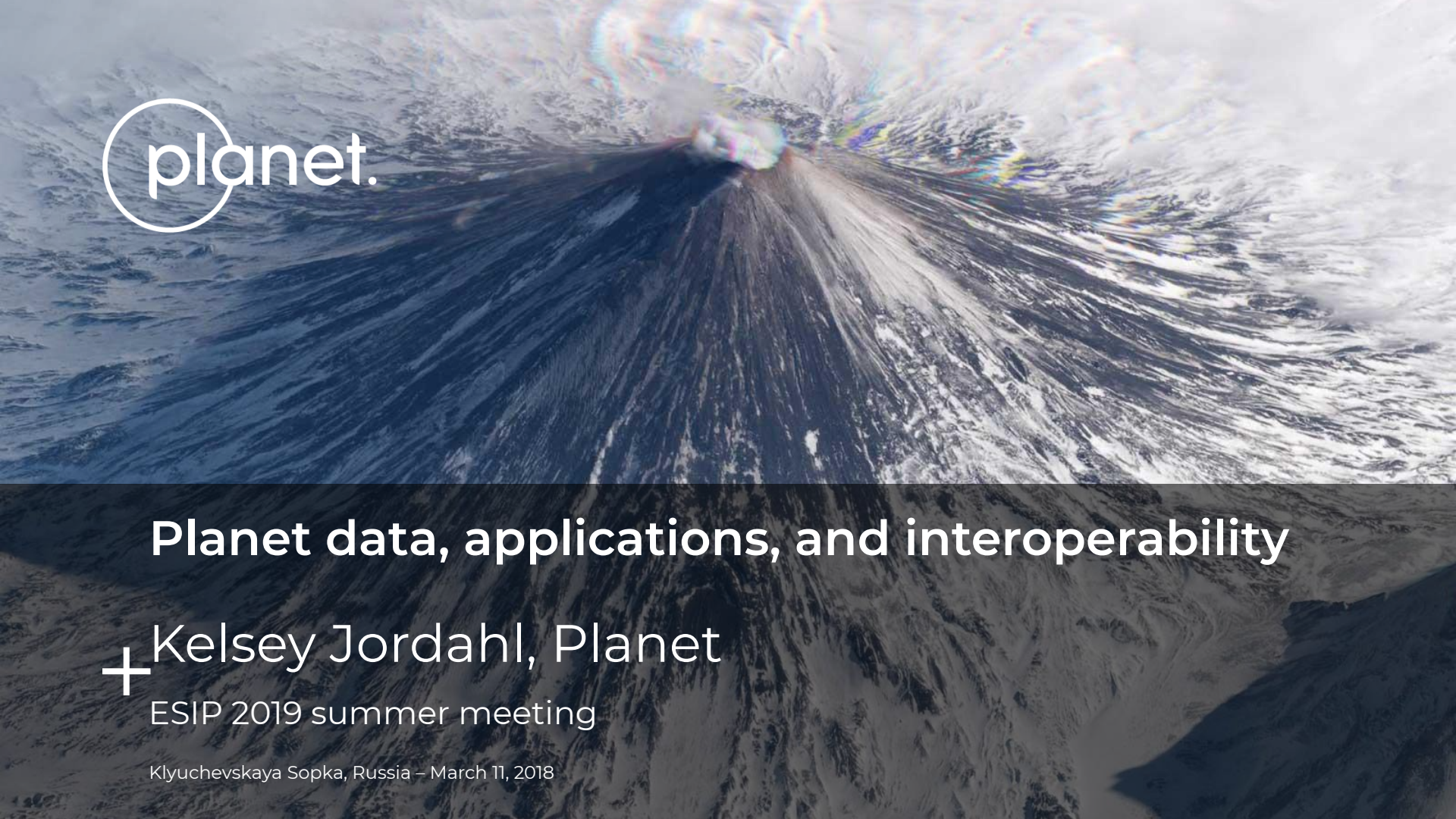


Planet data, applications, and interoperability

+ Kelsey Jordahl, Planet

ESIP 2019 summer meeting

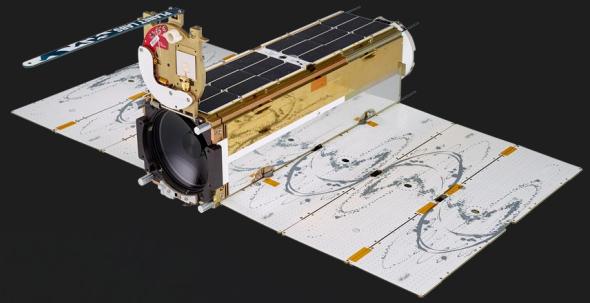
Klyuchevskaya Sopka, Russia – March 11, 2018

Outline

1. Introduction
    a. Who I am
    b. Planet satellite data
2. Examples of scientific applications
3. Interoperability
4. Following up

OUR CONSTELLATIONS

Constellation	Dove (Planetscope)	RapidEye	SkySat
Orbit Altitude	475 km	630 km	500 km
Spacecraft #	120 +	5	14
Image capture capacity	346 million km²/day	6 million km²/day	500,000 km²/day
GSD (Nadir)	3.9 m	6.5 m	0.72 m PAN
Pixel Resampled	3.125 m	5 m	1 m
Telescope and Camera	Bayer mask CCD sensor	Push broom imager	CMOS Frame Camera with Cassegrain telescope
Spectral Bands	RGB and NIR	RGB, Red Edge and NIR	RGB, PAN and NIR

