

RADARSAT-2

11/06/2021

| presented by *VIGISAT*



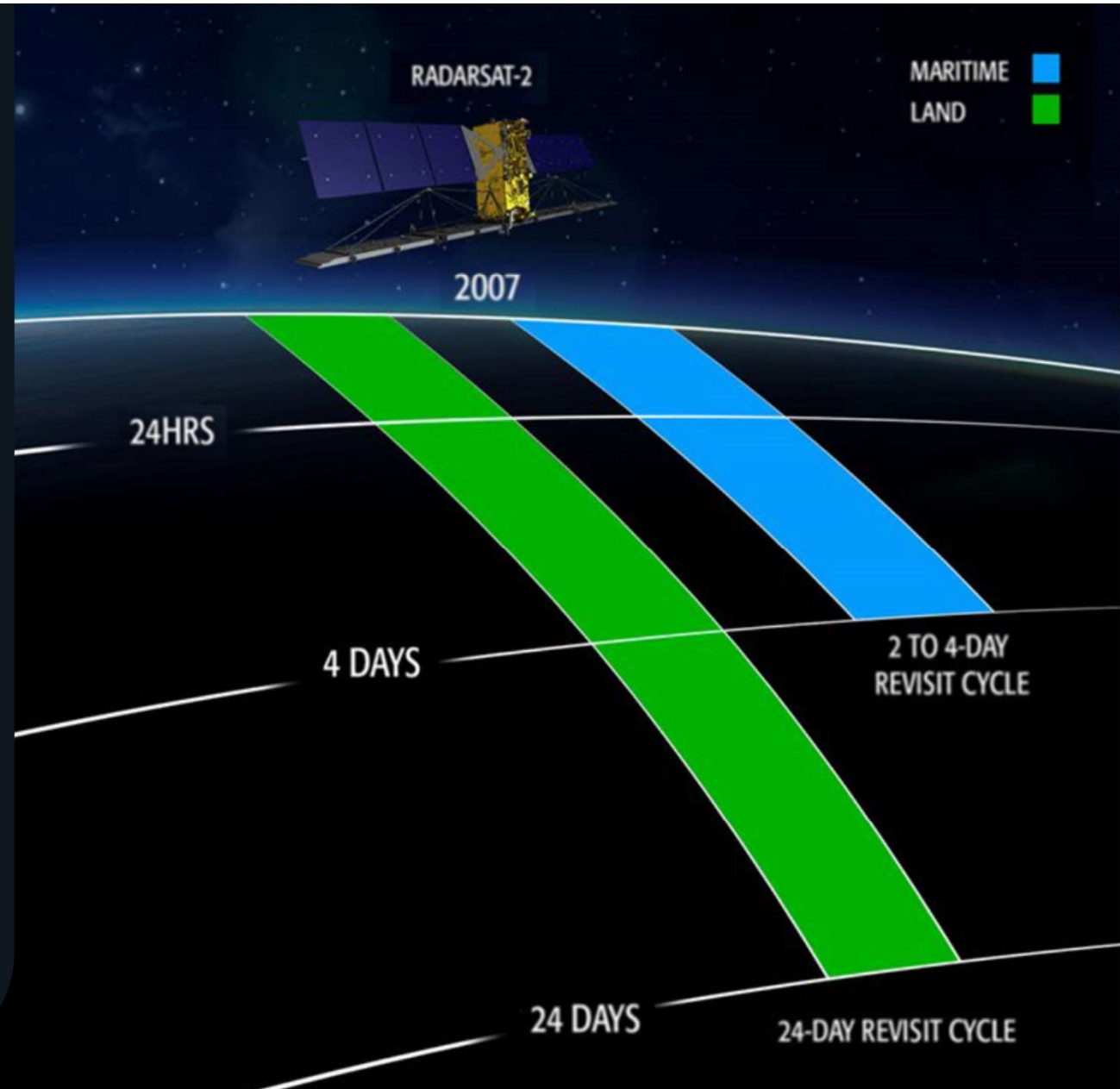
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INTRODUCTION

Parameter	RADARSAT-2
Launch	December 14, 2007
Imaging frequency	C-band at 5.405 GHz
Spatial resolution	1-100m
Polarization	Fully polarimetric
Altitude	798 km
Inclination	98,6°
Local Time on ascending node	18:00 hrs ±15 min
Look direction of SAR antenna	Left or Right



