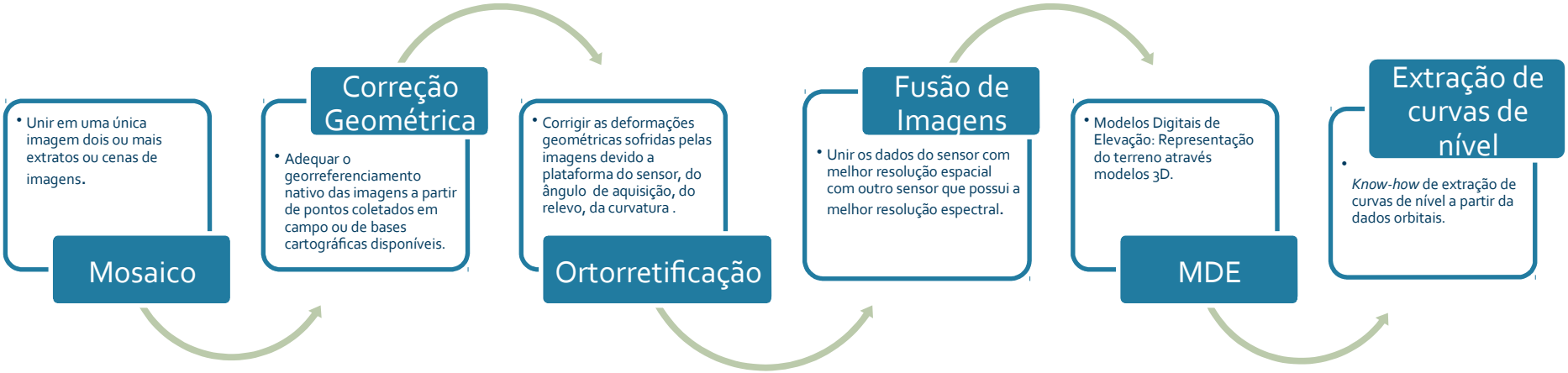
globalgeo

Tecnologia de ponta e
alta resolução nos seus projetos.

DigitalGlobe™

Processamento de Imagens



The Power of the Combined Constellation

Unique capabilities enabling you and your customers

Key Biscayne, FL | GeoEye-1 | 14 April 2012

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Topics

- The combined constellation
- Constellation optimization
- Capabilities coming soon
- WorldView-3

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The Combined Constellation

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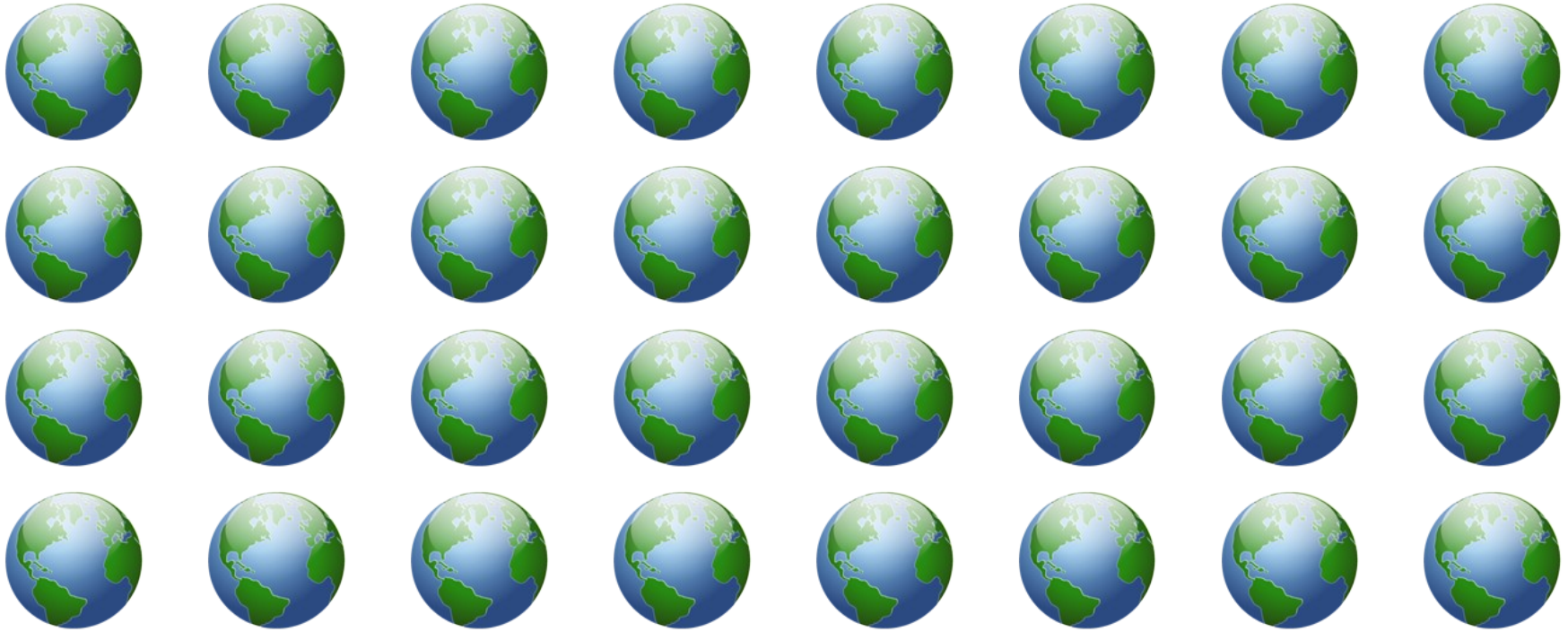
The combined company offers you the largest archive in the industry of high resolution imagery

3.9 billion km²



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Our robust 5-satellite constellation has complementary capabilities to meet your needs

	Ikonos	QuickBird	WV-1	GE-1	WV-2
Altitude (km)	680	450	496	680(1)	770
Nadir GSD (m)	0.82	0.61	0.5	0.41(1)	0.46
Spectral	Pan+4	Pan+4	Pan	Pan+4	Pan+8
Pixels (swath)	13.5K	27K	35K	37K	35K
High Agility			✔		✔
High Accuracy			✔	✔	✔
km^2/day	150,000	180,000	1,500,000	350,000(1)	1,200,000
Applications	Basemap	Basemap	Pan Basemap Stereo	Basemap	Basemap Stereo Spectral

(1) Legacy capacity. Improvements underway (see following slides)

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Capacity = meeting your needs faster, better

- 5 satellites on orbit
- Collects over 3 million km² daily of high resolution imagery
- Large area stereo collection capability
- Only provider to offer 8-band multispectral imagery

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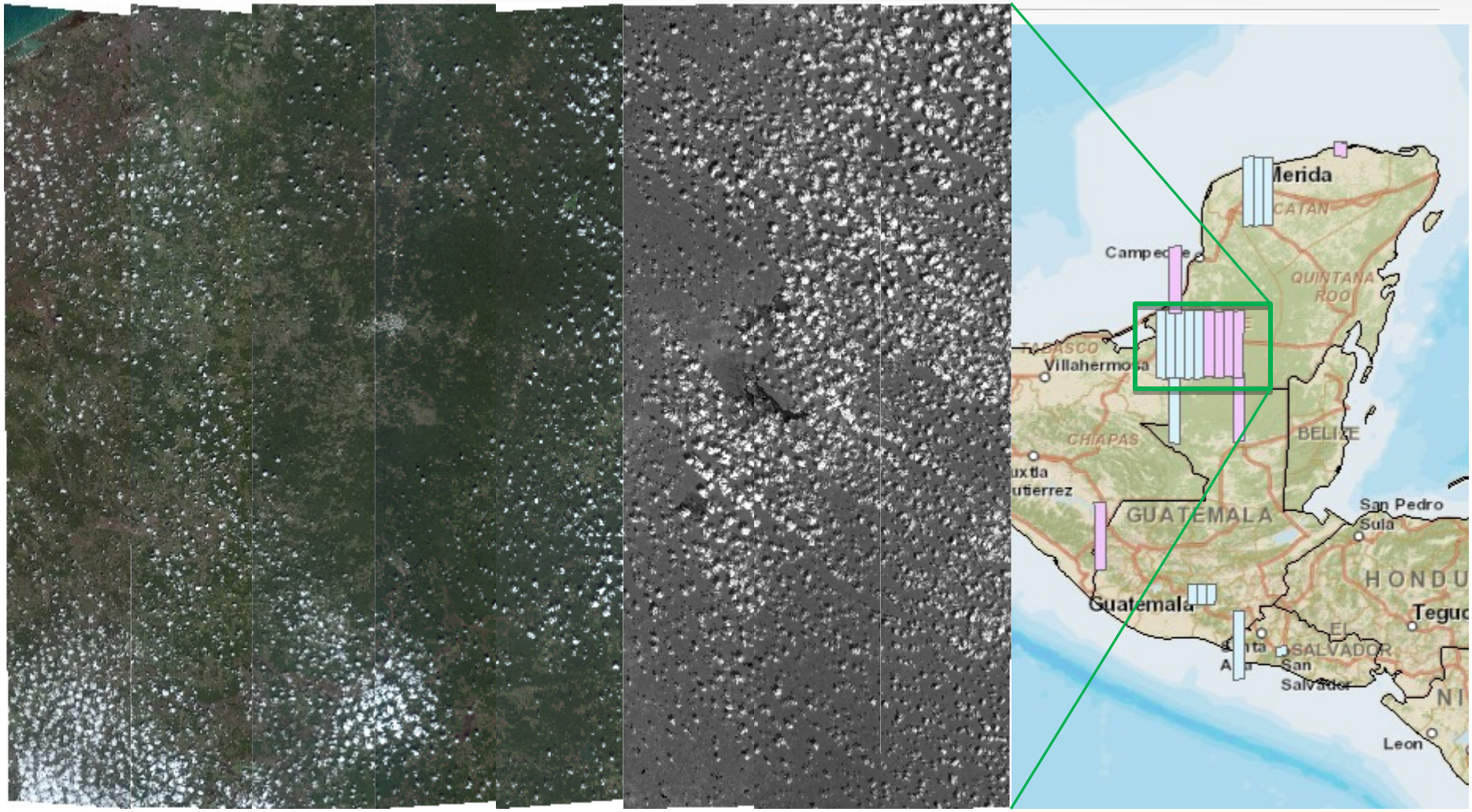
February 24 – WorldView collection with CSS



