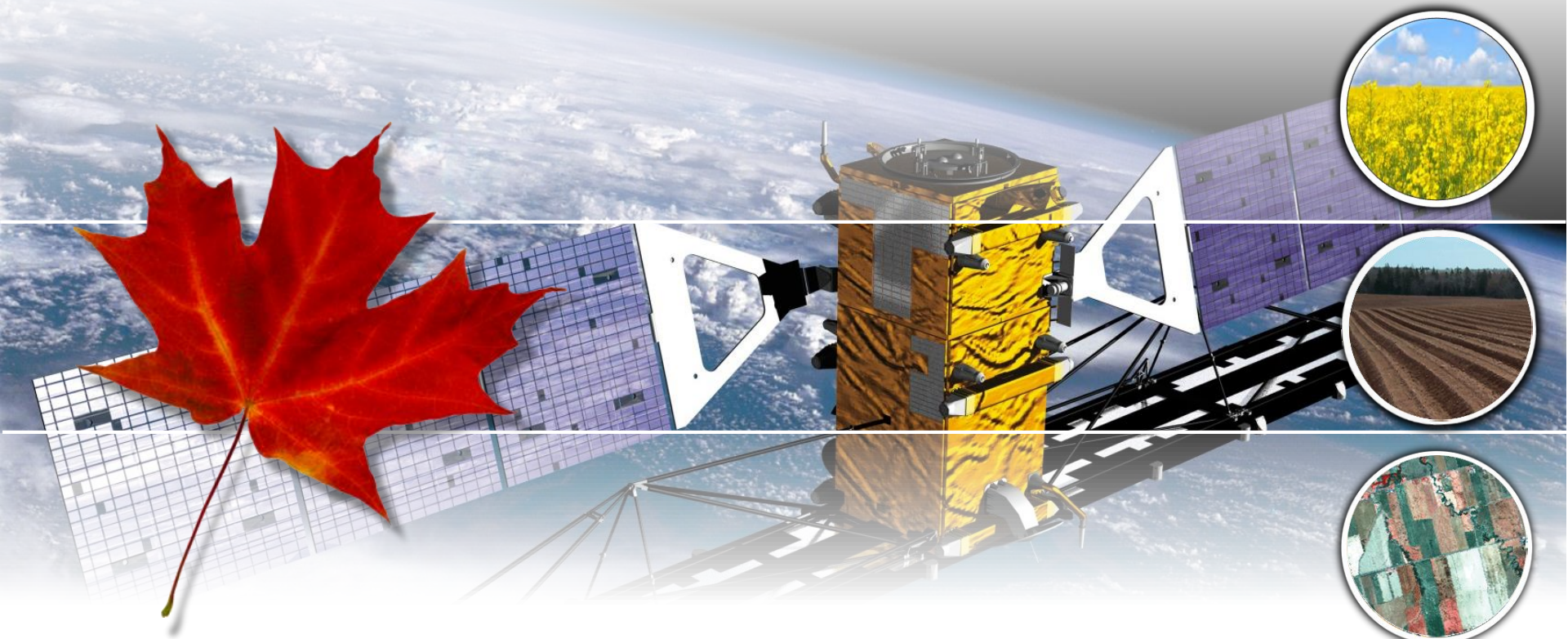




Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada



# Lab 1: Where's the Data