SECTION 2

RADARSAT-2 Beam Modes

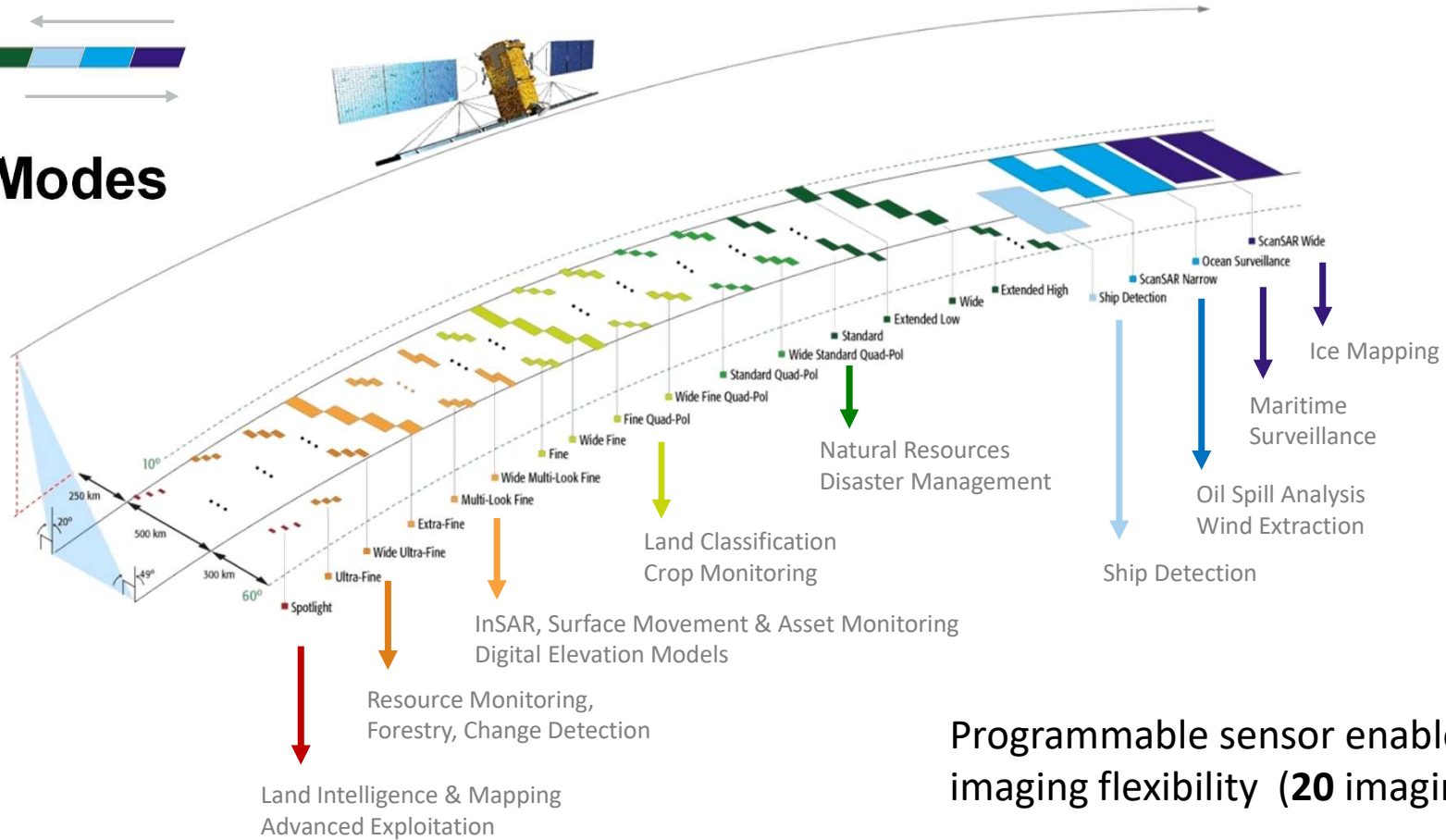


Imagery: Larsen Ice shelf calving, 2017 (SCWA)





Beam Modes

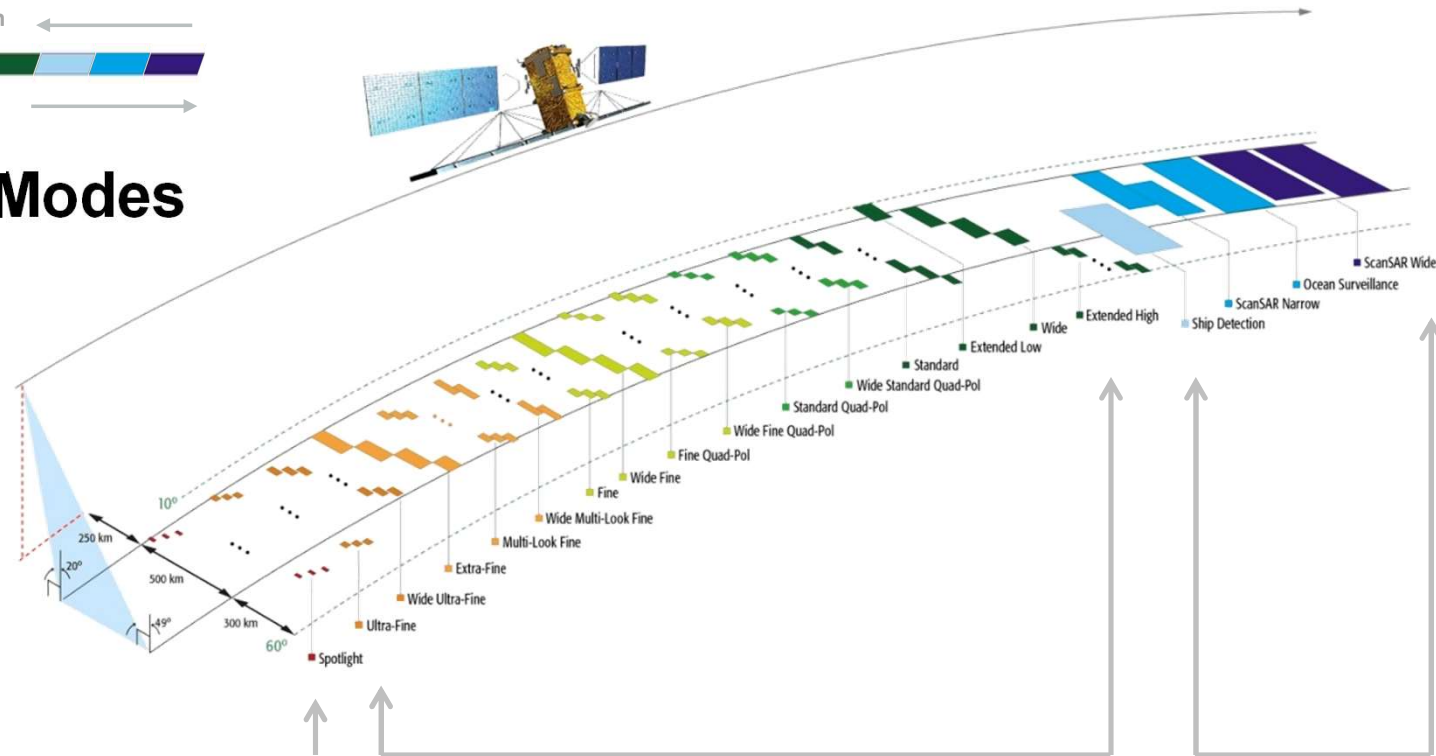


Programmable sensor enables superior imaging flexibility (**20** imaging modes)