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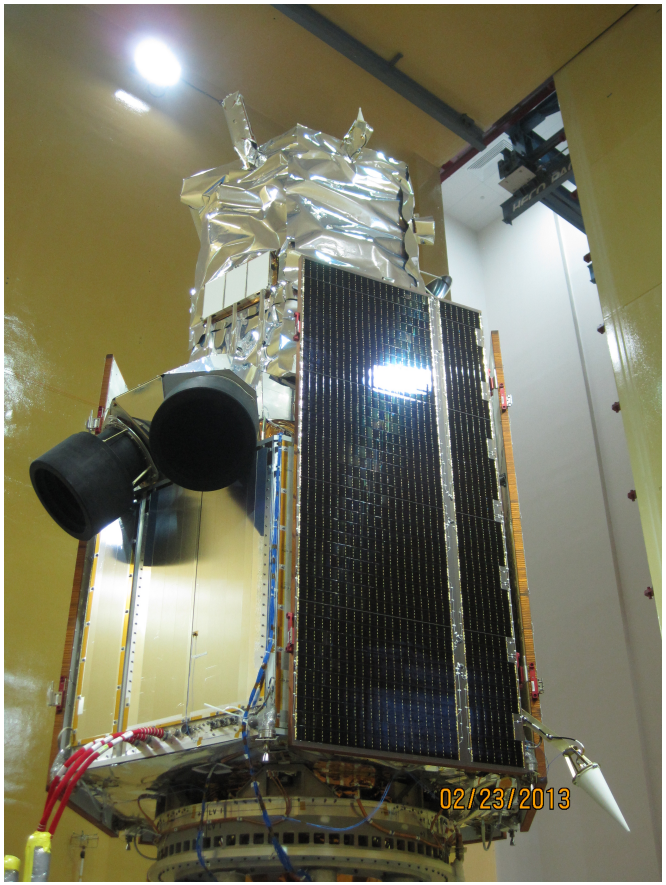
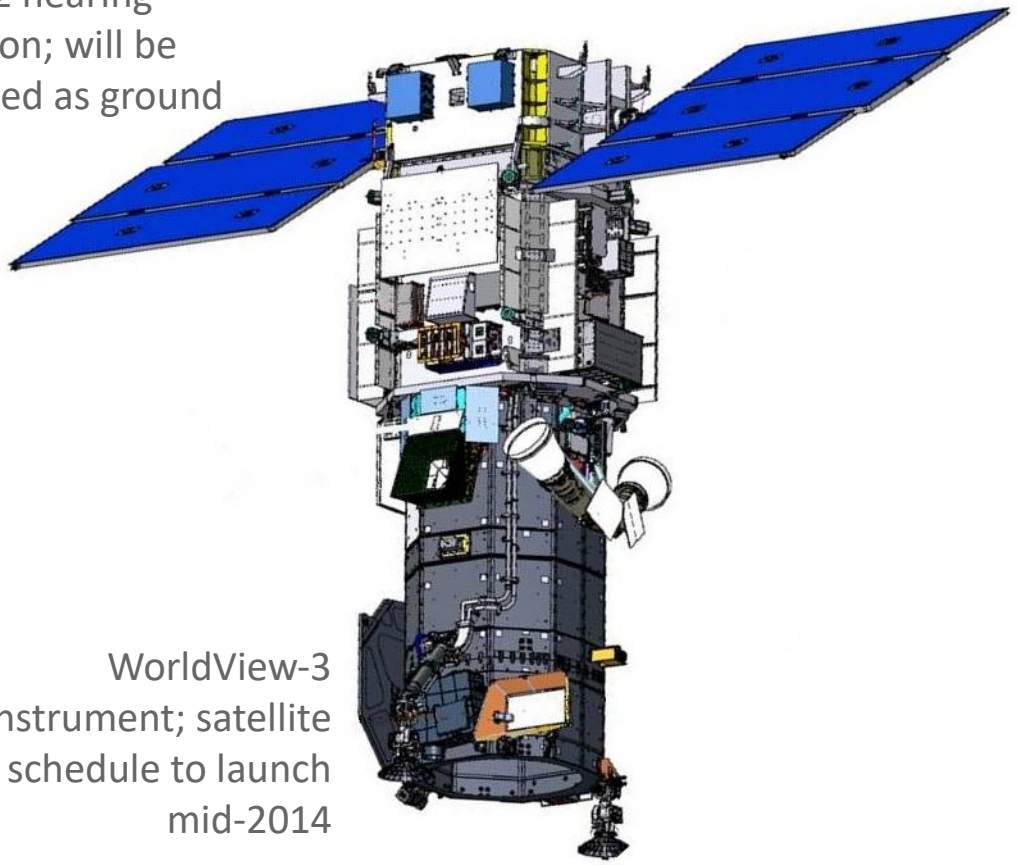
Two next-gen satellites under construction!



GeoEye-2 nearing completion; will be maintained as ground spare



WorldView-3 instrument; satellite on schedule to launch mid-2014

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Constellation Optimization

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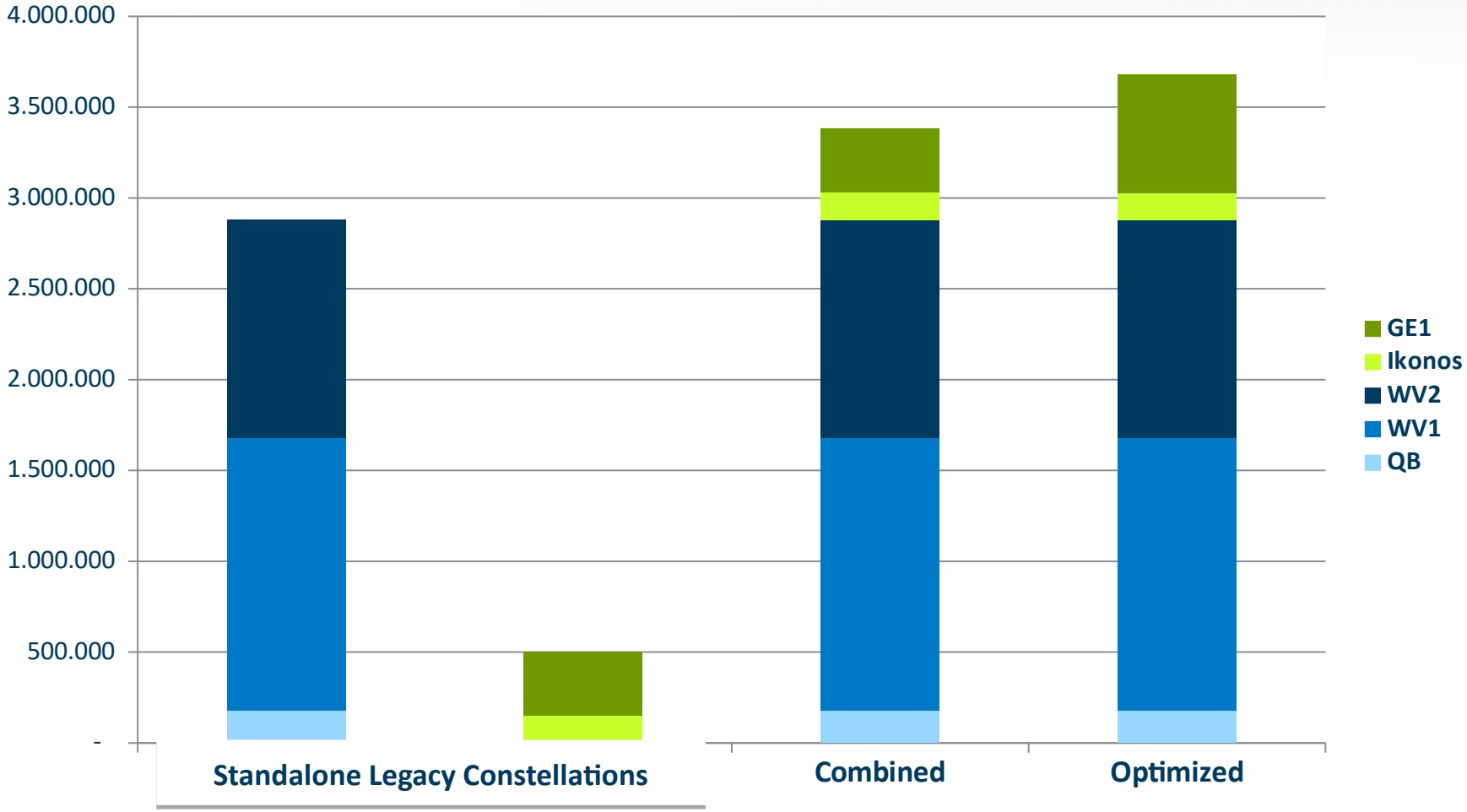
By optimizing our orbits we can further increase our constellation's capacity to collect for you