**Carleton**  
UNIVERSITY

Canada's Capital University



Natural Resources  
Canada

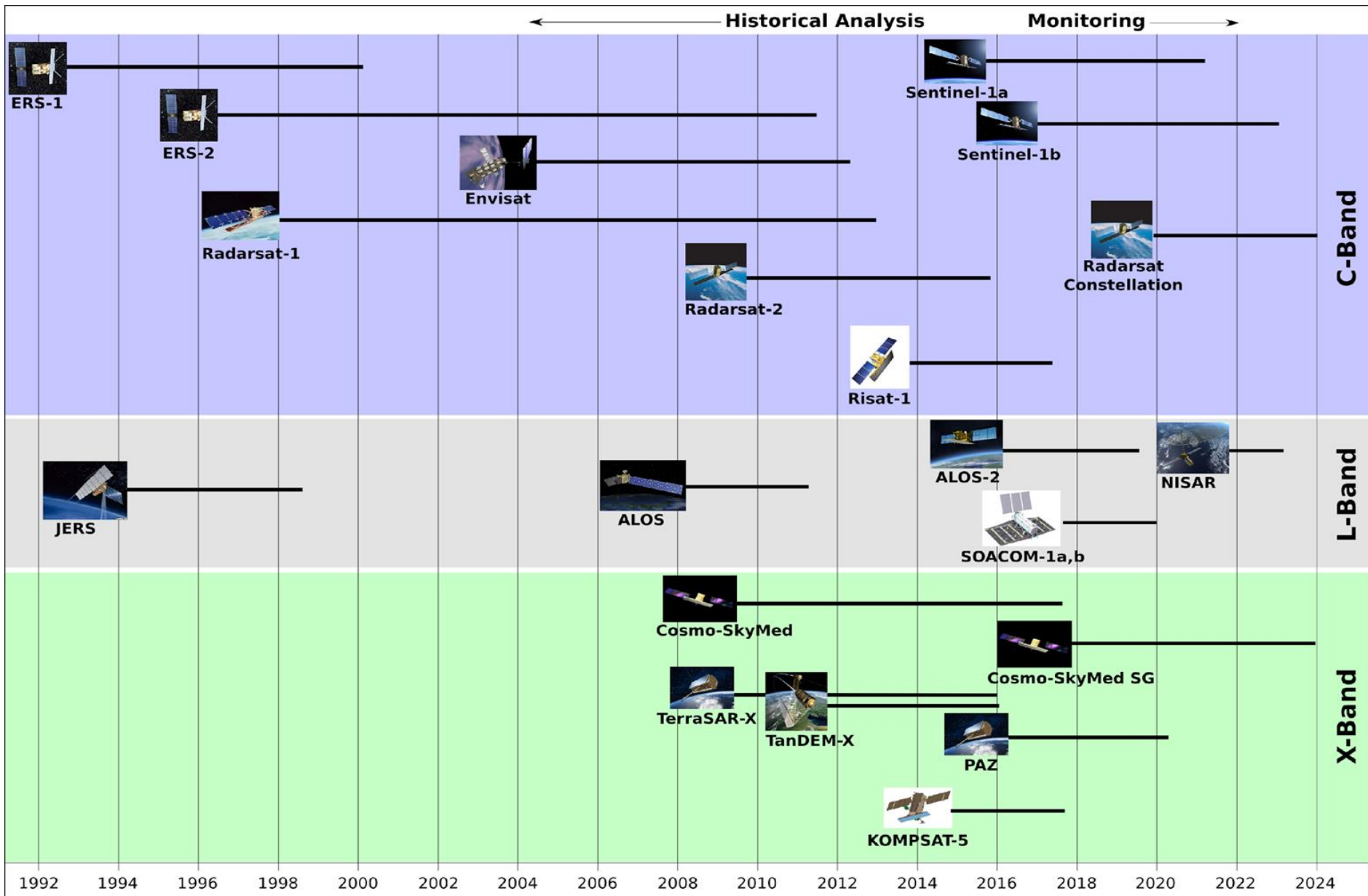