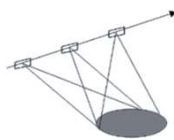
Imaging modes tailored to specific wide area and target monitoring



Beam Modes

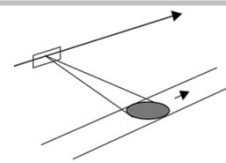


Spotlight



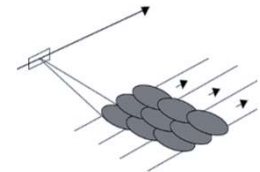
The radar operates with the highest sampling rate. Ground swath coverage limited to keep data rate within recorder limits. Images are of fixed size in the along-track direction

Single Beam



Single beam mode is a stripmap SAR mode. In Single Beam operation, the beam elevation and profile are maintained constant throughout the data collection period.

Scan SAR



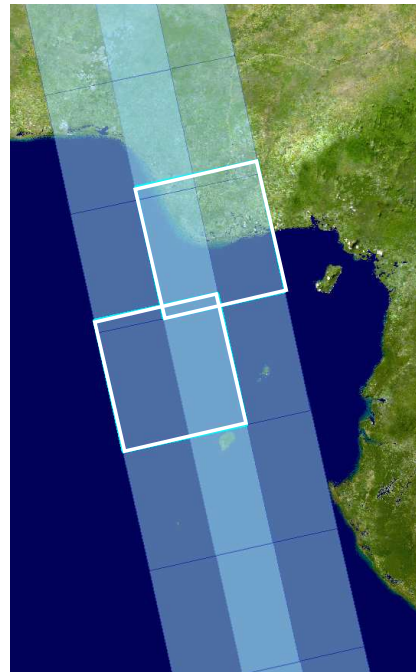
Beams covering adjoining swaths are used in combination. Data are collected from a wider swath than is possible with a single beam. A noise-subtracted Scan SAR mode is available, reduces the appearance of image artifacts.



Incidence Angle vs. Coverage



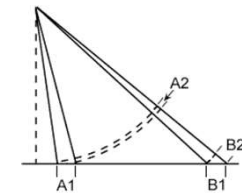
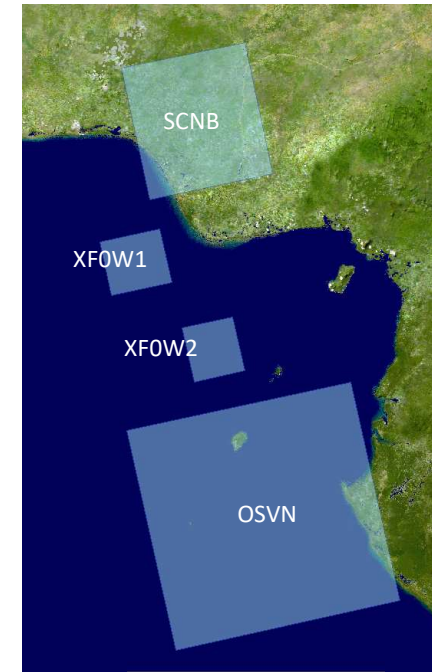
OSVN: 20.0° - 50.0°