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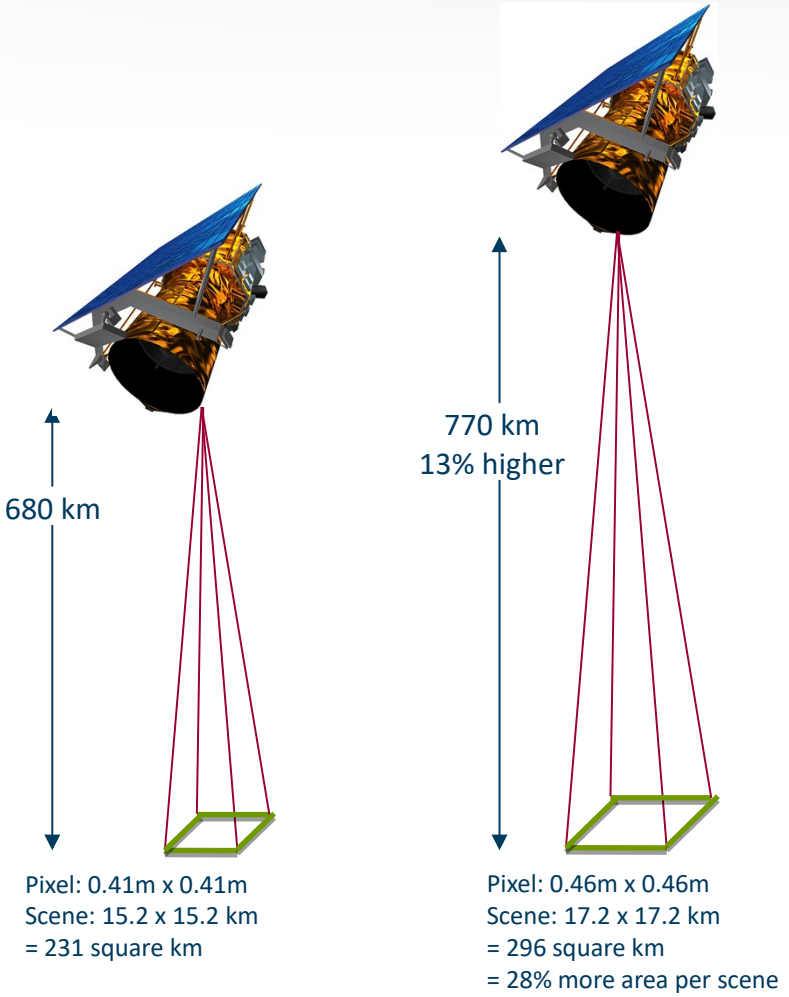
Raising GE-1 altitude to 770 km increases its capacity by 28% while still delivering <0.5m GSD

- Increases pixel size 0.41->0.46m
- Insignificant GSD difference.
- NOAA restrictions preclude us from selling better than 0.5m GSD commercially.
- Increases total area by 28%.



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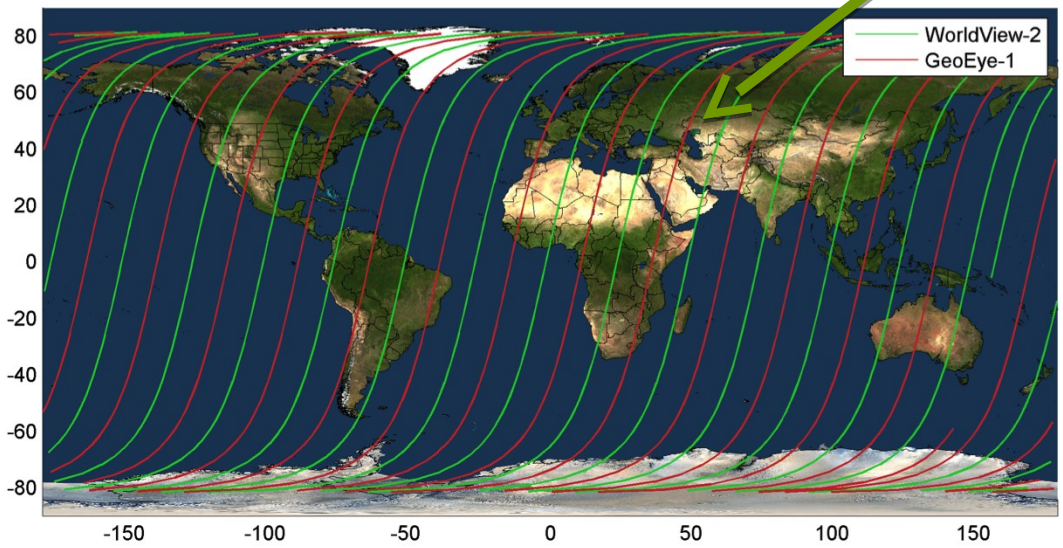
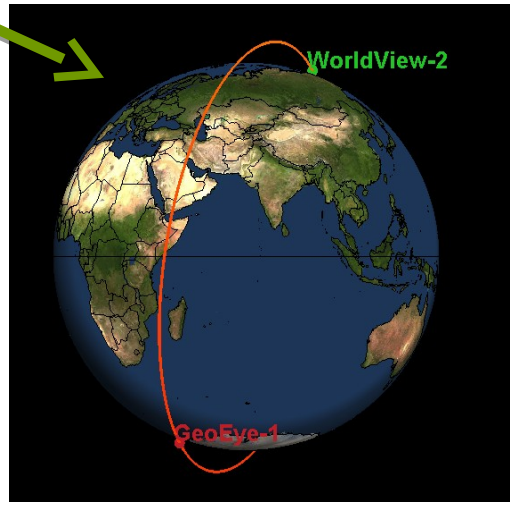
Phasing the raised GE-1 orbit means more frequent revisits (more “looks”)

Improves mean time to 0.6m GSD access from >25 hours to <14 hours

(45% less time to wait for next 0.6m access)

Phasing GeoEye-1 with WorldView-2 at 770 km results in evenly space ground tracks, better access





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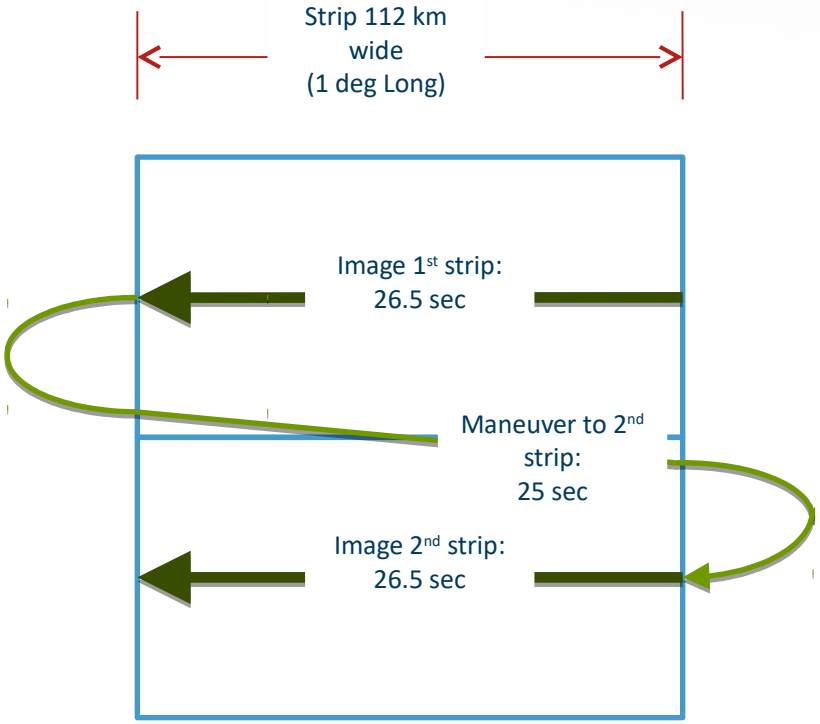
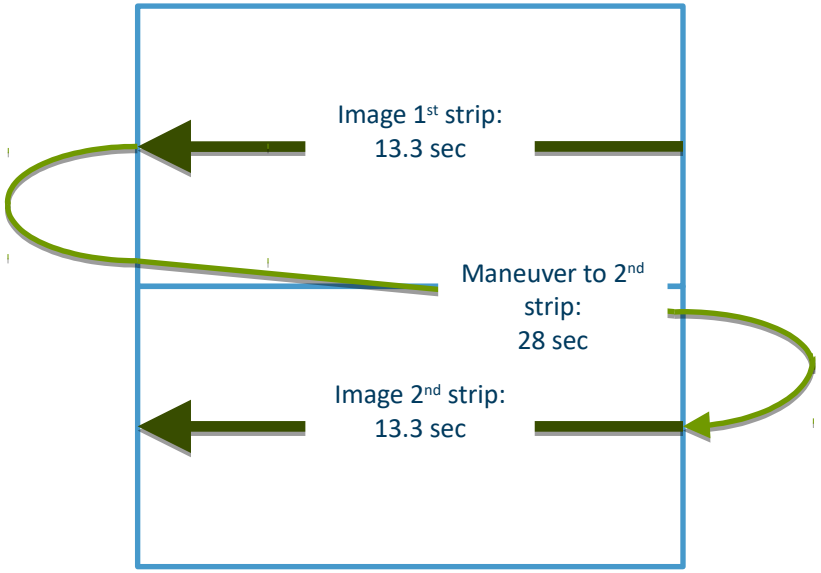
The GE-1 20K ("enhanced") line rate increases local area capacity by >31%, average total capacity by 15%



10K ("Standard") Line Rate
Total time: 78 sec



20K ("Enhanced") Line Rate
Total time: 55 sec
31% faster, leaving more time for other collections

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20K image quality is visually comparable to that at 10K

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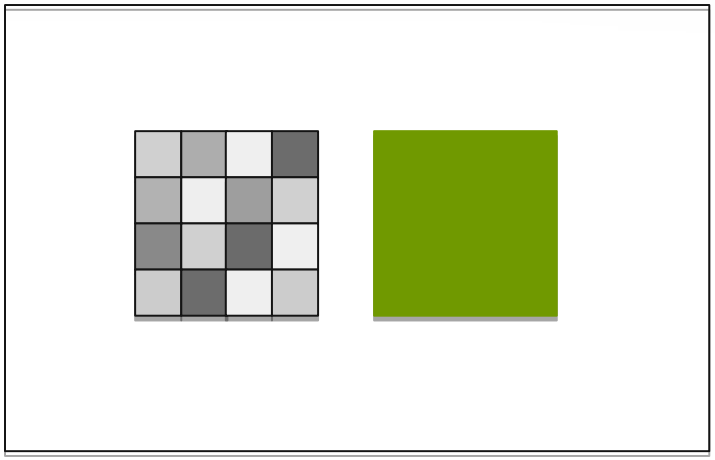
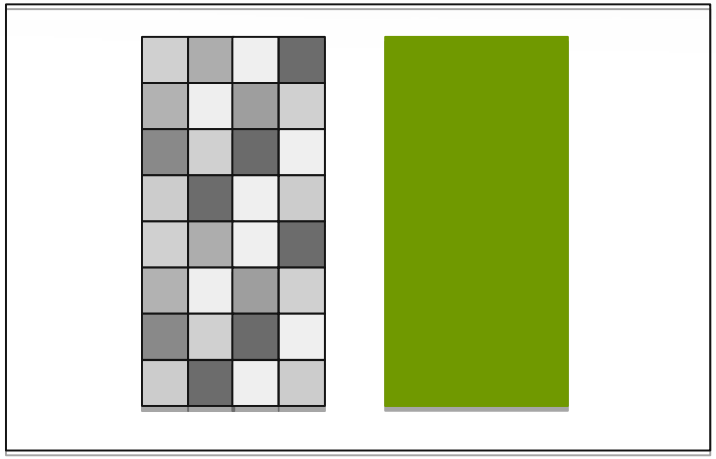
… despite lower resolution multispectral information



Standard Line Rate (SLR)
16 pan pixels for every multispectral pixel



Enhanced Line Rate (ELR)
32pan pixels for every multispectral pixel
Multispectral pixel aggregated to 1x2

With the combined constellation, we can focus GeoEye-1 on those collections where the ELR is appropriate and offload to other satellites those collections that require 1x1 multispectral data.