Ressources naturelles  
Canada



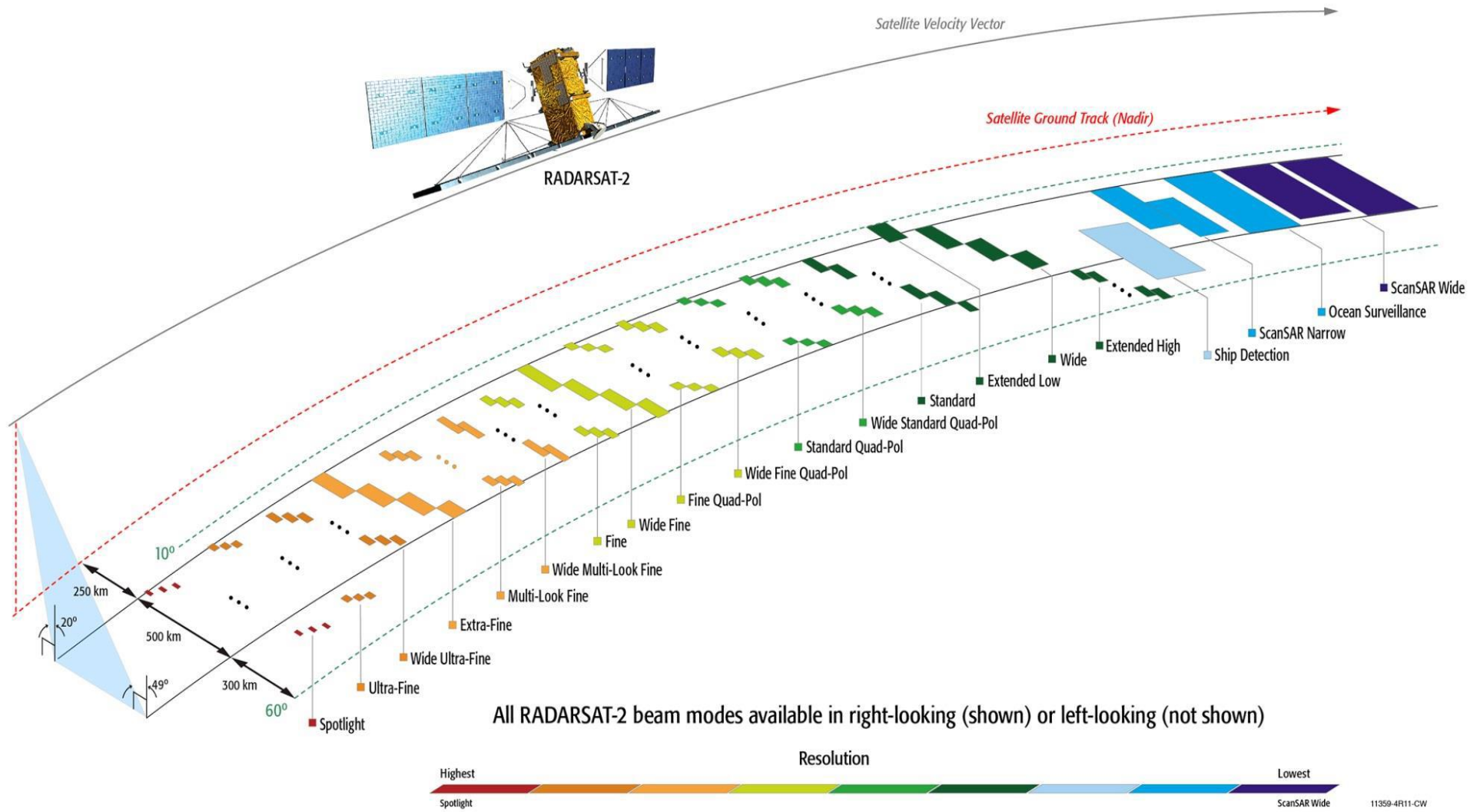
Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