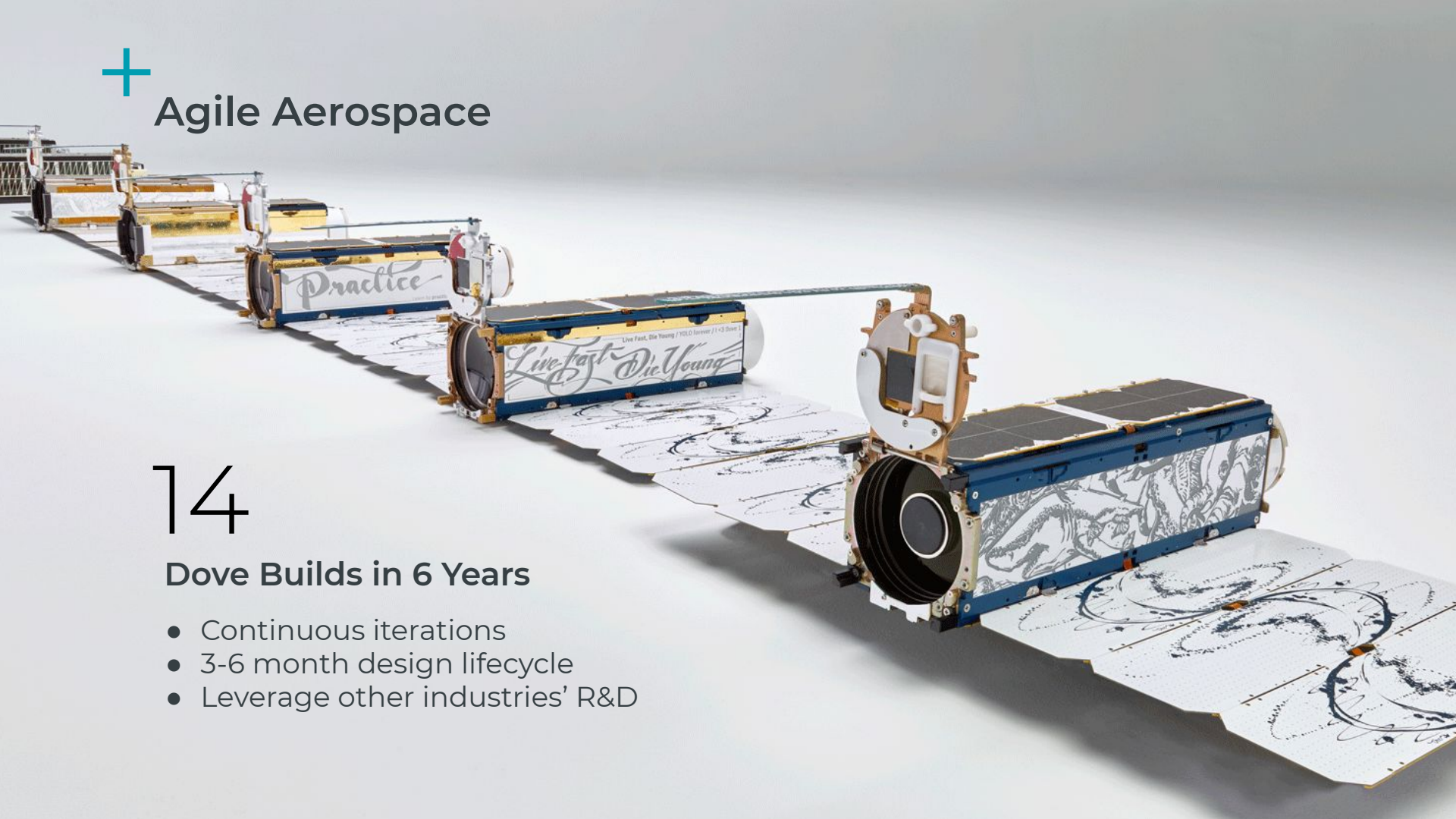


Doves

SATELLITES	GSD	CAPACITY
120+	**3.9 m**	**300 million km²**/day

ORBIT ALTITUDE	SPECTRAL BANDS
475 km	**RGB** and **NIR**

Agile Aerospace



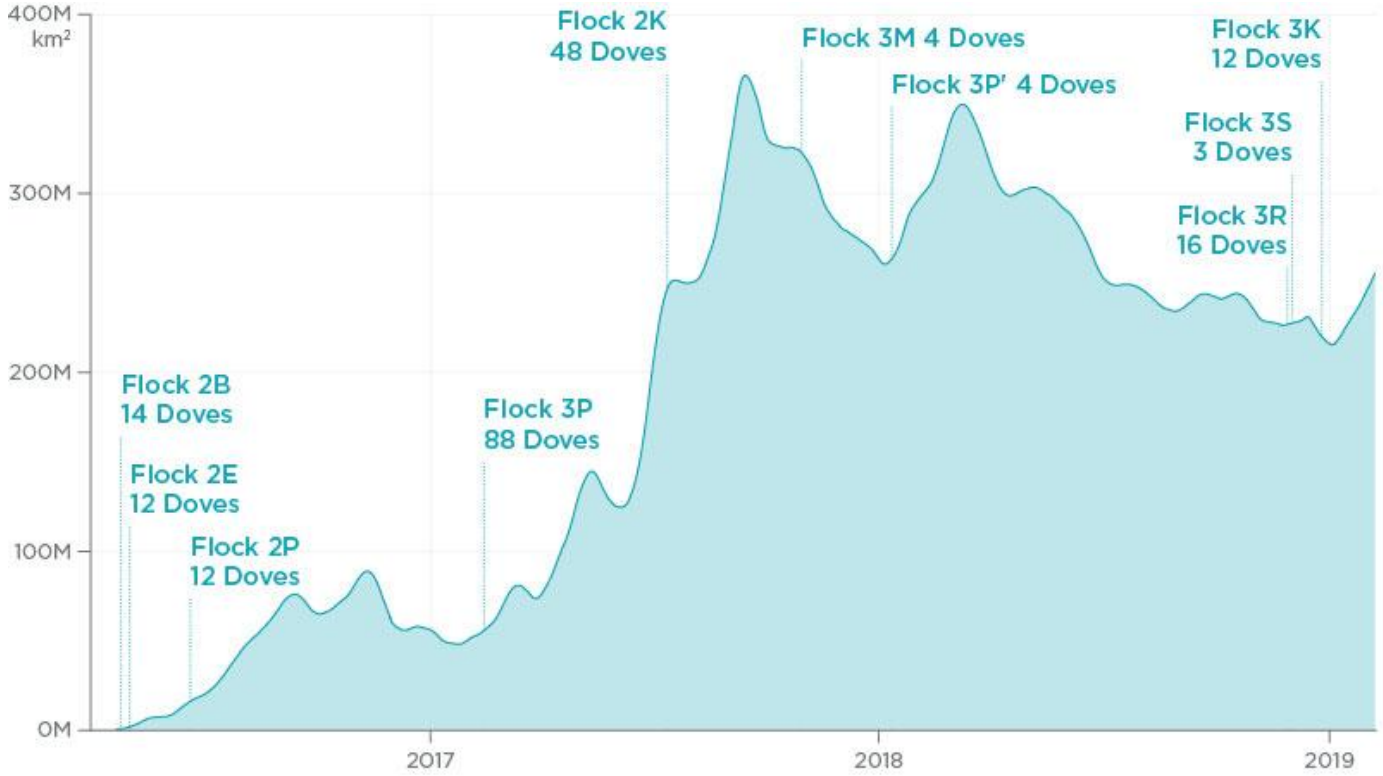