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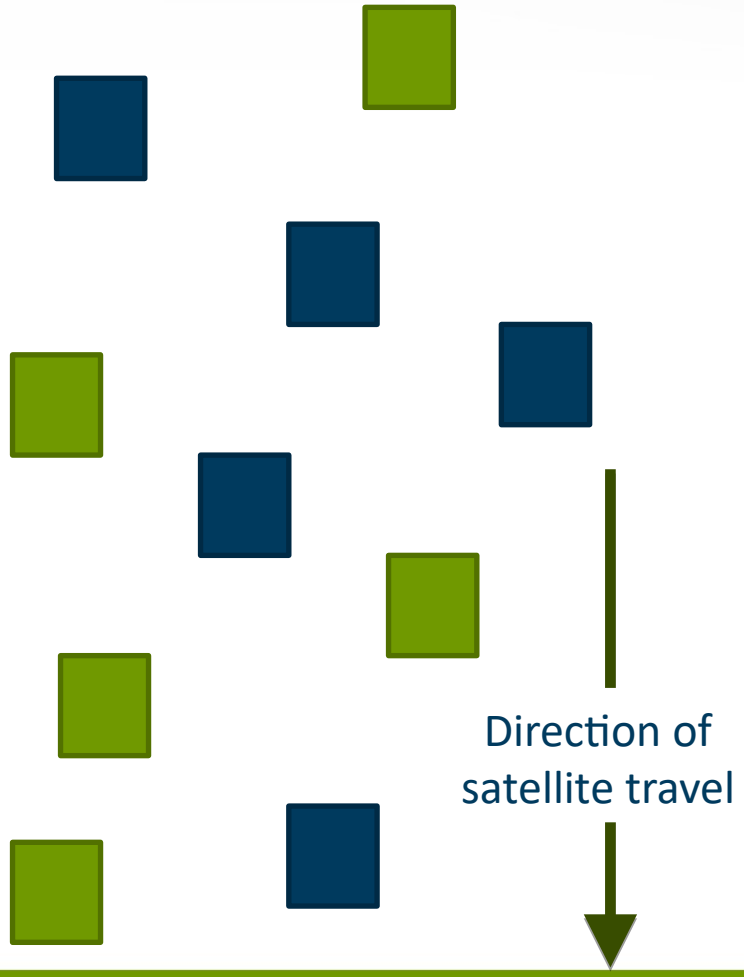
Without consolidated tasking, each company could only plan against what it knew



The optimal path is the one that results in the most targets, generally the one that requires the least slewing between targets

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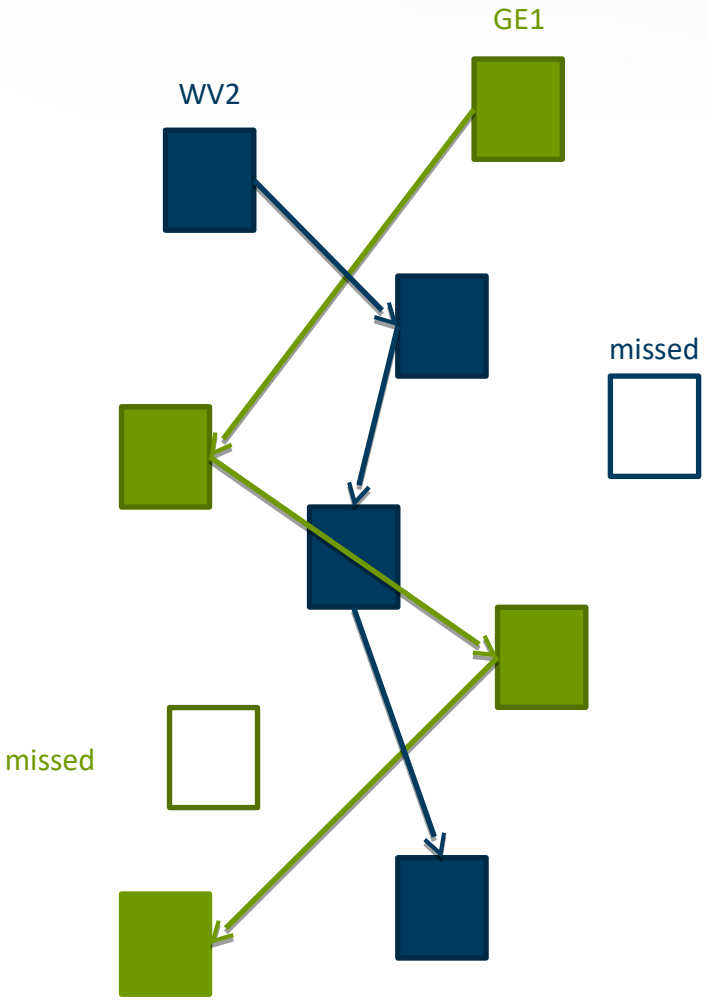
Separate tasking divided the work inefficiently and led to missed targets



- Each company was unaware of what the other needs to collect
- Each satellite had to maneuver more
- Led to missing targets that could otherwise have been collected had only there been common visibility and central planning.

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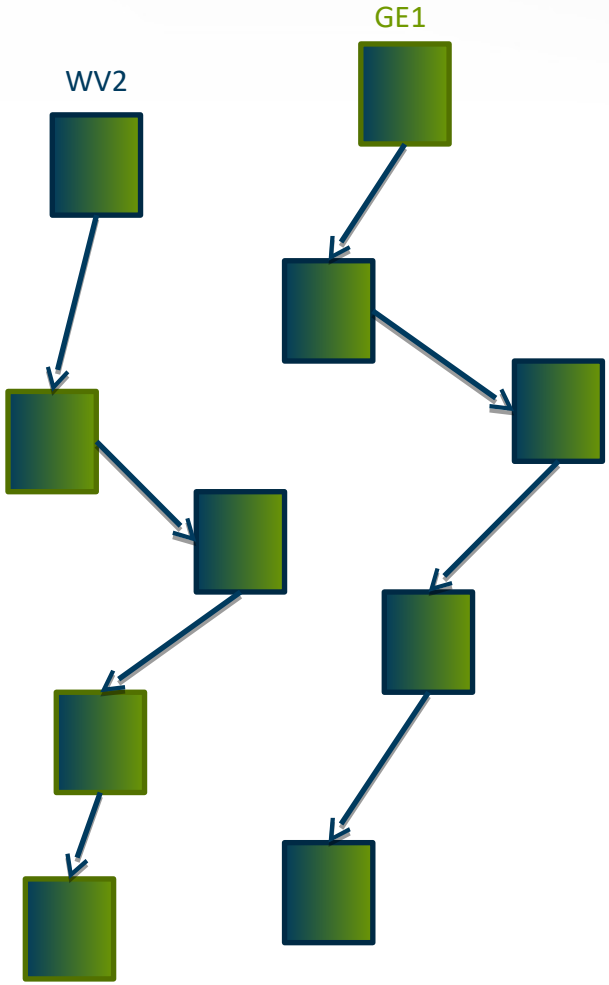
Consolidated tasking will increase average GE-1 capacity by 10%



- By central constellation planning, all targets are known
- Enables allocating the best set of targets to each satellite
  - Reduces avg maneuver time
  - More targets can be collected
  - Enhances capacity