# SAR Missions



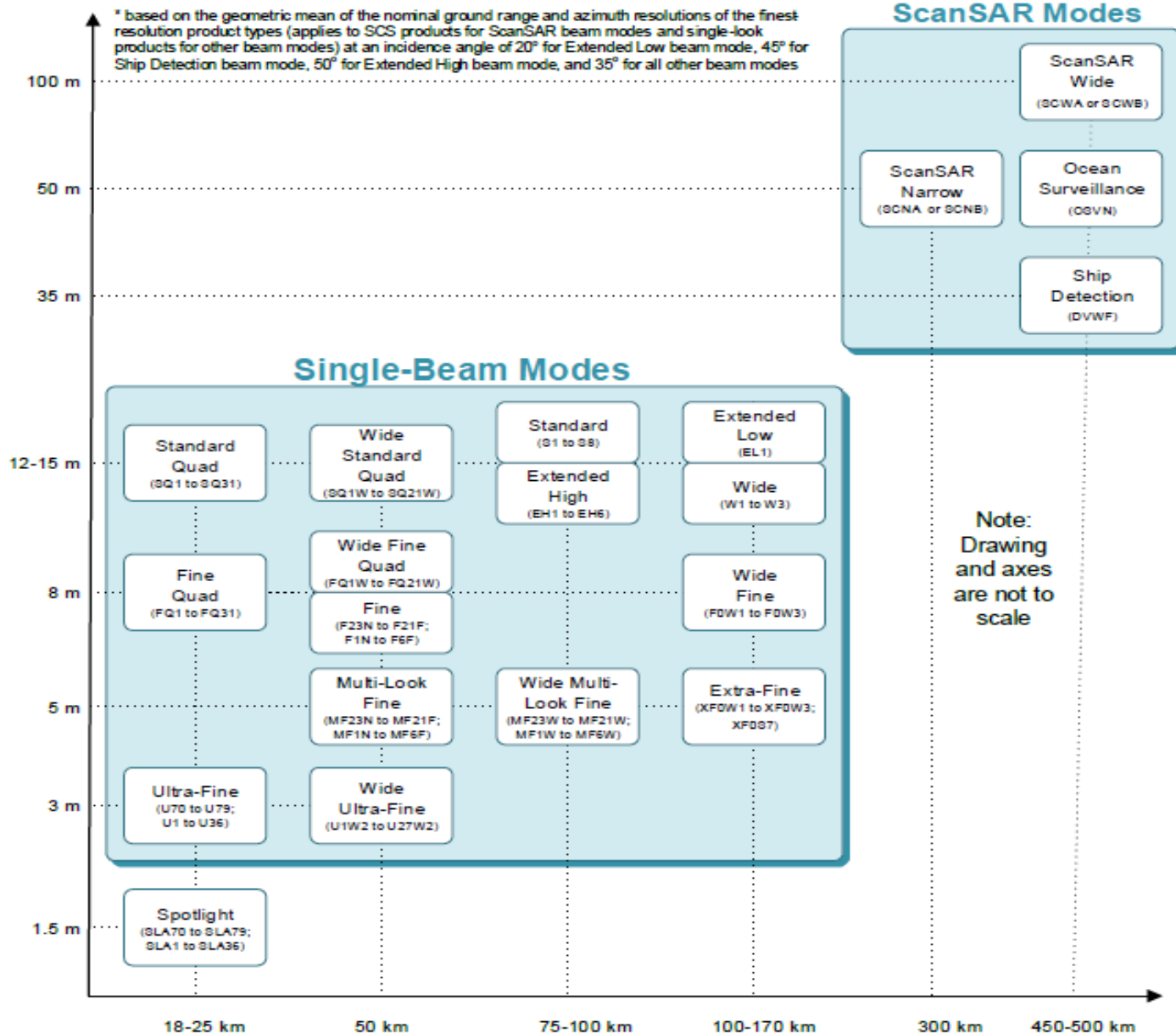
# RADARSAT-2



RADARSAT-2 SAR Beam Modes - Revisit time: 24 days



# Nominal Resolution Cell Size \*



RADARSAT-2 beam modes and beam positions in terms of their nominal swath width and achievable product resolution

# RADARSAT-2 Image Products

## Slant Range SLC Product (Single Look Complex)

- Each image pixel is represented by a complex (real  $I$  and imaginary  $Q$ ) magnitude value.
- No interpolation into ground range coordinates is performed during processing for SLC image products, and so the range coordinate is given in radar slant range rather than ground range, i.e. the range resolution is measured along a slant path perpendicular to the track of the sensor.
- The processing for all SLC products covers a single look in range and azimuth directions.
- For dual or quad polarization SLC products, the images for different polarization channels are co-registered.
- Intended for applications that require the full bandwidth and phase information, e.g. for SAR interferometry and polarimetry.

# RADARSAT-2 Image Products

## Ground Range Products (1)

- The range resolution is 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.
- These products are useful, if geocoding or orthorectification is to be applied by the customer, or in case geocoding is not required.

**SGX - SAR Georeferenced eXtra:** have very fine resolution that ensures that all image information is preserved meeting Nyquist criterion and makes the imagery suitable for post-processing.

**SGF - SAR Georeferenced Fine:** generated with pixel dimensions larger than those of the corresponding SGX products, therefore appropriate for applications where the reduction in product volume is important, and where the full precision is not needed.

# RADARSAT-2 Image Products

## Ground Range Products (2)

- SGF images do not meet the Nyquist criterion and are generated with standard ground-coordinate pixel dimensions, which are generally larger than those of the corresponding SGX images.
- The numerical value of each pixel in the digital image represents the intensity of the SAR image averaged over the sampling interval.
- The Nyquist criterion requires a sampling interval equal to twice the spatial frequency to accurately preserve the spatial resolution in the resulting digital image.