14

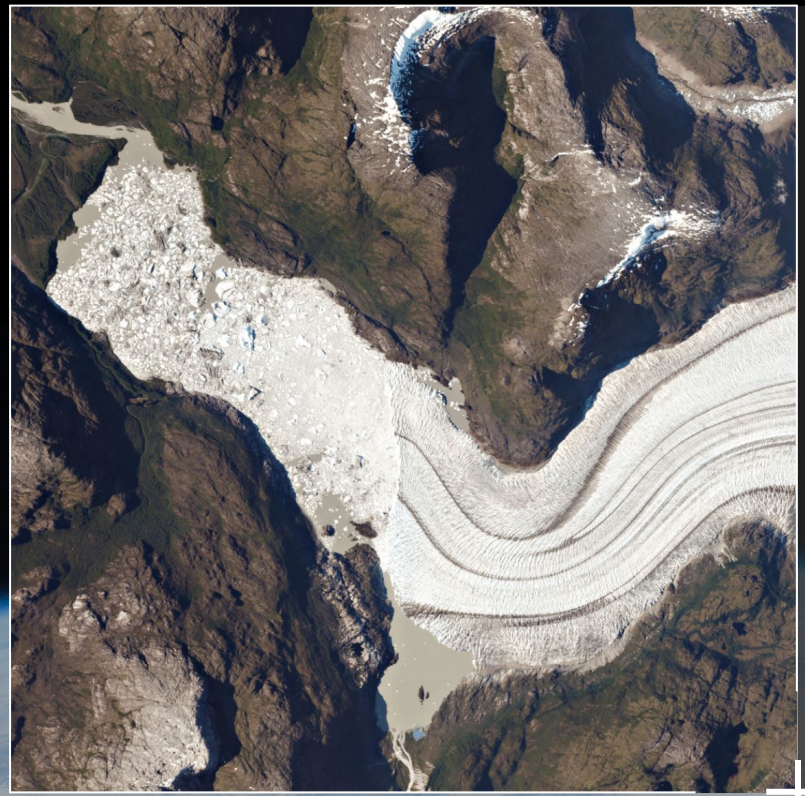
Dove Builds in 6 Years

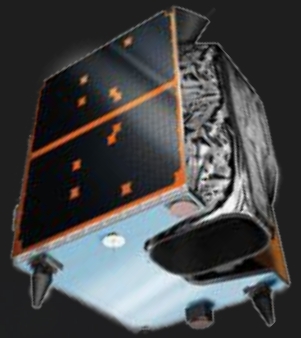
- Continuous iterations
- 3-6 month design lifecycle
- Leverage other industries' R&D