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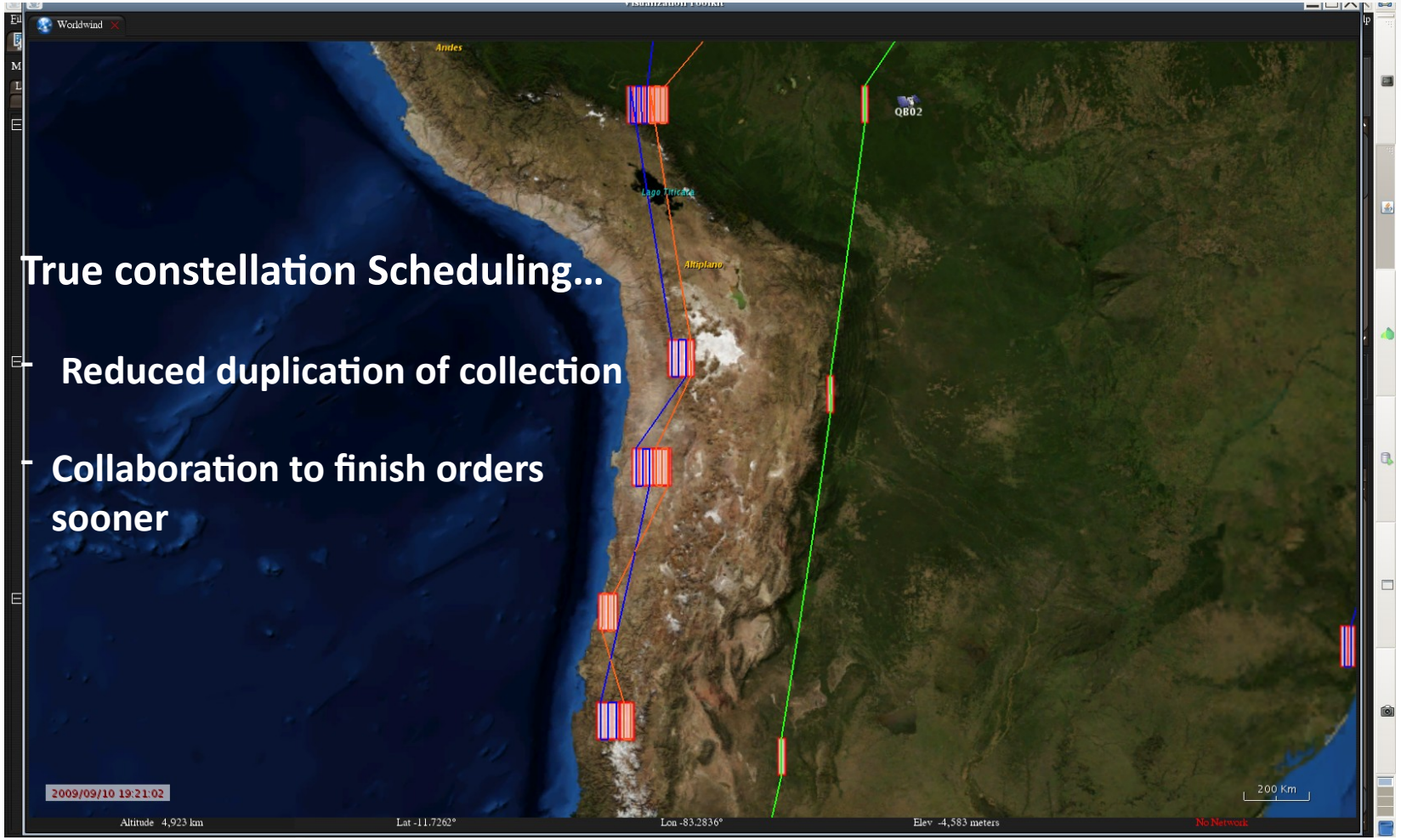
Multi-Sensor Coordination



True constellation Scheduling…

- Reduced duplication of collection
- Collaboration to finish orders sooner

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Coming Soon

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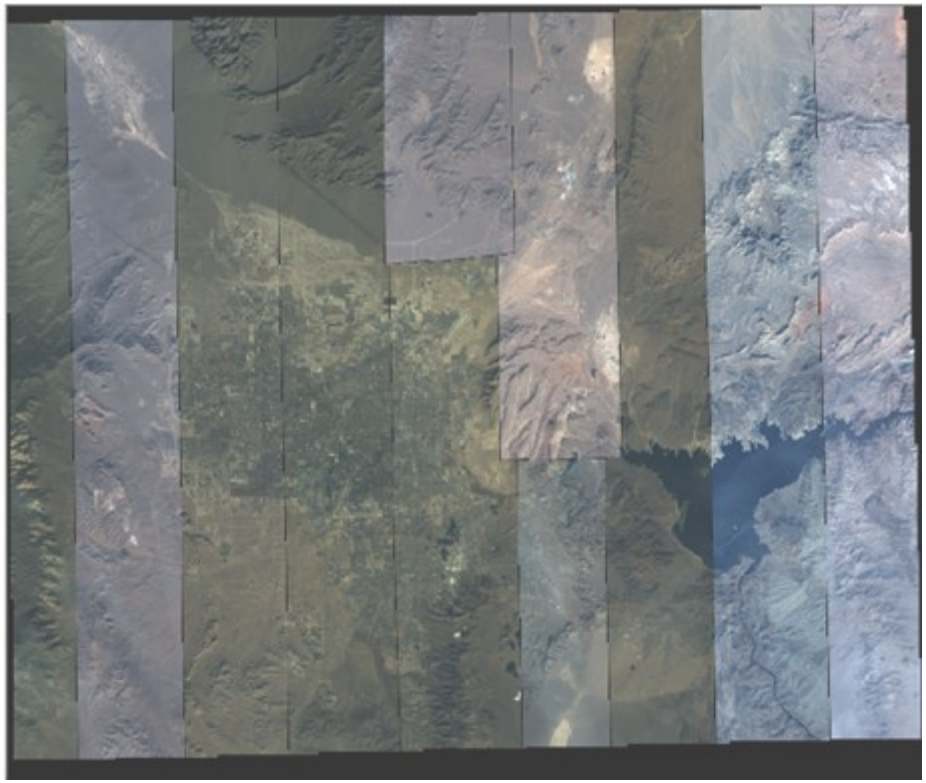
Our Global Base Map country scale orthomosaics will provide accurate, seamless base layers

Conventional



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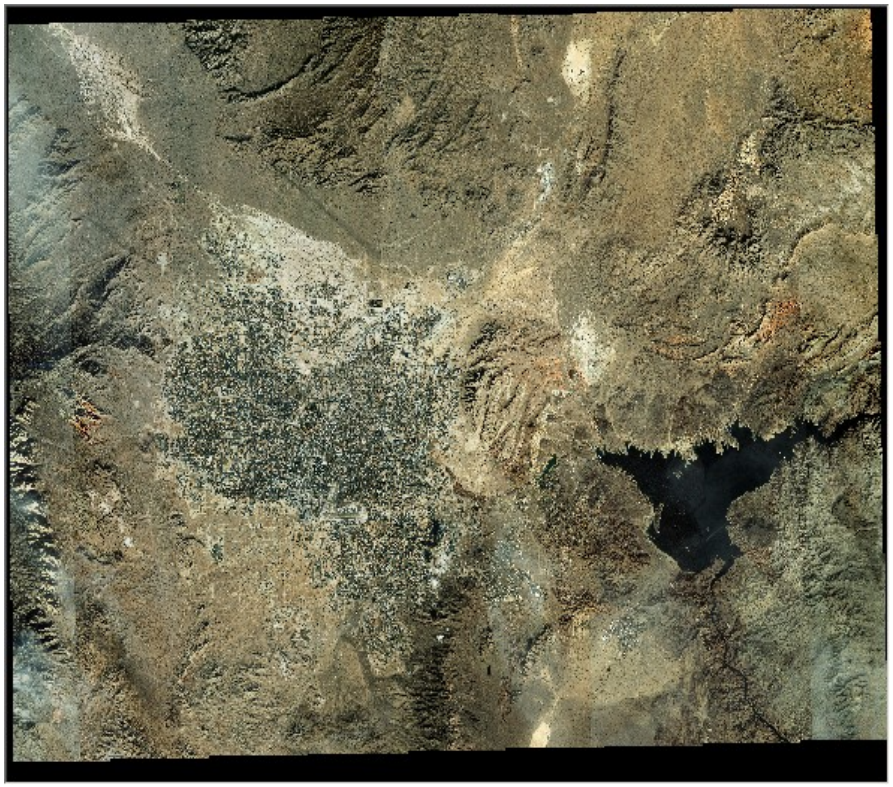

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WorldView-3

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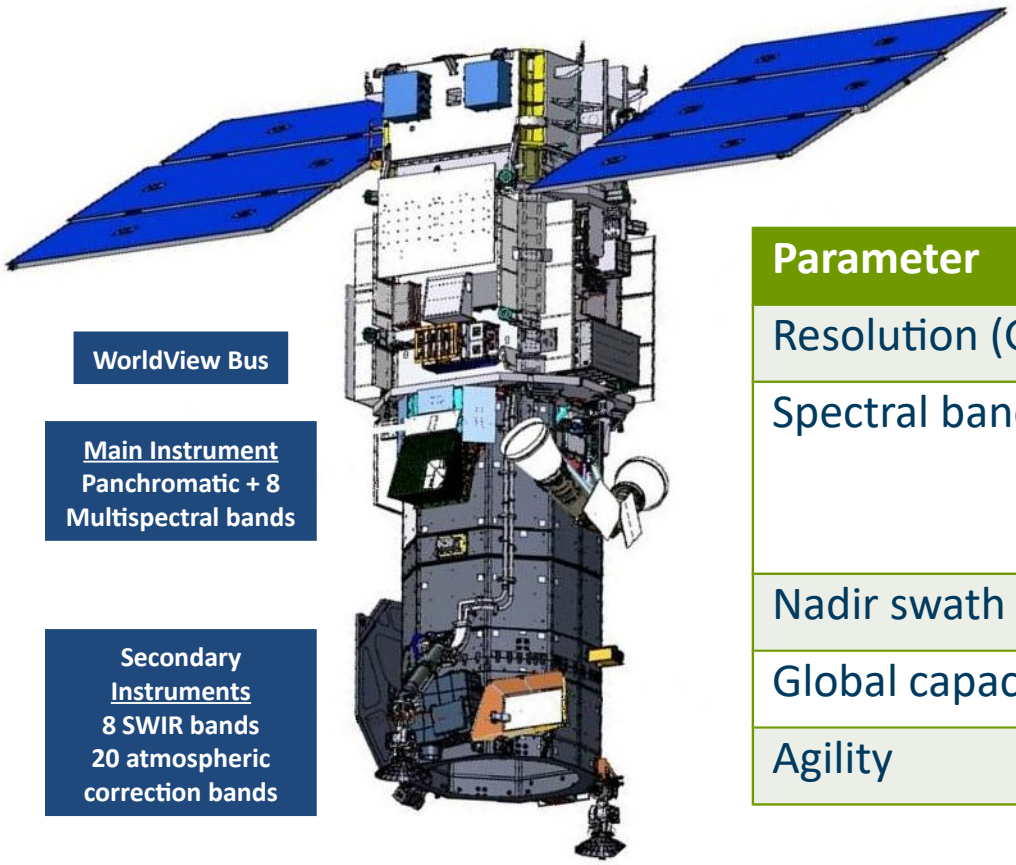
WV-3 Satellite Overview