# RADARSAT-2 Image Products

## Ground Range Products (3)

**SCN - ScanSAR Narrow beam:** refers to SGF product produced from the ScanSAR Narrow Beam Mode generated using two looks in range and two looks in azimuth.

**SCW - ScanSAR Wide beam:** refers to SGF product produced from the ScanSAR Wide Beam Mode generated using four looks in range and two looks in azimuth.

**SCF (ScanSAR Fine) and SCS (ScanSAR Sampled):** are similar to SCN or SCW products with the additional processing options of noise subtraction.



# RADARSAT-2 Image Products

## Geocorrected Products:

**SSG - SAR Systematic Geocorrected:** generated by geocorrection of single beam products. The geocorrection process for SSG products does not include the use of ground control points (GCP).

Geocorrection can include either orthorectification using a Digital Elevation Model (DEM) or can be based on a fixed elevation above a reference ellipsoid, which is specified by the user.

**SPG - SAR Precision Geocorrected:** bears the same relationship to the input image data as the SSG product, except that it is geocorrected using precise ground control points.

# RADARSAT-2 Data Access

- Natural Resources Canada Earth Observation Data Management System (EODMS).
- RADARSAT-2 data is available through EODMS for Government of Canada users only.
- EODMS will be used for RCM data ordering. Other users need to register.

The screenshot displays the Natural Resources Canada Earth Observation Data Management System (EODMS) website. The header features the Government of Canada logo and navigation links for Canada.ca, Services, Departments, and Français. The main navigation bar includes categories like Energy, Mining/Minerals, Forests, Earth Sciences, Hazards, Explosives, The North, and Environment. A search bar is located on the right. The breadcrumb trail shows the path: Home → Natural Resources Canada → EODMS. The left sidebar, titled 'Start', contains a welcome message and a list of options for visitors, categorized into 'All Visitors' and 'Registered Visitors'. The main content area, titled 'Map Options', shows a map of North America with various geographical features and labels. A scale bar at the bottom left indicates 1000km and 500mi. The bottom right corner displays the coordinates 21K 538954.15 7965669.97.

Government of Canada / Gouvernement du Canada

Canada.ca | Services | Departments | Français

Natural Resources Canada

Canada

Energy ▾ Mining/Minerals ▾ Forests ▾ Earth Sciences ▾ Hazards ▾ Explosives ▾ The North ▾ Environment ▾

Home → Natural Resources Canada → EODMS

**Start**

Welcome to the EODMS  
(Earth Observation Data Management System)

Select one of the following options:

**All Visitors**

- Search for Earth Observation Data and Aerial Photographs ?
- Register (Required to order products) ?
- Read What's New ?
- View Help Documentation ?
- About ?
- Contact Us ?

**Registered Visitors**

- Login ?
- View Saved Search Criteria ?
- View Saved Watch Mode Searches ?
- View Account ?
- View Order Status ?
- Add Remote Search Target - Catalogue Service for the Web (CSW) ?

**Map Options**

Map of North America showing various geographical features and labels.

1000km  
500mi

21K 538954.15 7965669.97

# RADARSAT-2 Data Access

[Home](#) → [Natural Resources Canada](#) → EODMS

Start Search

Search

### 1. Select an Area of Interest

- ▶ Search for a Geographic Location ?
- ▶ Use Current Map Extent ?
- ▶ Draw an Area ?

 Rectangle Remove

 Polygon

 Circle

**Z** Line

 Point

- ▶ Enter Coordinates ?
- ▶ Import a File ?
- ▶ Use a Saved Area of Interest ?
- ▶ Enter Roll and Photo Number (Aerial Photos Only) ?

## 2. Select Dates

### 3. Select Data

#### 4. Select Data Options

## Map Options





# RADARSAT-2 Data Access

Start Search

Search

1. Select an Area of Interest

2. Select Dates

3. Select Data

☐ **National Air Photo Library [Online]**  
Over six million aerial photographs covering all of Canada, some of which date back to the 1920s.