REACHING A DAILY PICTURE OF EARTH

Area collected daily in km^2



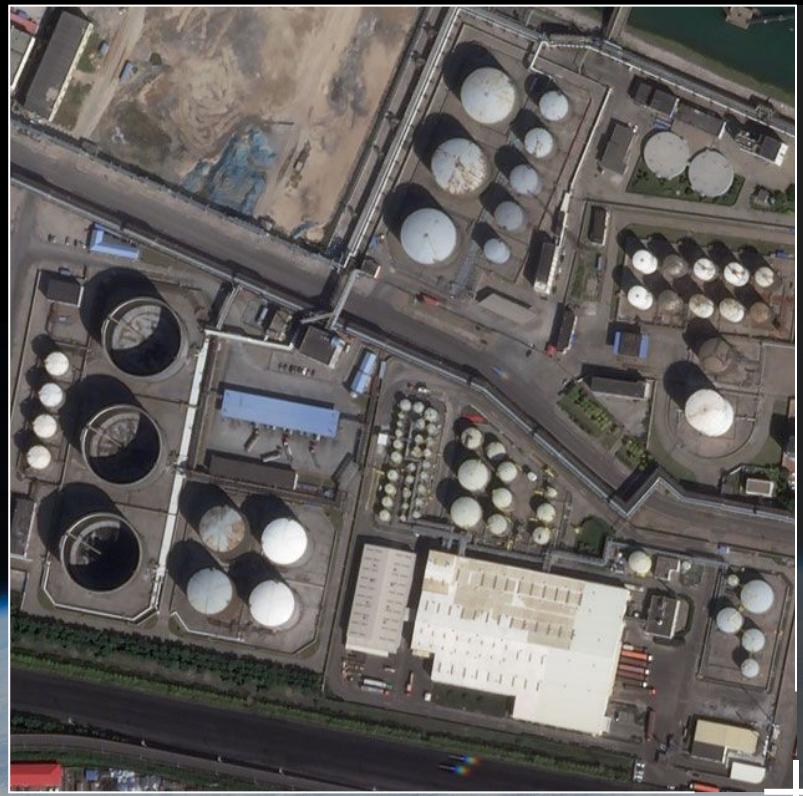


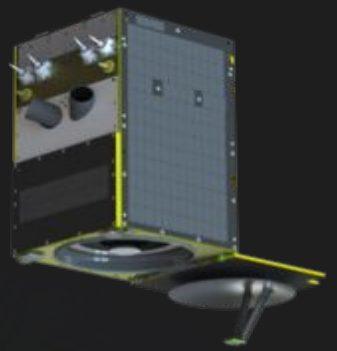


RapidEye

SATELLITES	GSD	CAPACITY
5	**6.5 m**	**6 million km²**/day

ORBIT ALTITUDE	SPECTRAL BANDS
630 km	**RGB, Red Edge** and **NIR**





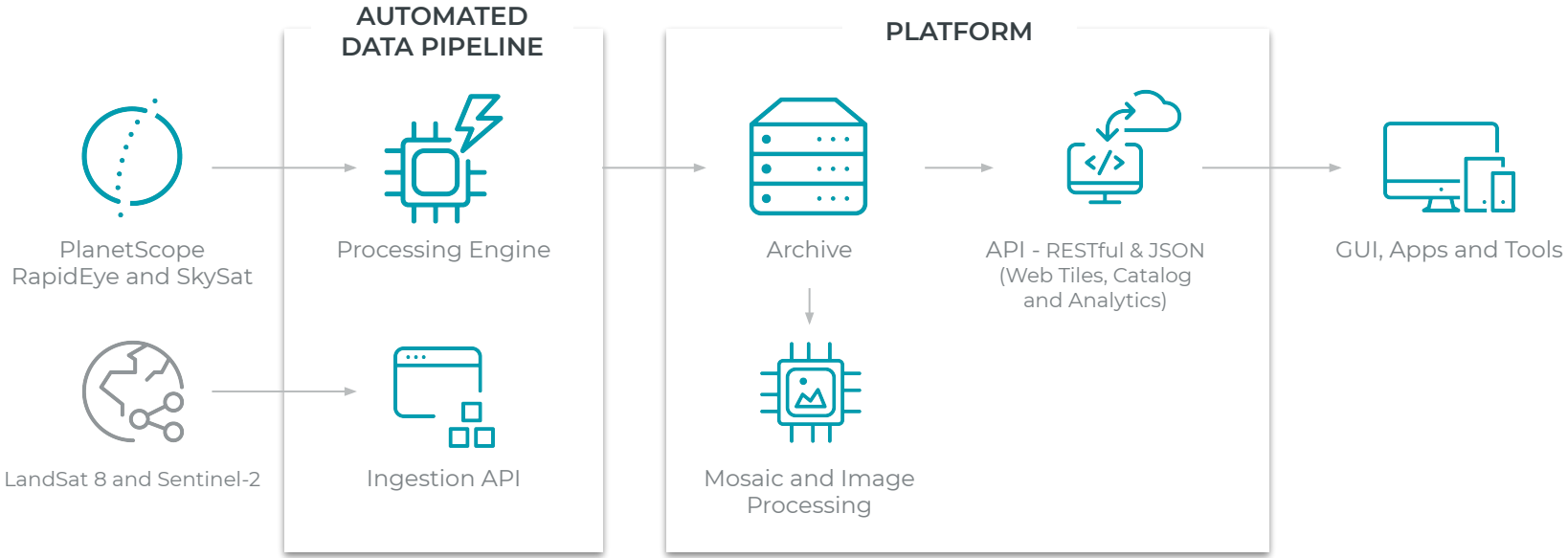
SkySat

SATELLITES	GSD	CAPACITY
14	**0.72 m**	**500 K km²**/day

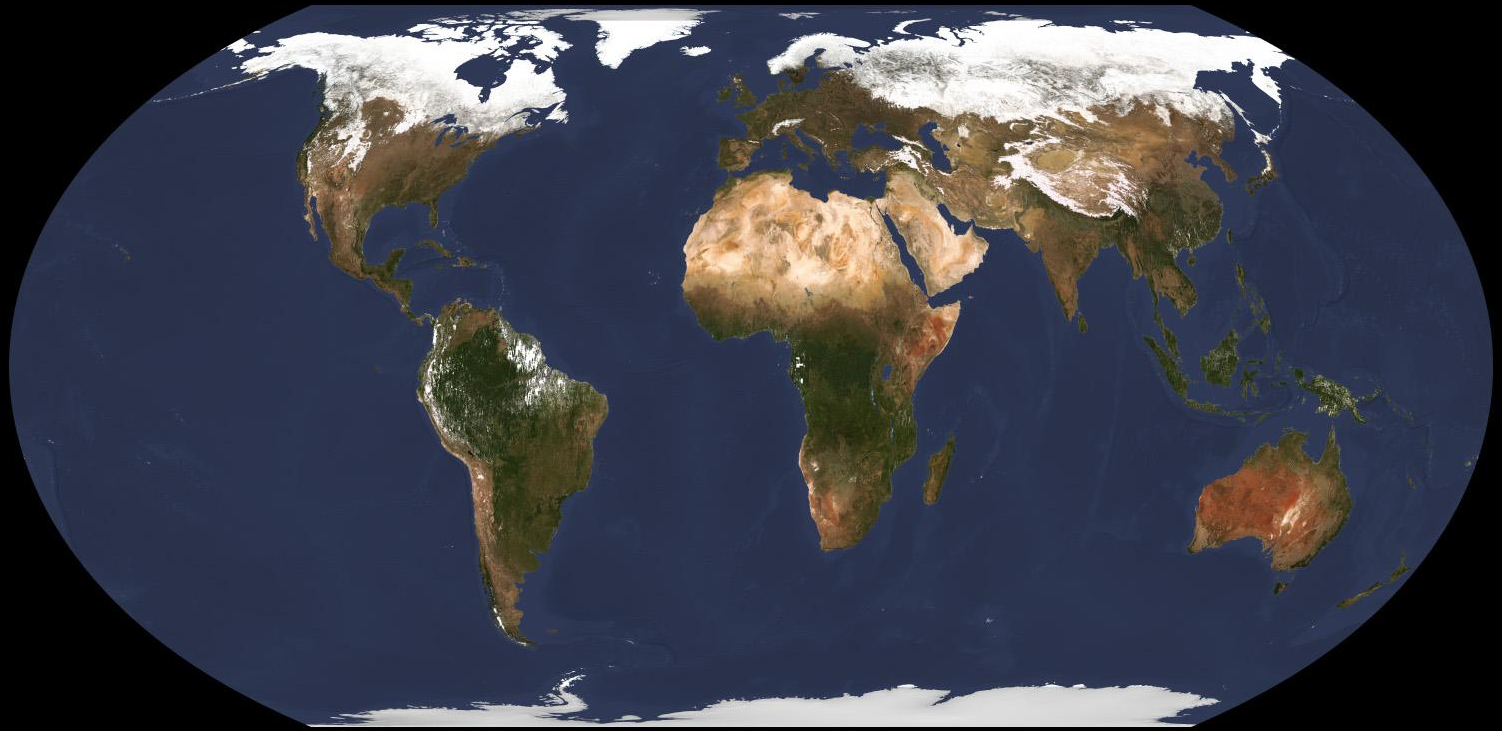
ORBIT ALTITUDE	SPECTRAL BANDS
500 km	**RGB, PAN** and **NIR**