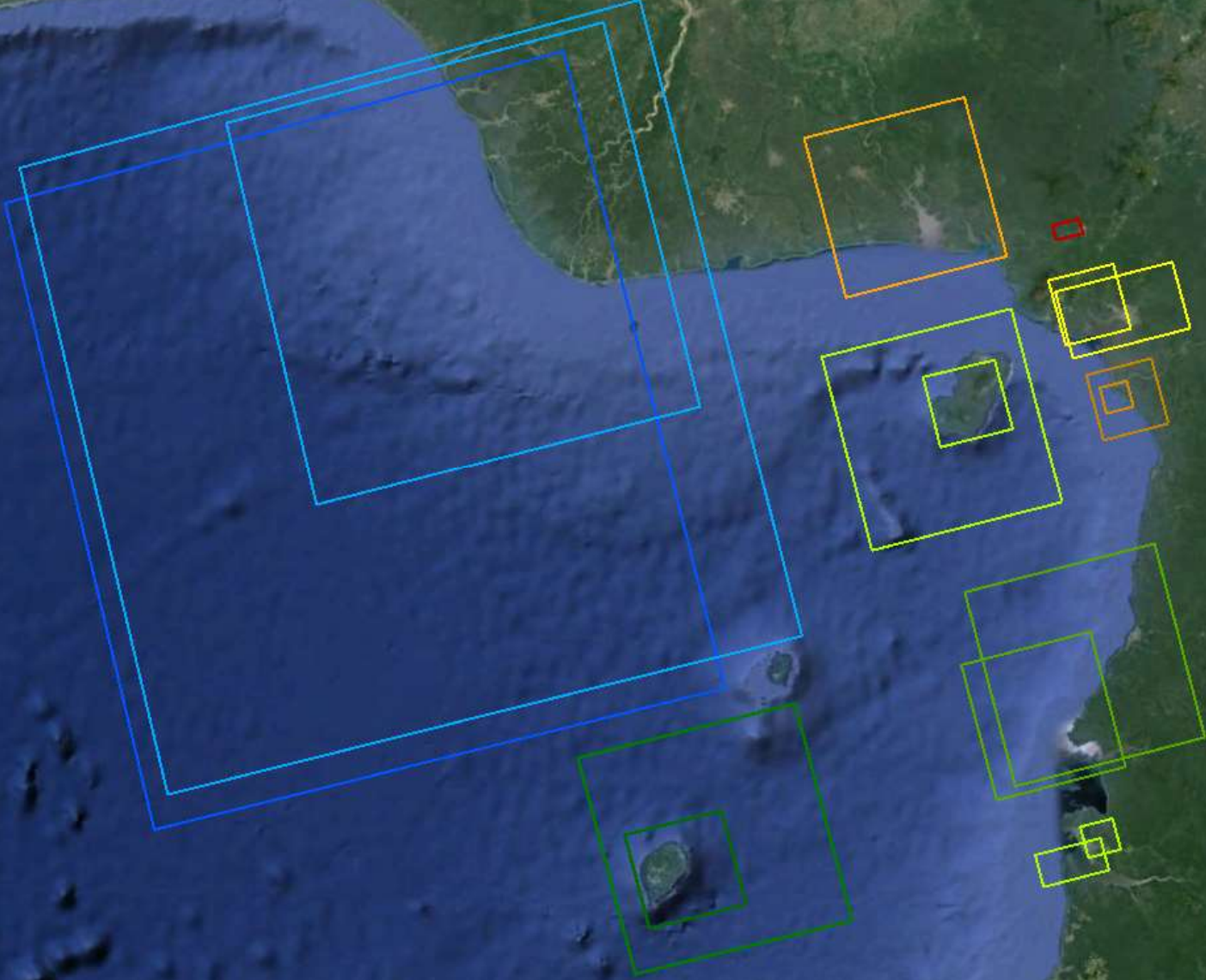


SCNA: 20.0° - 39.5°
SCNB: 30.6° - 46.5°



XFOW1: 21.8° - 32.4°
XFOW2: 31.6° - 38.7°
XFOW3: 38.1° - 44.2°
XFOS7: 44.0° - 48.8°



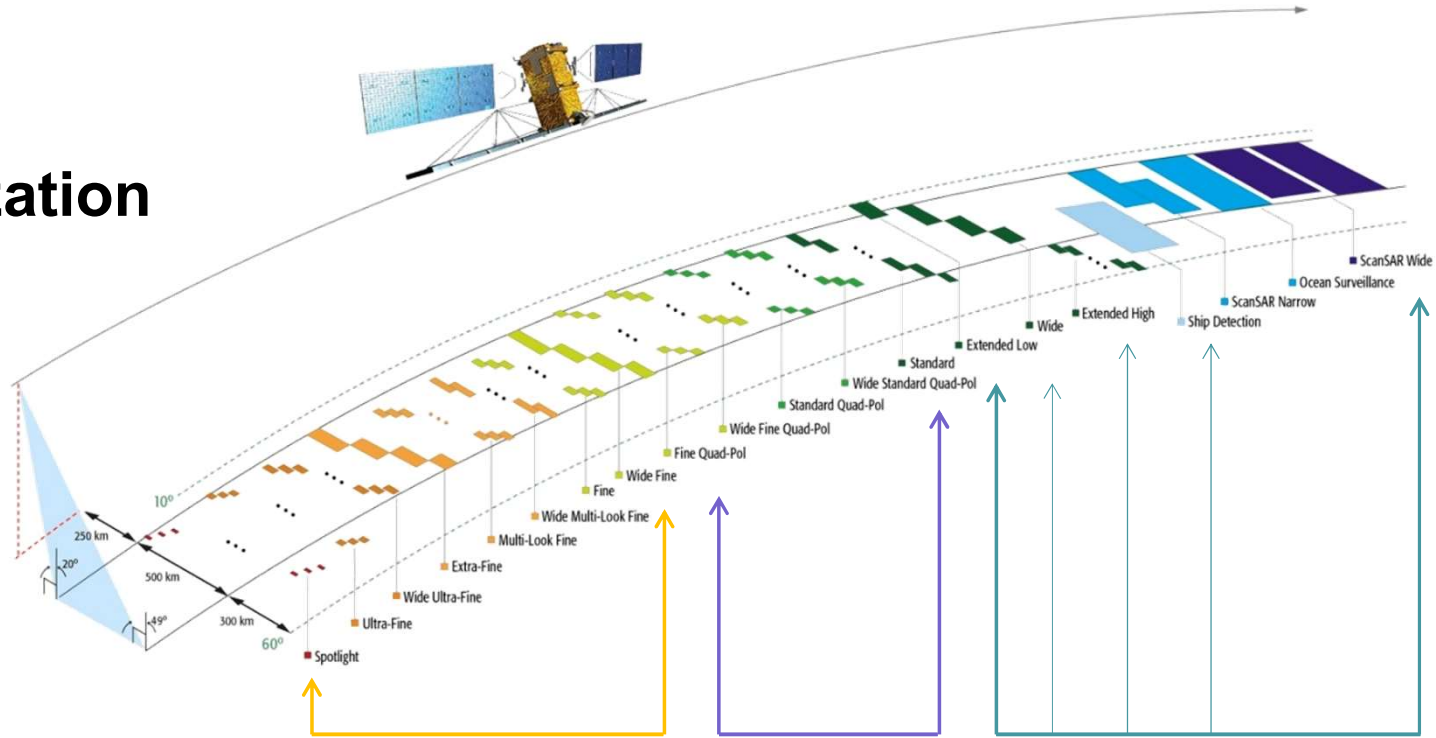


Beam Mode	Scene Size (km x km)
Ship Detection (DWWF)	450 x 500
Ocean Surveillance (OSVN)	500 x 500
ScanSAR Wide	500 x 500
ScanSAR Narrow	300 x 300
Extended Low	170 x 170
Extended High	75 x 75
Wide	150 x 150
Standard	100 x 100
Wide Standard Quad Pol	50 x 25
Standard Quad Pol	25 x 25
Wide Fine Quad Pol	50 x 25
Fine Quad Pol	25 x 25
Wide Fine	150 x 150
Fine	50 x 50
Wide Multi-Look Fine	90 x 50
Multi-Look Fine	50 x 50
Extra Fine	125 x 125
Wide Ultra-Fine	50 x 50
Ultra-Fine	20 x 20
Spotlight	18 x 8