WorldView Bus

Main Instrument
Panchromatic + 8 Multispectral bands

Secondary Instruments
8 SWIR bands
20 atmospheric correction bands

Parameter	Value
Resolution (GSD)	0.31m Pan
Spectral bands	1.24m / 8 VNIR MS 3.7m / 8 SWIR MS 30m / 11 atmospheric corr.
Nadir swath	13.1 km
Global capacity	680,000 sqkm/day
Agility	CMGs

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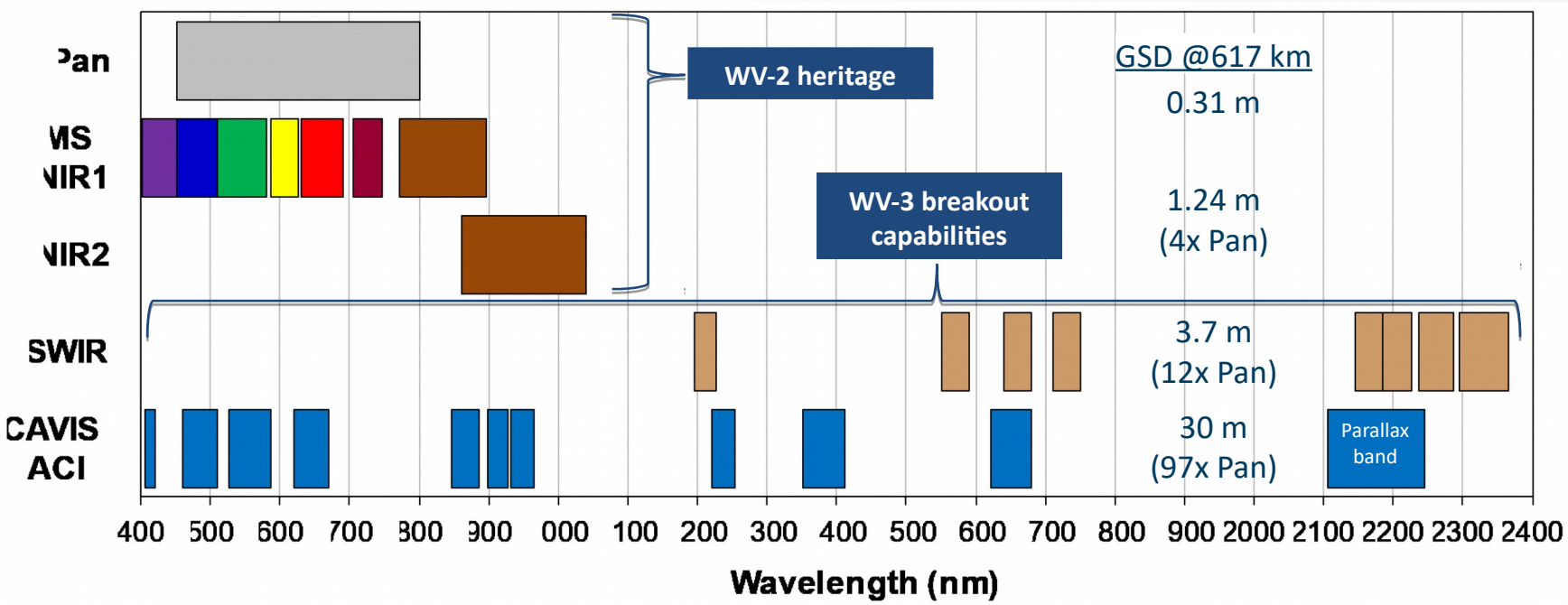
WV-3 Goes "Super-Spectral"



- Preserves heritage Panchromatic + 8 Multispectral bands
- Adds 8 SWIR bands in 3 atmospheric transmission windows
- Adds CAVIS-ACI (Cloud, Aerosol, water Vapor, Ice, Snow – Atmospheric Correction Instrument)
  - Improves cloud cover assessment and scene grading; restores hazy imagery
  - Produces even more accurate surface reflectance products

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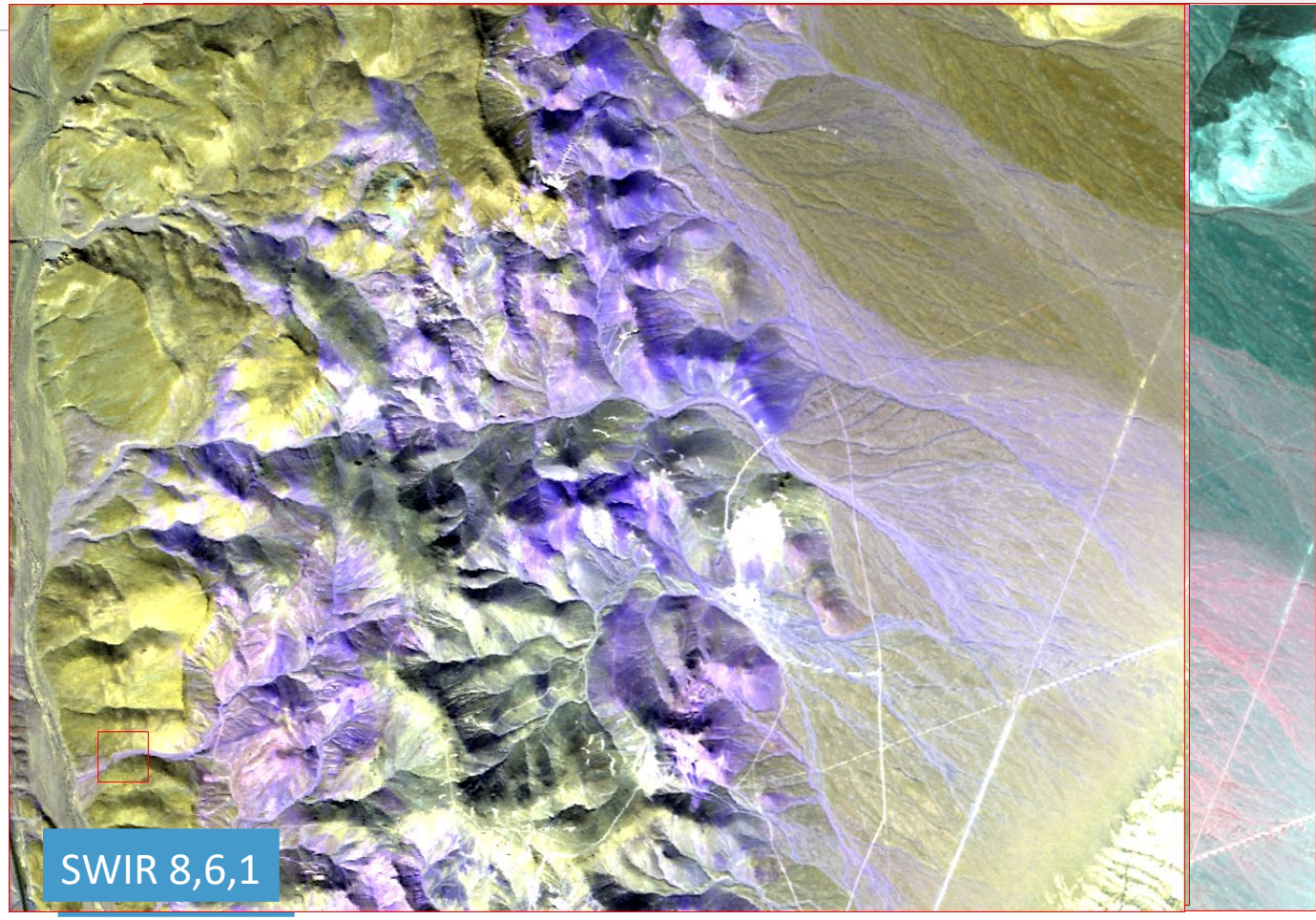
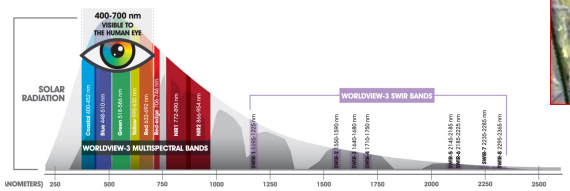
New and Unique Applications - Geology

Visualization of SWIR for Geology





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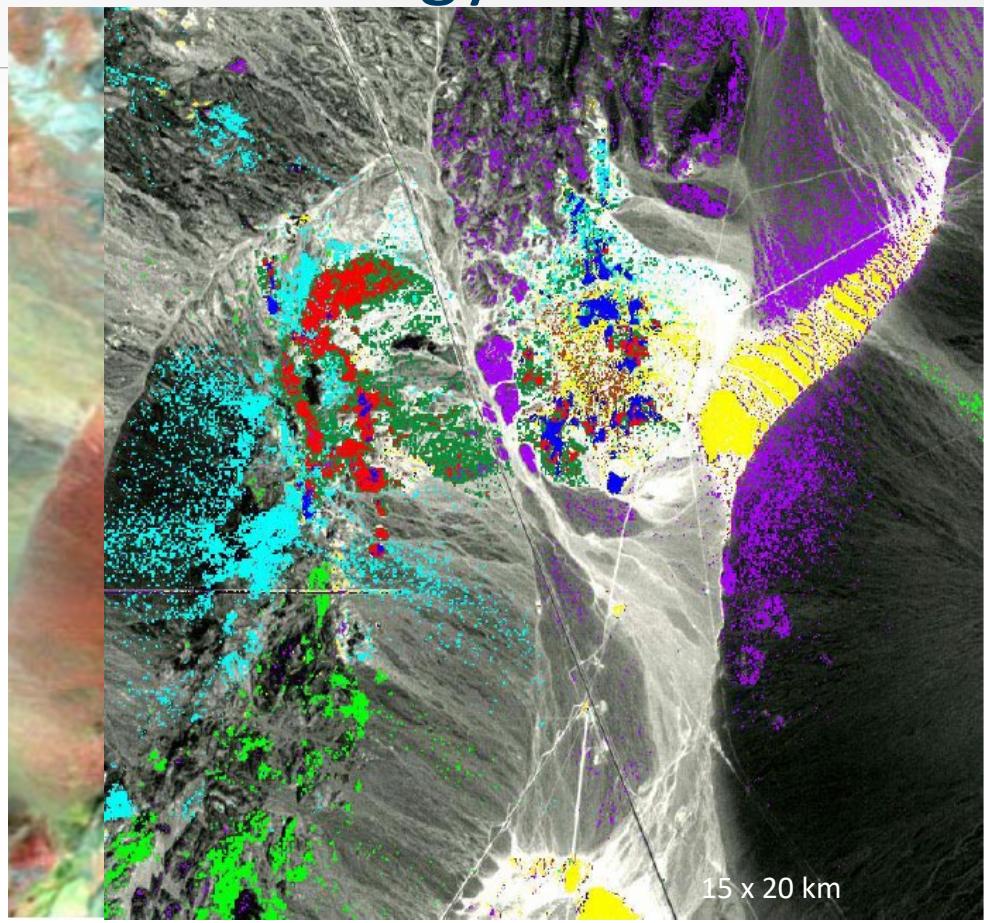
New and Unique Applications - Geology