Planet Platform

Integrated and built for scale

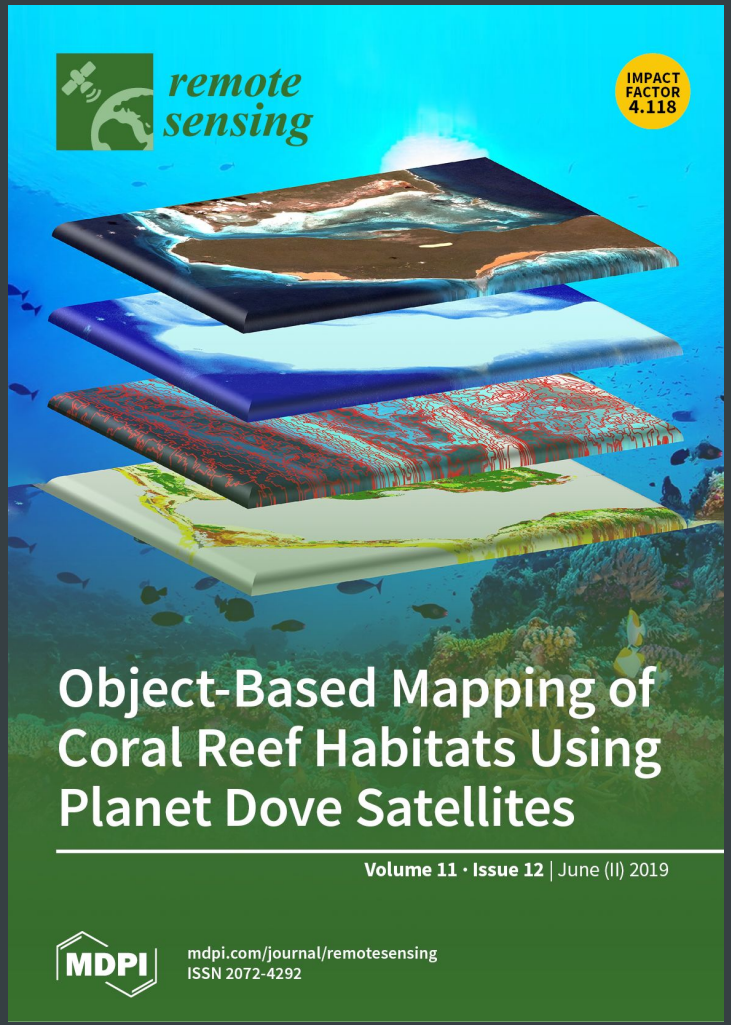


EARTH



March 2019

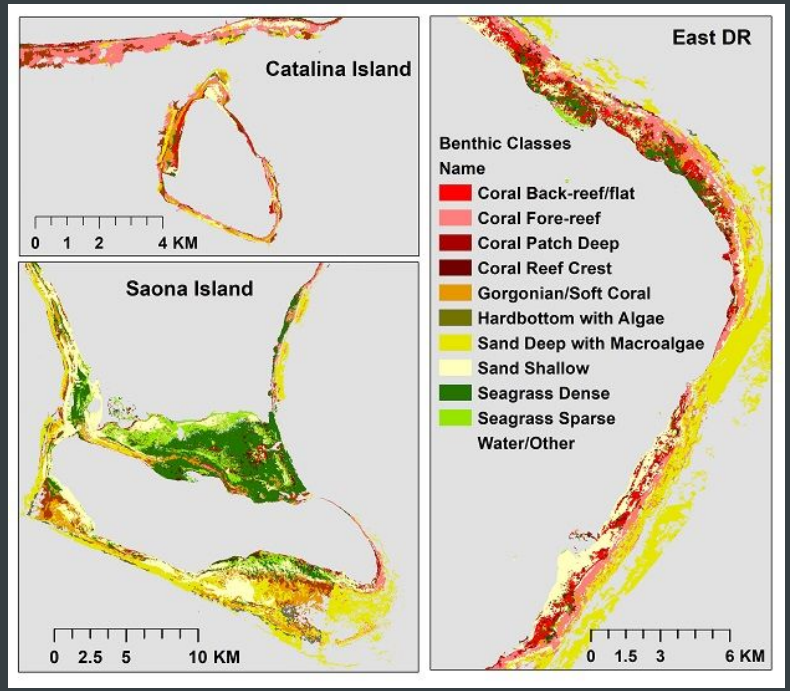
Scientific applications of Planet data

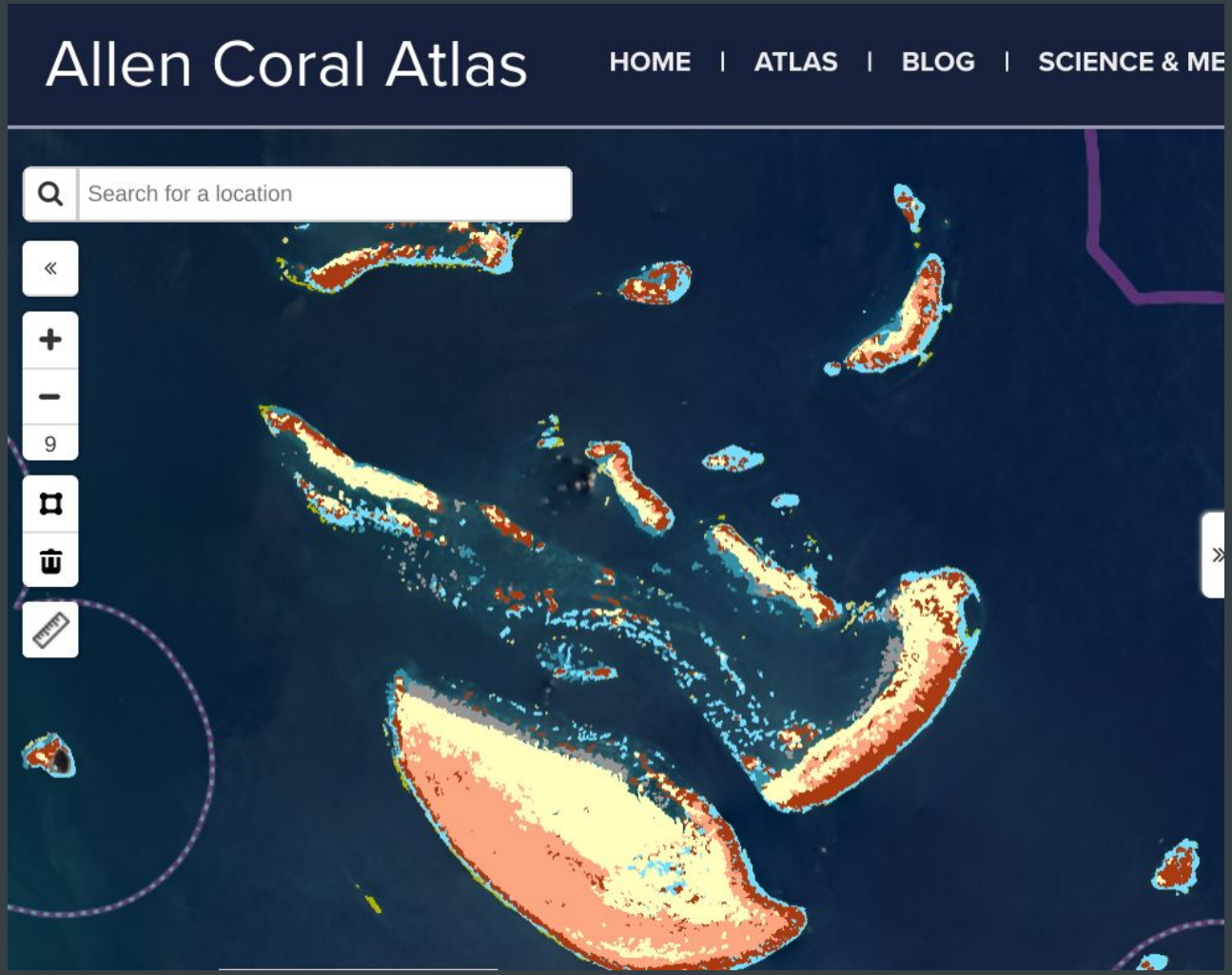


Object-Based Mapping of Coral Reef Habitats Using Planet Dove Satellites

Jiwei Li, S. R. Schill, D. E. Knapp and G. P. Asner

Remote Sensing, doi:10.3390/rs11121445

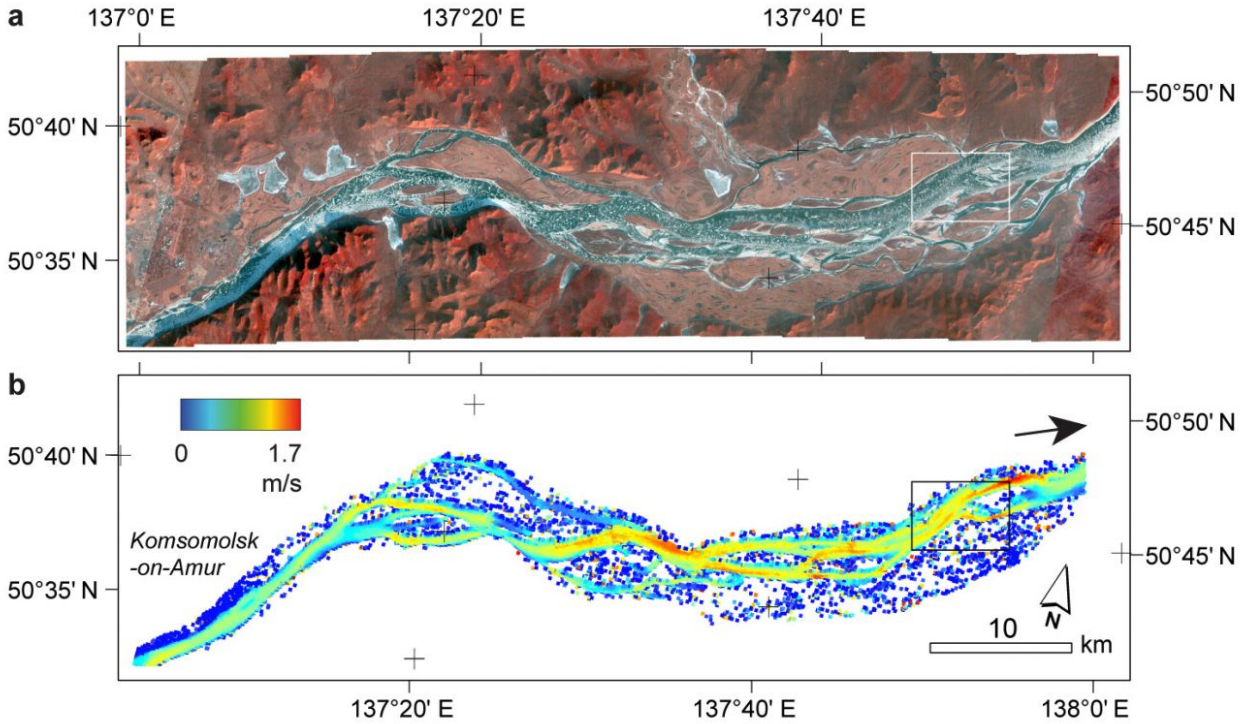



Allen Coral Atlas
HOME | ATLAS | BLOG | SCIENCE & ME
Search for a location
9

River ice and water velocities using the Planet optical cubesat constellation

A. Kääb,, B. Altena, and J. Mascaro

Hydrology and Earth System Sciences doi:10.5194/hess-2019-62

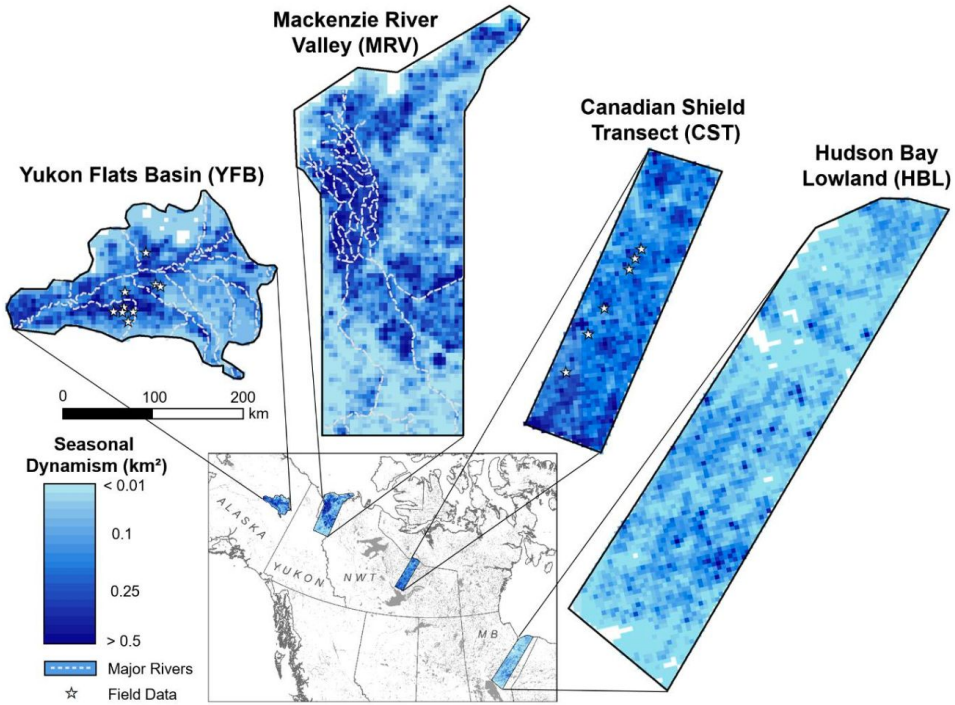