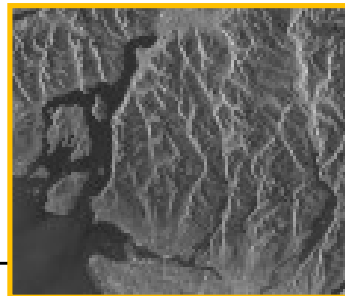


Polarization



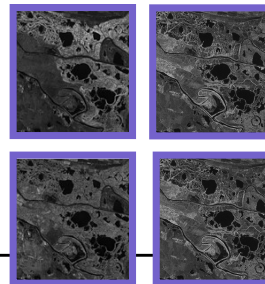
Selective Single Polarization

HH, HV, VH, VV



Quad Polarization

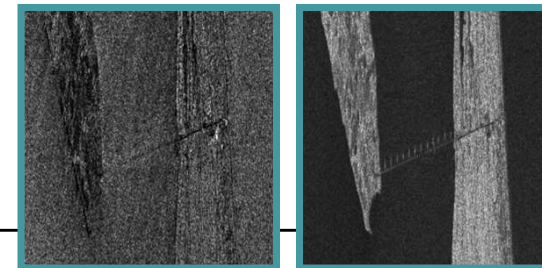
one or all: HH+HV+VH+VV



Selective Polarization

single: HH, HV, VH, VV, HH only: Extended & DVWF

dual: HH+HV or VV+VH



SECTION 2

Product Types

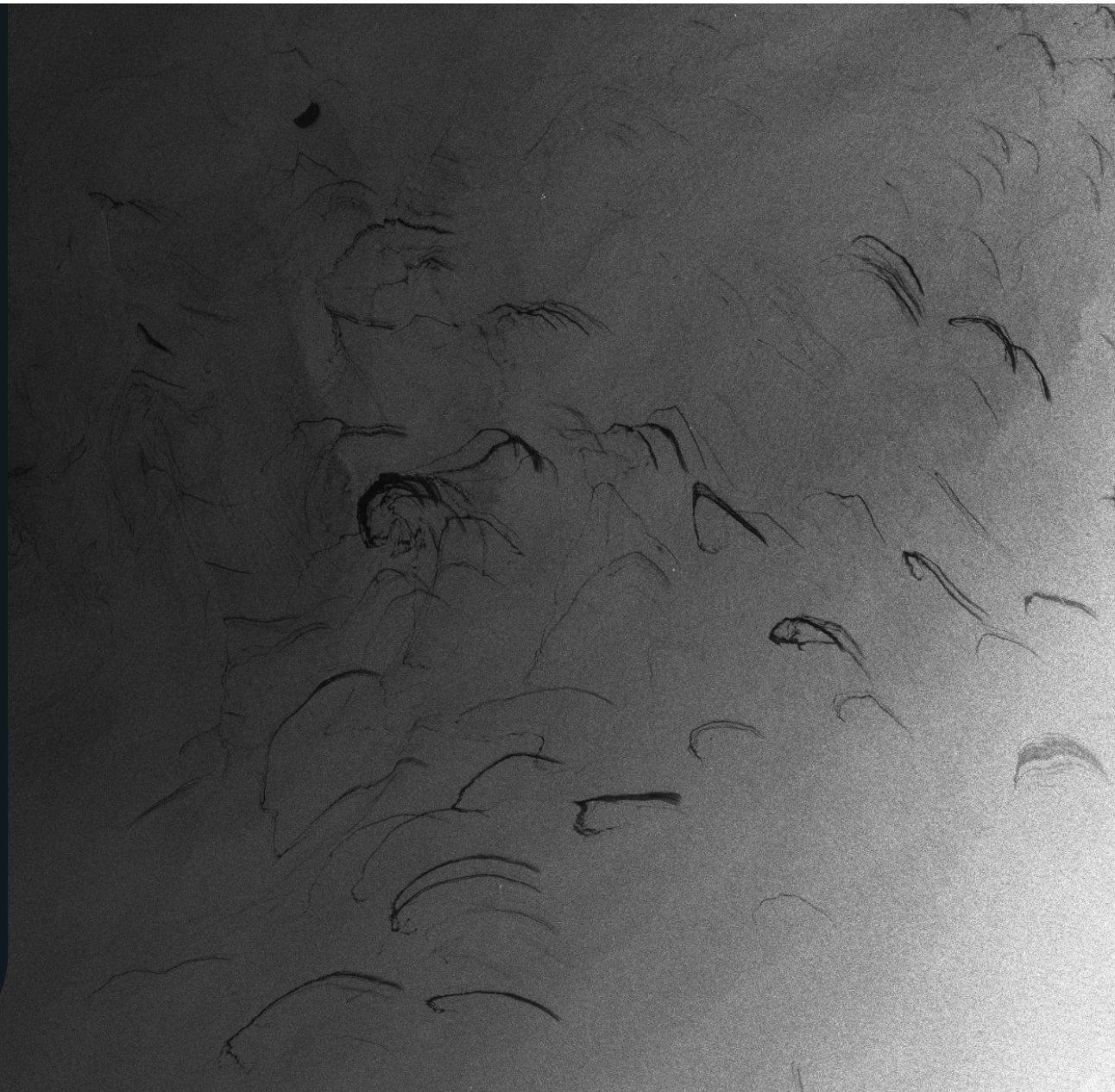
Product Types

- Slant Range
- Ground Range
 - Path Image
 - Map Image

Calibration & Look Up Tables

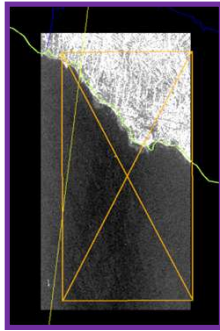
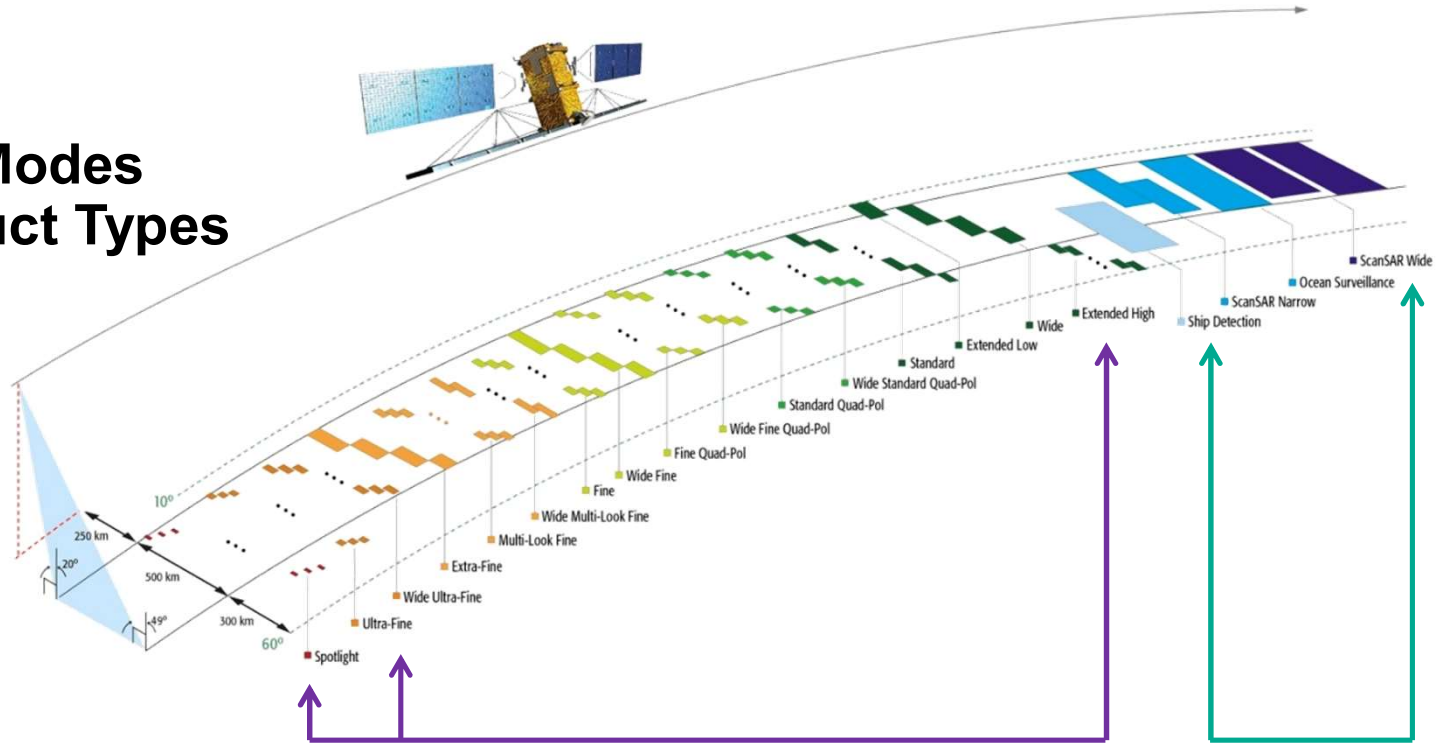


Imagery: Oil seeps in the Gul of Mexico (SCNA)

