

29 Using Planet Cubesat Imagery for a Dynamic Environmental Sensor Web



James Mason¹, Steve Chien¹, Jim Boerkoel², Daniel Wang¹, Ashley Davies¹, Joel Mueting³, Vivek Vittaldev³, Vishwa Shah³, Ingacio Zuleta³

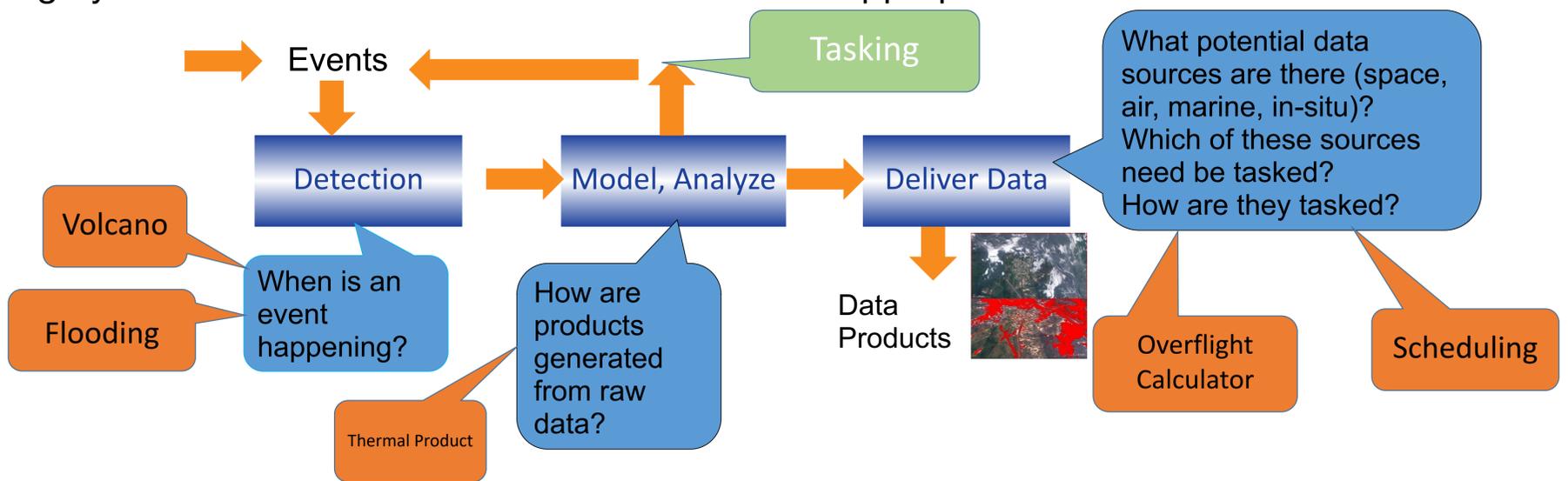
¹Jet Propulsion Laboratory, California Institute of Technology. ²Harvey Mudd College.

³Planet Labs, Inc.

james.mason@jpl.nasa.gov

Sensorweb concept and technologies

- Aggregate data from satellite and in-situ sensors to track phenomena.
- Use automated data analysis to generate prioritized alerts
- Use federated scheduling algorithms to plan observations for a given constellation, requesting imagery from both NASA and commercial assets as appropriate



Volcano Monitoring Data Sources

Data Source	Data Type	Spatial Coverage
MODVOLC (MODIS, Terra+Aqua)	Thermal emission	Worldwide
VIIRS Active Fires	Thermal emission	Worldwide
Iceland Met Office	Seismic	Iceland
IGEPN (Ecuador)	Reported	Ecuador
Serganomín (Chile)	Reported	Chile
USGS	Seismic	Worldwide
Volcanic Ash Advisory (VAAC)	Reported Aviation Ash	Worldwide (7 regions implemented)

End to end demonstration

We have prototyped a volcano observation sensorweb to serve as a driving use case for sensorweb technology development. In this effort we have operationalized tracking of a number of volcano monitoring sources (see table).

In Spring 2020, we tested the above concepts in an end to end demonstration. Using the above triggers, we enabled automated tasking of the Planet Skysat constellation from a JPL sensorweb node. Three scenes were acquired in early February.

This effort is part of the Earth Science Technology Office (ESTO) New Observing Systems (NOS) Testbed. ESTO NOS is bringing together technologists and scientists to integrate disparate modules to demonstrate new observation paradigms.

We have previously used sensorwebs to task the EO-1 spacecraft for the Volcano and Thailand Flood sensorwebs.



Acquired Planet Skysat Scene
13 Feb 2020
Trigger: VIIRS (Active Fire)
Target: Billy Mitchell



Acquired Planet Skysat Scene
14 Feb 2020
Trigger: VIIRS, MODVOLC
Target: Nishinoshima



Acquired Skysat Scene
14 Feb 2020
Trigger: USGS Seismic
Target: Mere Lava (Vanuatu)