Amur River, Siberia, surface velocities of 1 November 2016 tracked over a 73s time lapse between overlapping Planet Dove images

Arctic-Boreal Lake Dynamics Revealed Using CubeSat Imagery

S. W. Cooley, L. C. Smith, J. C. Ryan, L. H. Pitcher and T. M. Pavelsky

Geophysical Research Letters, doi:10.1029/2018GL081584

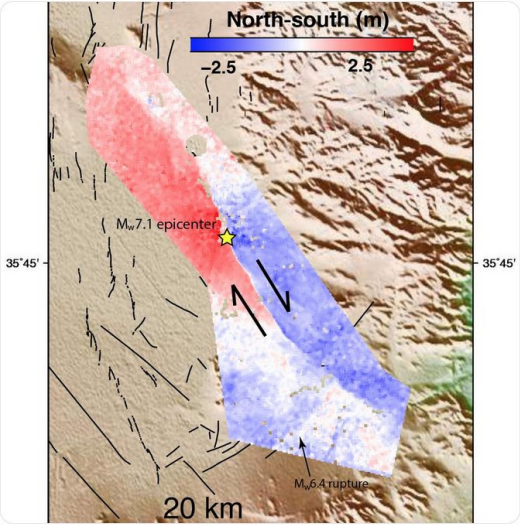


Dynamism measured as the area difference between the seasonal maximum and minimum lake extent using Planet Dove and RapidEye imagery.

Chris Milliner
@Geo_GIF

Following

A complete image of the Mw 7.1 Ridgecrest #earthquake showing amount of surface displacement measured by @planetlabs satellite imagery. Rupture is ~40 km in length with up to ~5m of fault slip. Fault trace has remarkably similar rupture geometry to 1999 Mw 7.1 Hector Mine event.