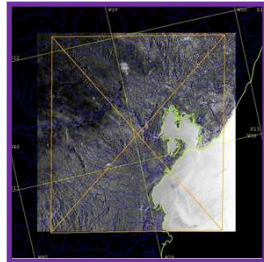




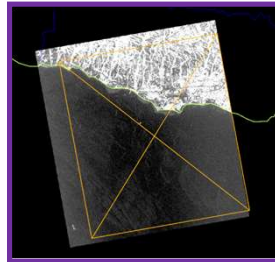
Beam Modes > Product Types



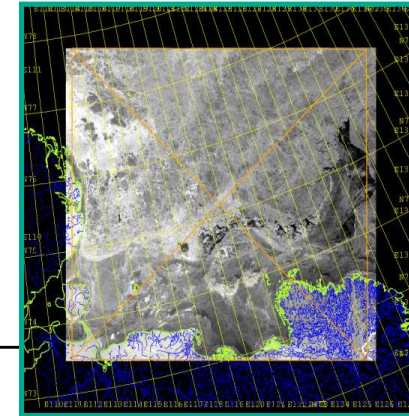
SLC Single Look Complex (slant range)



SGF/SGX Path Image (ground range)



SSG/SPG Map Image (ground range)

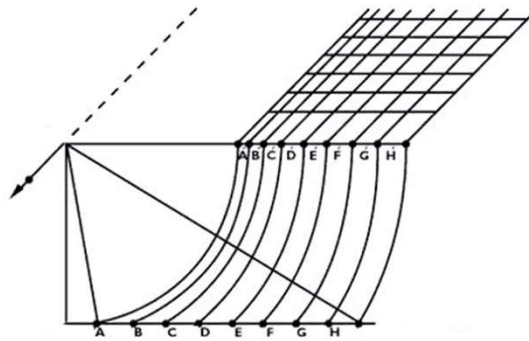


ScanSAR SCF/SCS/SCN/SCW Path Image

Section: Product Types



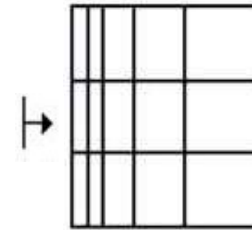
Product Types



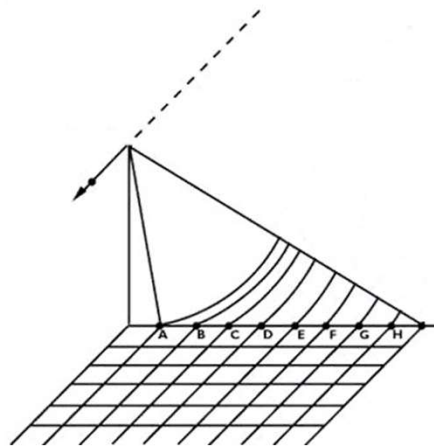
Slant Range

range pixel spacing and range resolution are measured along a slant path perpendicular to the track of the sensor