Applications: Spectral Geology/
Mineral Identification

Spectral Geology:
Identify different rock types, weathering regimes, and surface materials, their mineralogy and their alteration signatures

Blue = Kaolinite
Red = Alunite
Light Green = Calcite
Dark Green = Alunite + Kaolinite
Cyan = Montmorillonite
Purple = Unaltered
Yellow = Silica or Dickite



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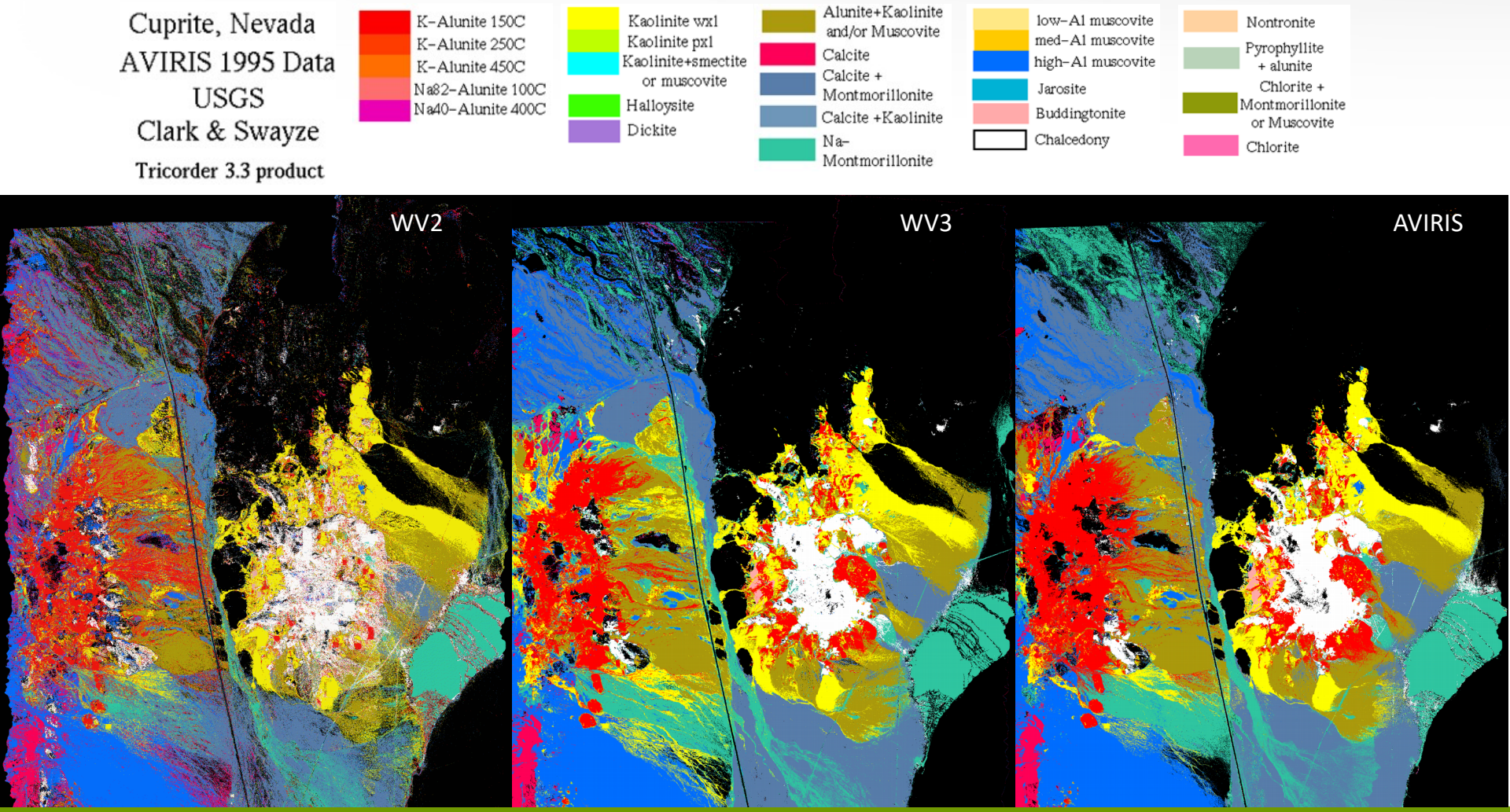
SWIR enables accurate geological classification, within 2–5% of AVIRIS



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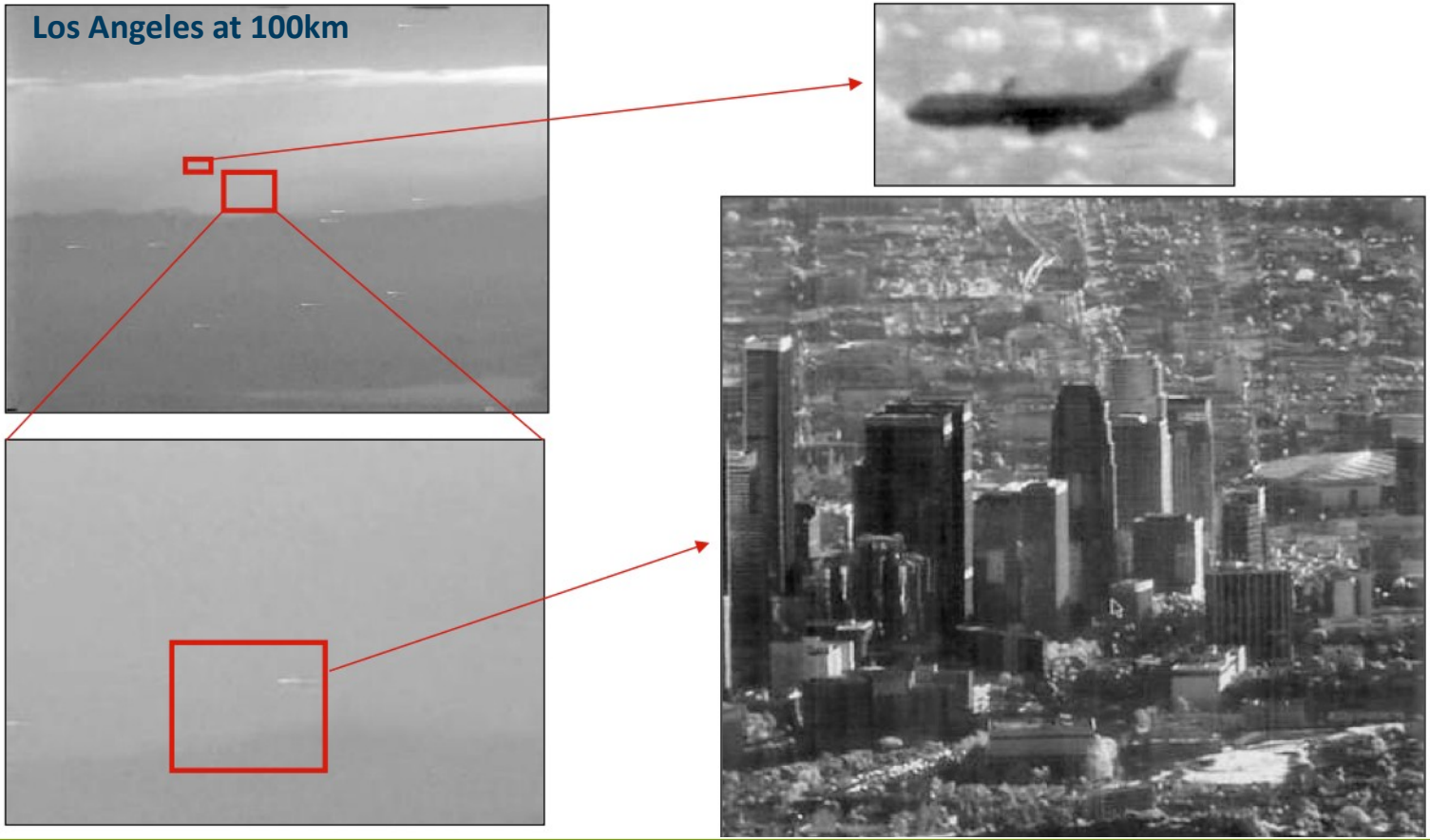
SWIR penetrates haze and other obscurants

The example below shows airborne SWIR looking through a hazy atmosphere to illustrate the value.