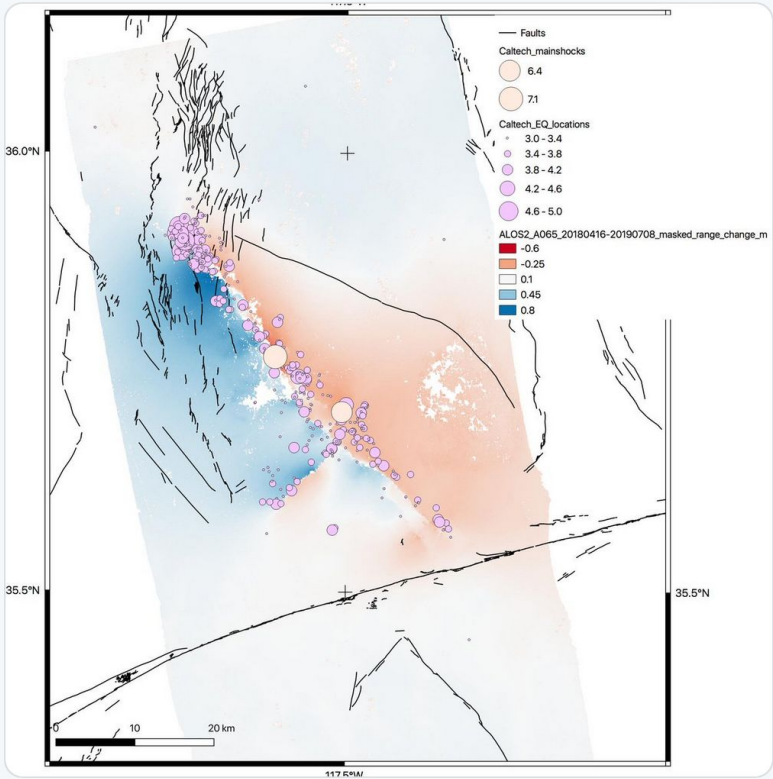
6:26 PM - 8 Jul 2019

170 Retweets 287 Likes

14 170 287

Eric Fielding @EricFielding · Jul 10

Map of permanent ground displacement due to M6.4 and M7.1 earthquakes near Ridgecrest California from NASA Caltech-JPL ARIA processing of JAXA ALOS-2 (unwrapped interferogram, path 65). This InSAR sensitive to west and up motion of ground. @zross_ relocated main and aftershocks



6 109 195

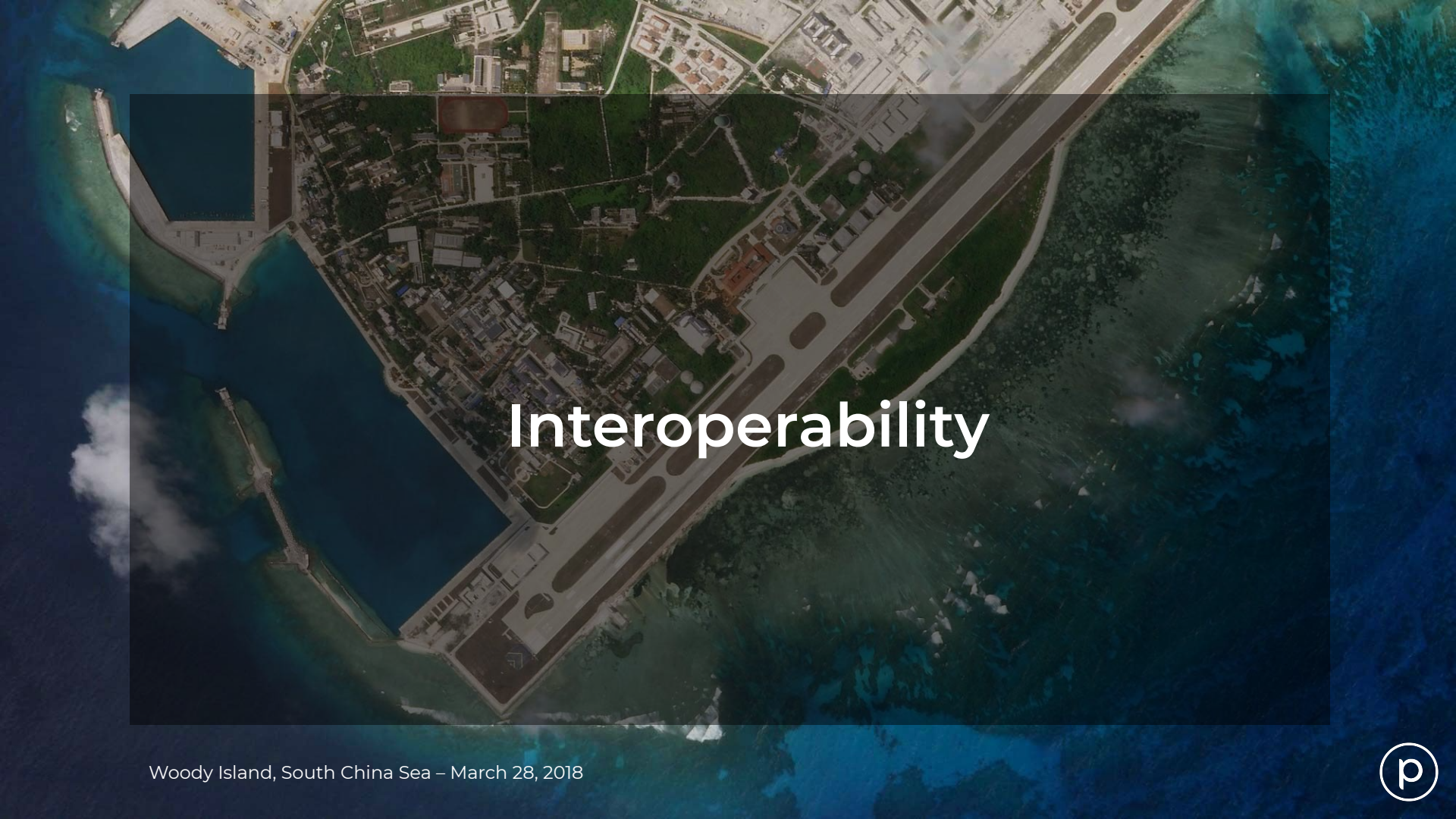
LAND AND SEA ICE

Robertson Island, Antarctica · April 2, 2019


POPOCATÉPETL
Pueblo and Morelas, Mexico • April 10, 2019


MISSOURI RIVER
Pacific Junction, IA • March 17, 2019


MISSOURI RIVER
Pacific Junction, IA • March 18, 2019



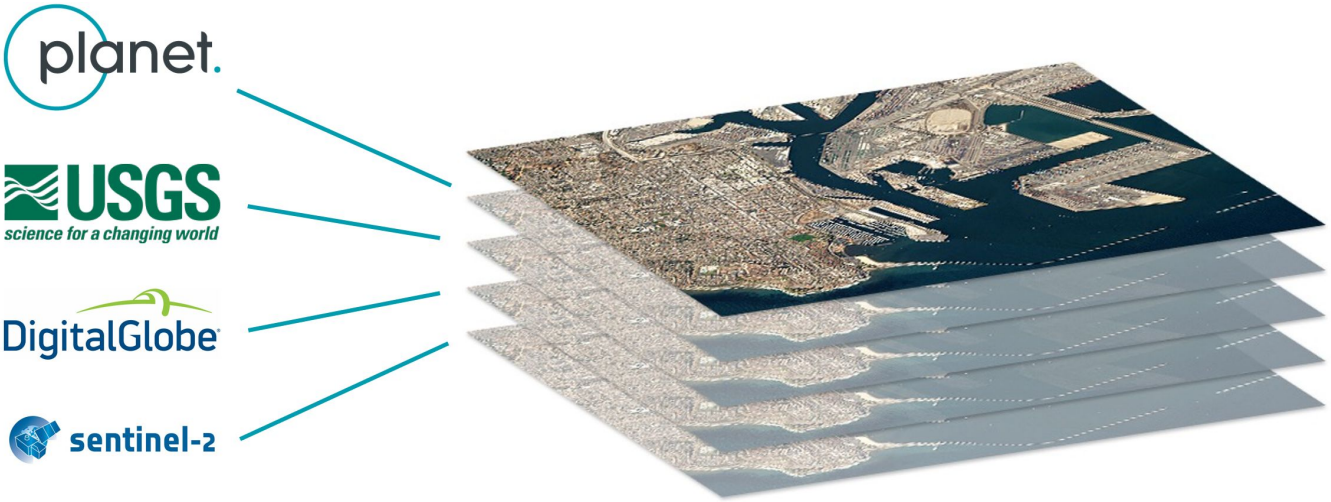
Interoperability

Woody Island, South China Sea – March 28, 2018

PLANET WORKS WITH MULTIPLE DATA SOURCES

Visualize time, analyze change, integrate workflows

Built for speed and affordability, Planet enables customers to build tools, ingest other datasets, and bring to life applications that create actionable insights for smarter decisions.