SLC; complex data, **phase** is maintained



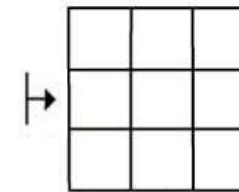
Path Image:
Processing aligns the scene parallel to the satellite's orbit path.



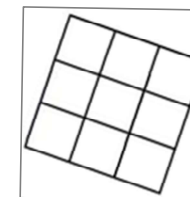
Ground Range

range pixel spacing and range resolution are measured in ground range coordinates, i.e. along an assumed Earth's surface that follows the shape of the ellipsoid at a local elevation height

SGF, SGX; magnitude detected pixels represented as unsigned integers



Path Image:
Processing aligns the scene parallel to the satellite's orbit path.



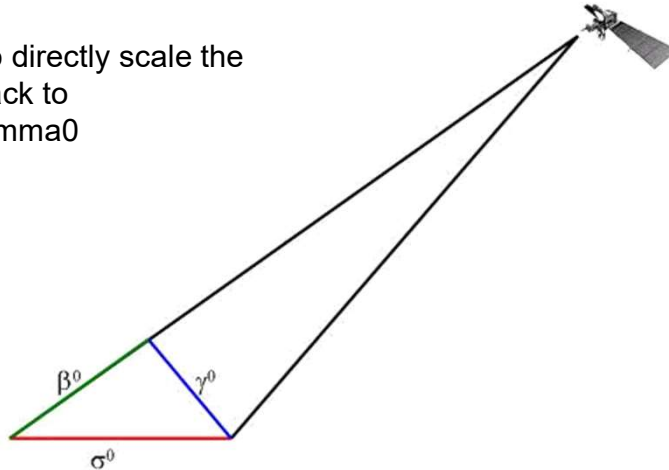
Map Image:
Geocorrected to a map projection.



Calibration Type: Output Scaling LUT files

3 output scaling Look-up Tables (LUTs) are included with most products (all but SSG & SPG). These LUTs allow you to convert the digital numbers found in the output product to sigma-nought, beta-nought, or gamma-nought values by applying a constant offset and range dependent gain to the SAR imagery.

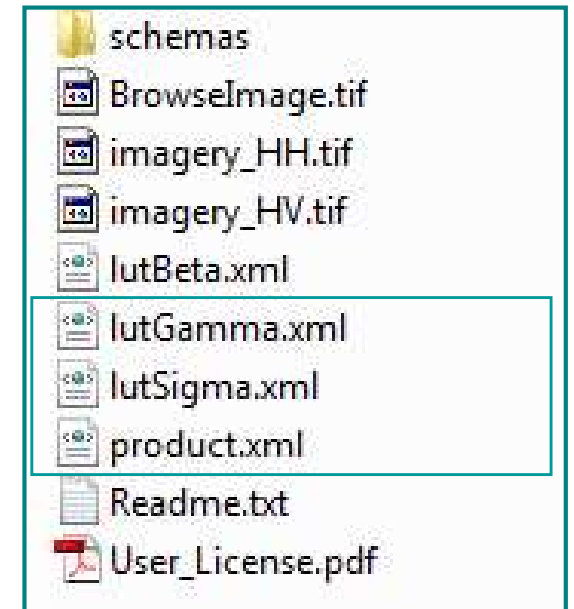
This allows the user to directly scale the integer pixel values back to beta0, sigma0 and gamma0 backscatter.



Beta nought is the radar brightness coefficient

Sigma nought is the measure of the strength of radar signals backscattered

Gamma nought is typically used when calibrating the antenna.