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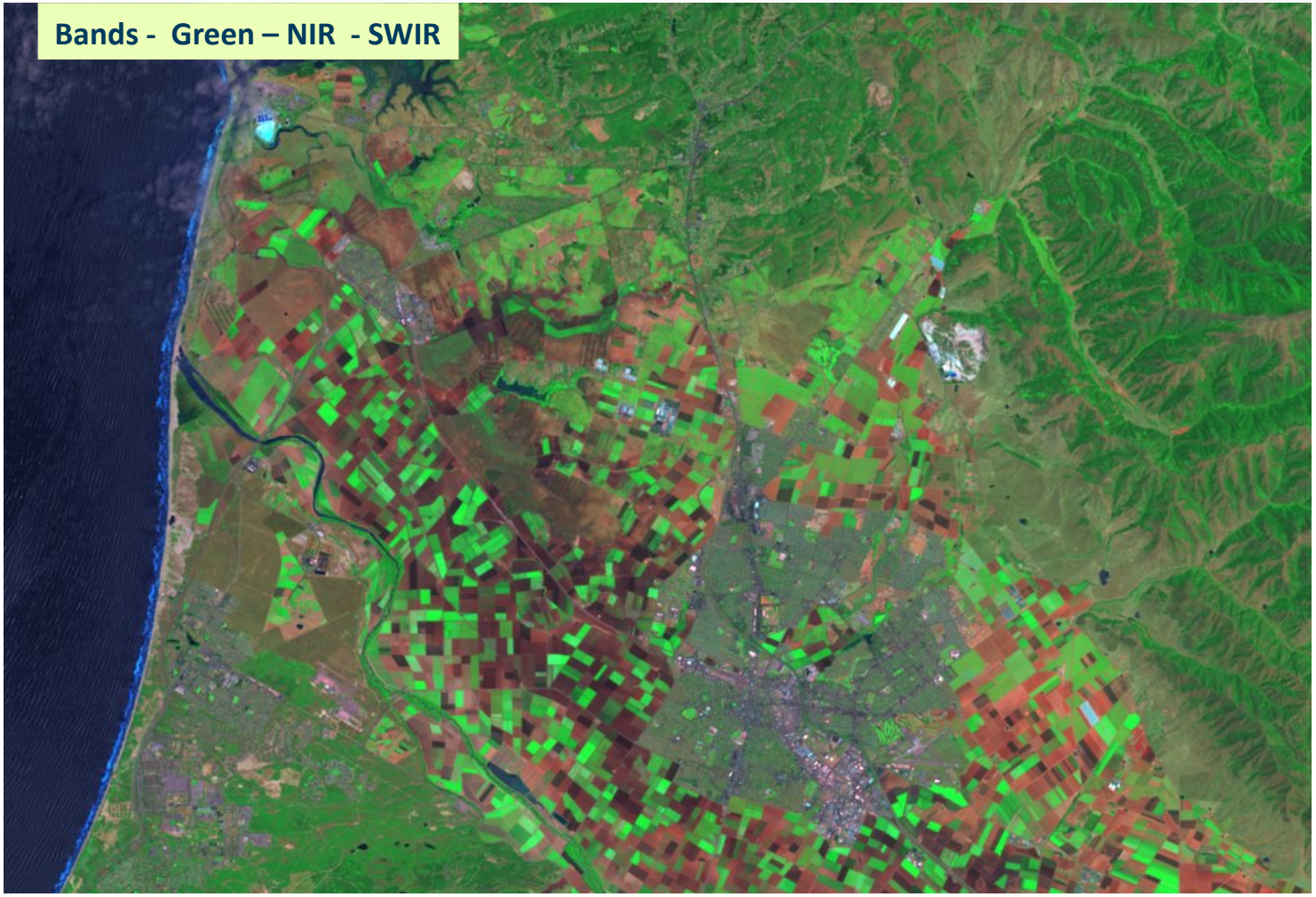
Combining SWIR + MSI enhances classification of materials and land cover



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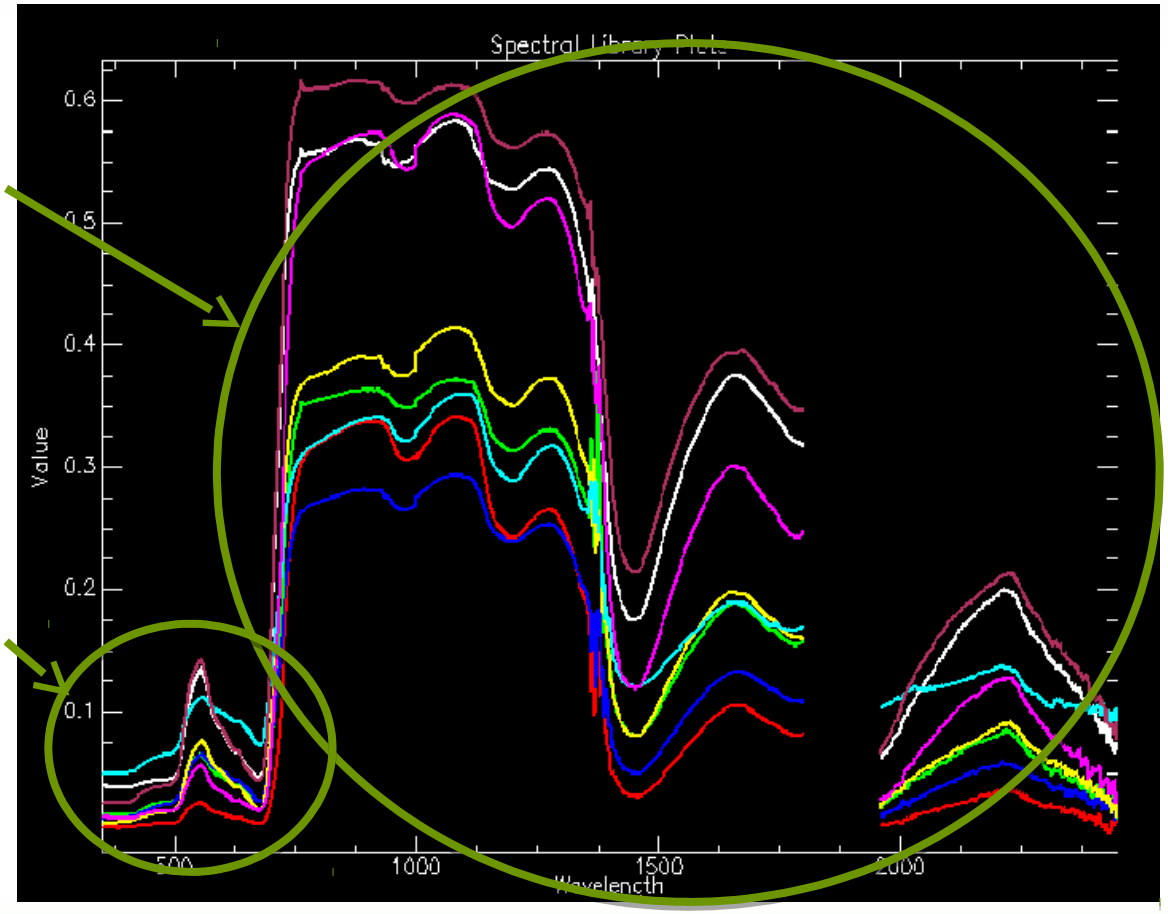
New and Unique Applications - Forestry

Allows for Forest Species Detection using VNIR and SWIR Bands

Larger differences in spectral response when also looking in SWIR region

Smaller differences in spectral response in VNIR only



Green Ash
Crab Apple
White Ash
Hackberry
Honey Locust
Spruce
Norway Maple
Red Sunset Maple

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New and Unique Applications - Forestry

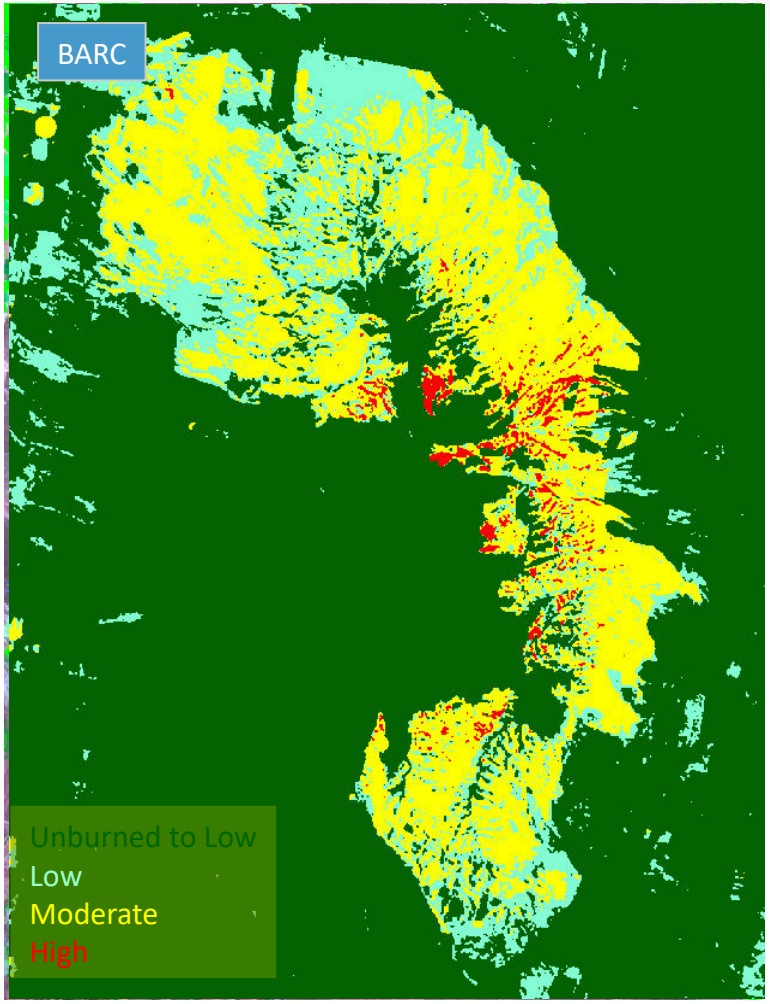
Forestry (Burned Area Mapping)

NBR = (NIR – SWIR) / (NIR + SWIR)

dNBR = Pre NBR – Post NBR

SWIR at 1.6 or 2.1 nm

Normalized Burn Ratio (NBR)
Differenced Normalized Burn Ratio (dNBR)



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