Miami, Florida, captured by a SkySat satellite on August 13, 2017. Image ©2017 Planet Labs, Inc. cc-by-sa 4.0

CNG Part 3: Planet's Cloud Native Geospatial Architecture

Chris Holmes Follow
Nov 9, 2017 · 9 min read

So far we have talked about Cloud Native Geospatial in the abstract, and introduced a core CNG format — the Cloud Optimized GeoTIFF. At this point the most helpful thing is likely to get a bit more concrete about what an actual Cloud Native Geospatial Architecture looks like. Planet has been building one for several years now, so it's a great place to start.

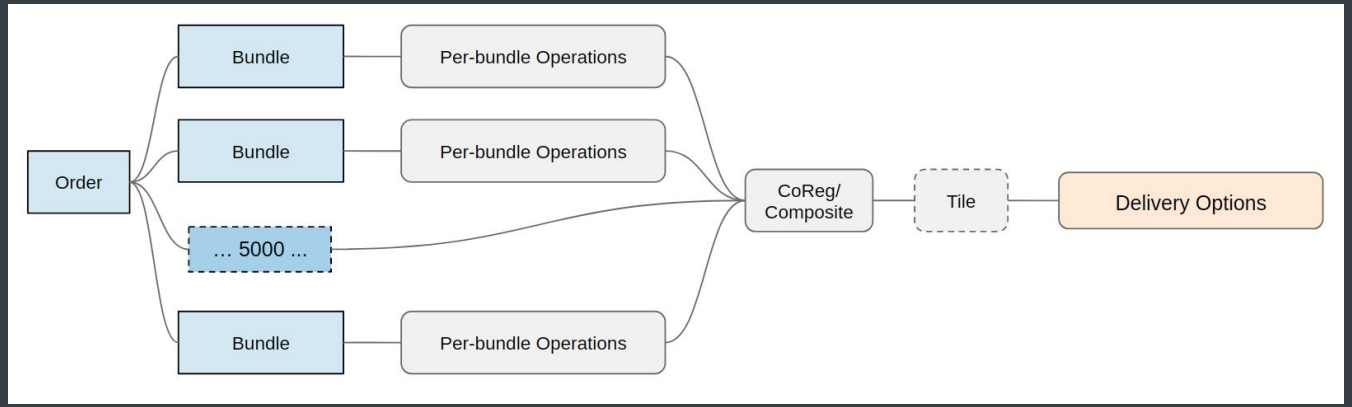
Cloud Delivery
Planet API ordering service (Orders v2 API)

Operations include:

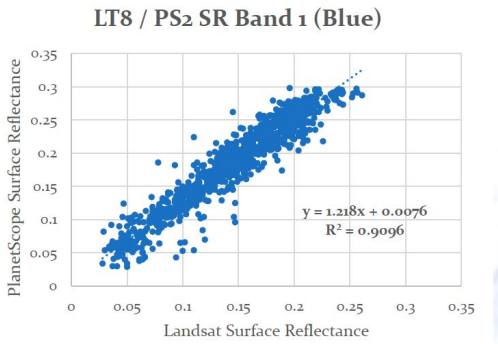
band math, clip, composite, reproject, coregister

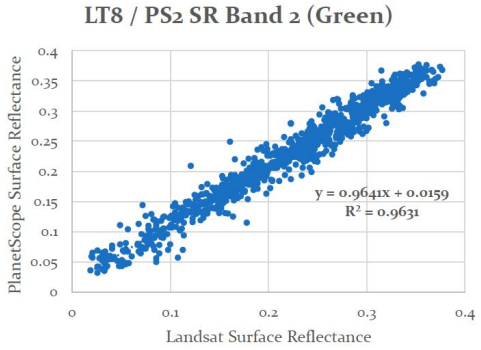
Delivery options include:

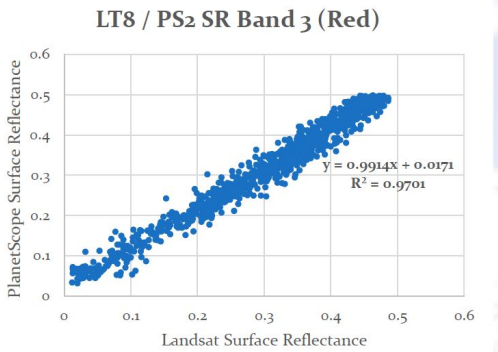
Amazon S3, Azure, Google Cloud Storage

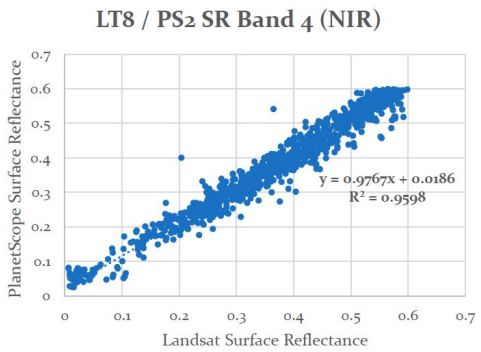


PS2 / LT8 Correlations









Variable	Blue	Green	Red	NIR
R^2	0.91	0.96	0.97	0.96
Slope	1.22	0.96	0.99	.98

High correlation between PS2 and LT8 imagery (0.91 to 0.97 in R^2)

High correlation observed across all analyzed locations, dates, LC types, and PS2 sensors and bands (Red band has the highest correlation)

Lower R^2 for Blue band may be due to the differences in SR calibration – LT8 SR includes haze removal

Varlyguin et al. (GDA/NGA), JACIE 2018

How do I get my hands on Planet data?

1. New or existing contracts

2. Education and Research program
   https://www.planet.com/markets/education-and-research
3. 14-day free trial
   https://www.planet.com/trial

ANALYSIS-READY DATA WORKSHOP 2019

#ARD19 // MEASURE. FUSE. ANALYZE.

Aug 5-7, 2019, USGS Menlo Park

https://www.ard.zone/ard19

http://go.planet.com/explore19


planet.
Thank You!
Kelsey Jordahl
kels@planet.com
@kajord
Kure Atoll, Hawaii, USA – May 12, 2016