SECTION 2

Product Selection

Acquisition Planning

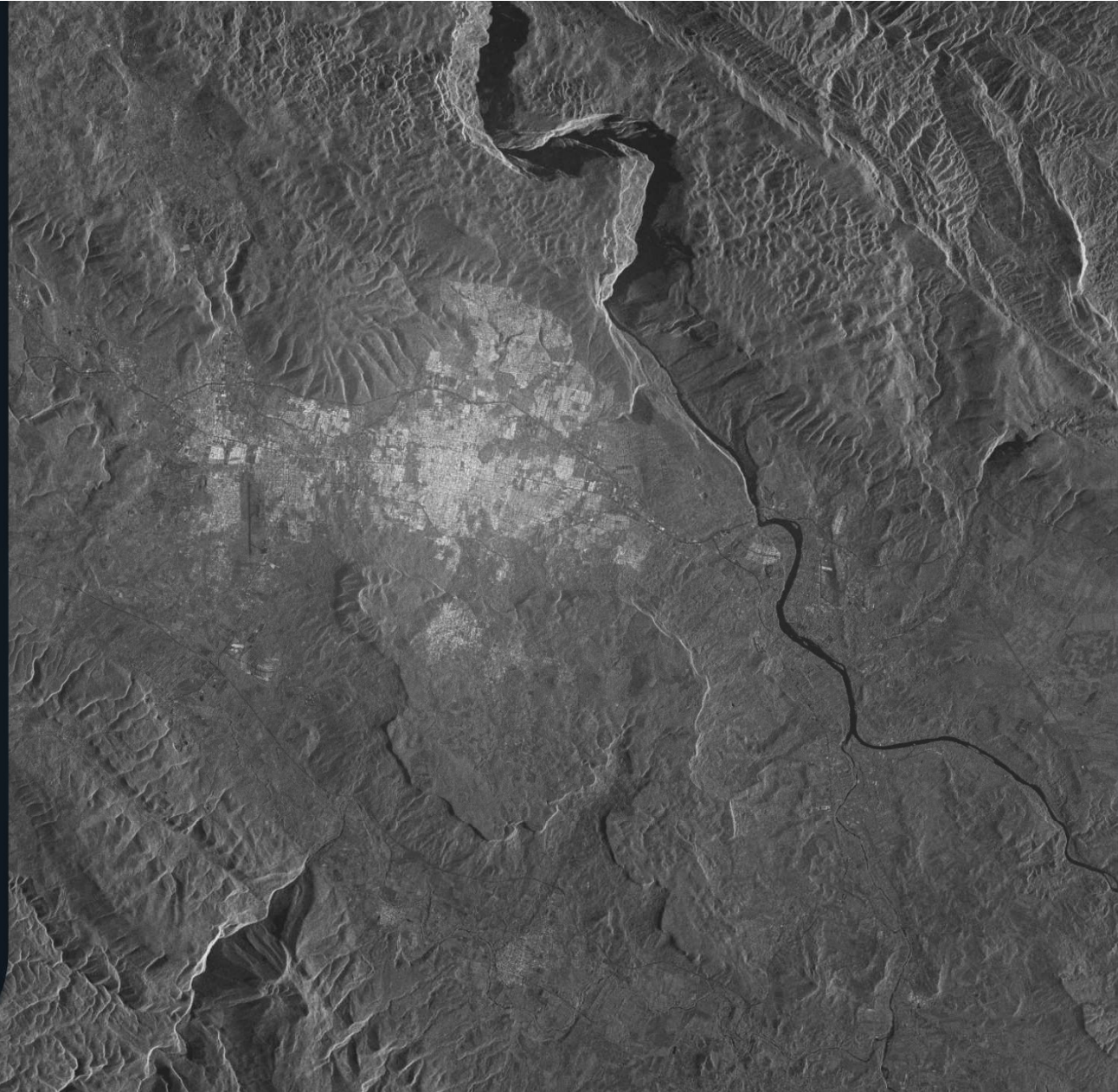
- ✓ Beam mode
- ✓ Product Type
- ✓ Format

Tasking & Ordering

- ✓ Programming Level
- ✓ Delivery Priority



Chiapas, Mexico (U10W2)





Product selection

Acquisition Planning

Beam Mode

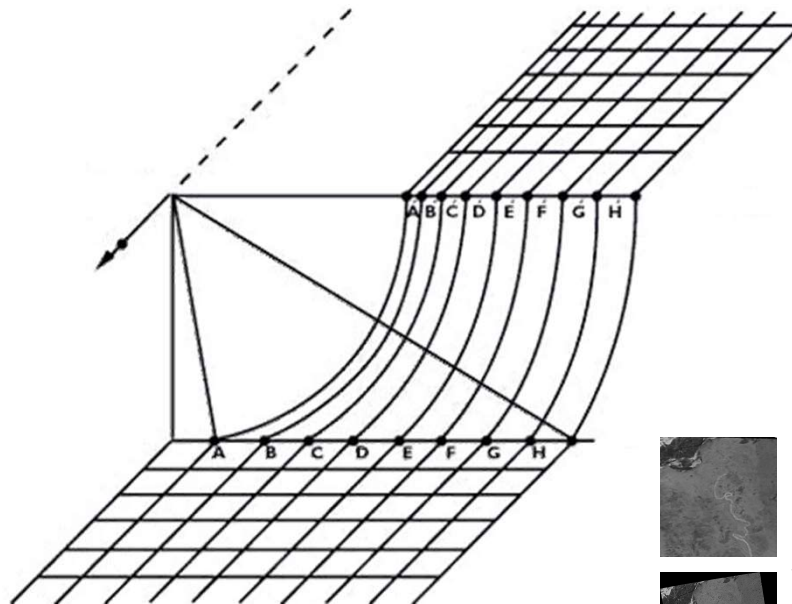
- ✓ Coverage vs. Resolution
- ✓ Incidence Angle
- ✓ Polarization

Product Type

1. Slant Range
 - a) Path Image
 - b) Map Image
2. Ground Range
 - a) Path Image
 - b) Map Image

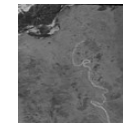
Format

1. RS2 GTIFF + XML
2. Value Added



Slant Range

range pixel spacing and range resolution are measured along a slant path perpendicular to the track of the sensor
SLC; complex data, phase is maintained



Ground Range

range pixel spacing and range resolution are measured in ground range coordinates, i.e. along an assumed Earth's surface that follows the shape of the ellipsoid at a local elevation height
SGF, SGX; magnitude detected pixels represented as unsigned integers



Product selection

Tasking & Ordering

Programming Level	Order Submission (before tasking)	Priority
1. Emergency Programming	4 - 12 hours	<i>Highest</i>
2. Guaranteed Time Critical (GTC)	> 72 hours	<i>Precedence over NTC, TC</i>
3. Time Critical (TC)	> 72 hours	<i>Precedence over NTC</i>
4. Non Time Critical (NTC)	> 72 hours	<i>Standard, precedence over Late</i>
5. Late Programming	12 - 72 hours	<i>Lowest</i>

Delivery Priority	Latency from reception to delivery	
1. Near-Real Time	< 4 hours	<i>Best effort, within 1 hour of downlink</i>
2. RUSH	< 24 hours	<i>~6 – 24 hours</i>
3. Regular	< 5 days	<i>~26 hours</i>

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presented by *VIGISAT*

Questions?