☒ **Radar Satellites**  
Radar Satellites

☐ **RADARSAT-1 Raw Products [Online]**  
Raw data products from the RADARSAT-1 satellite.

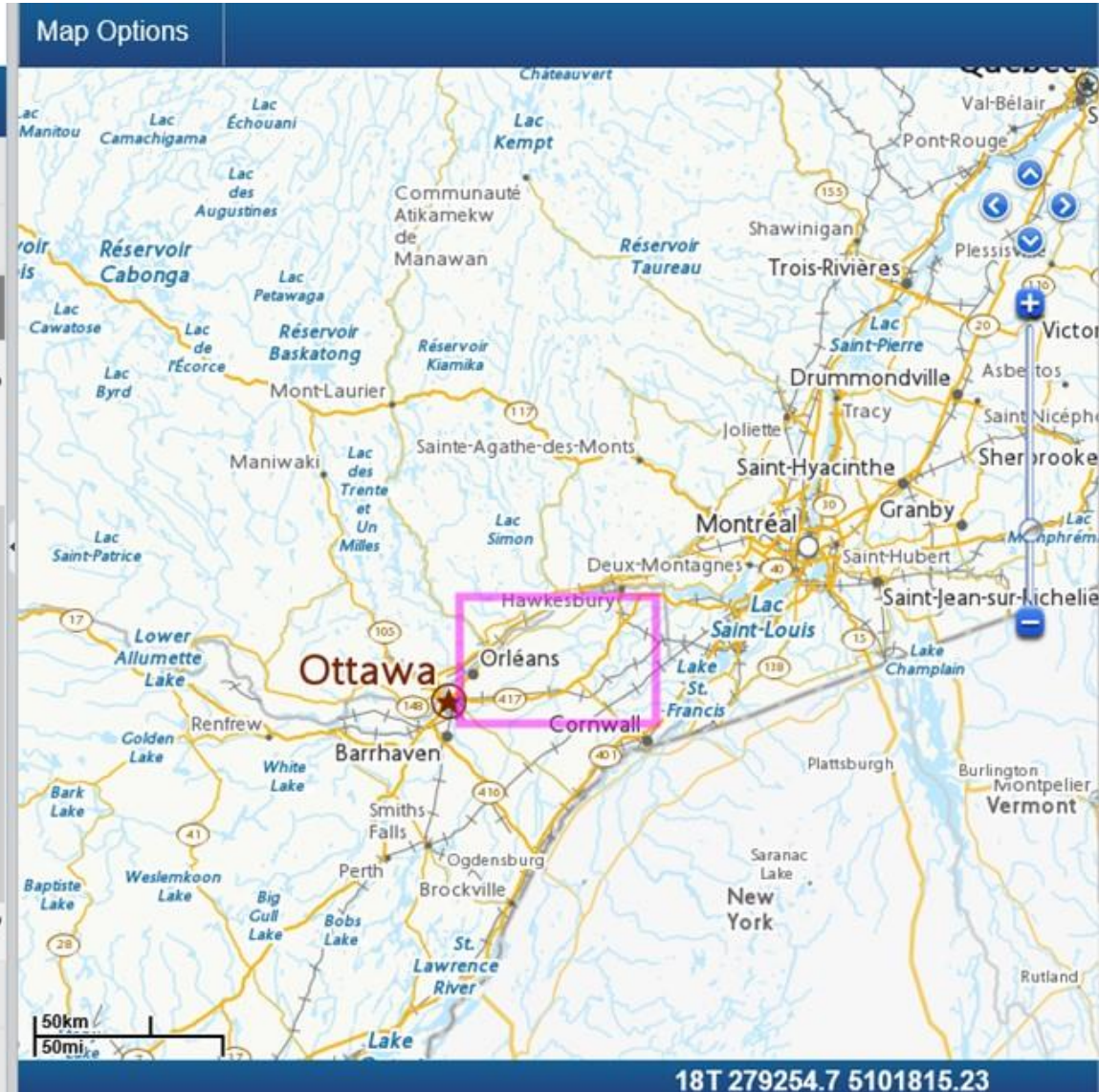
☒ **RADARSAT-2 Raw Products [Online]**  
Raw data products from the RADARSAT-2 satellite.

☐ **Value-added Satellite Products**  
Value-added Satellite Products

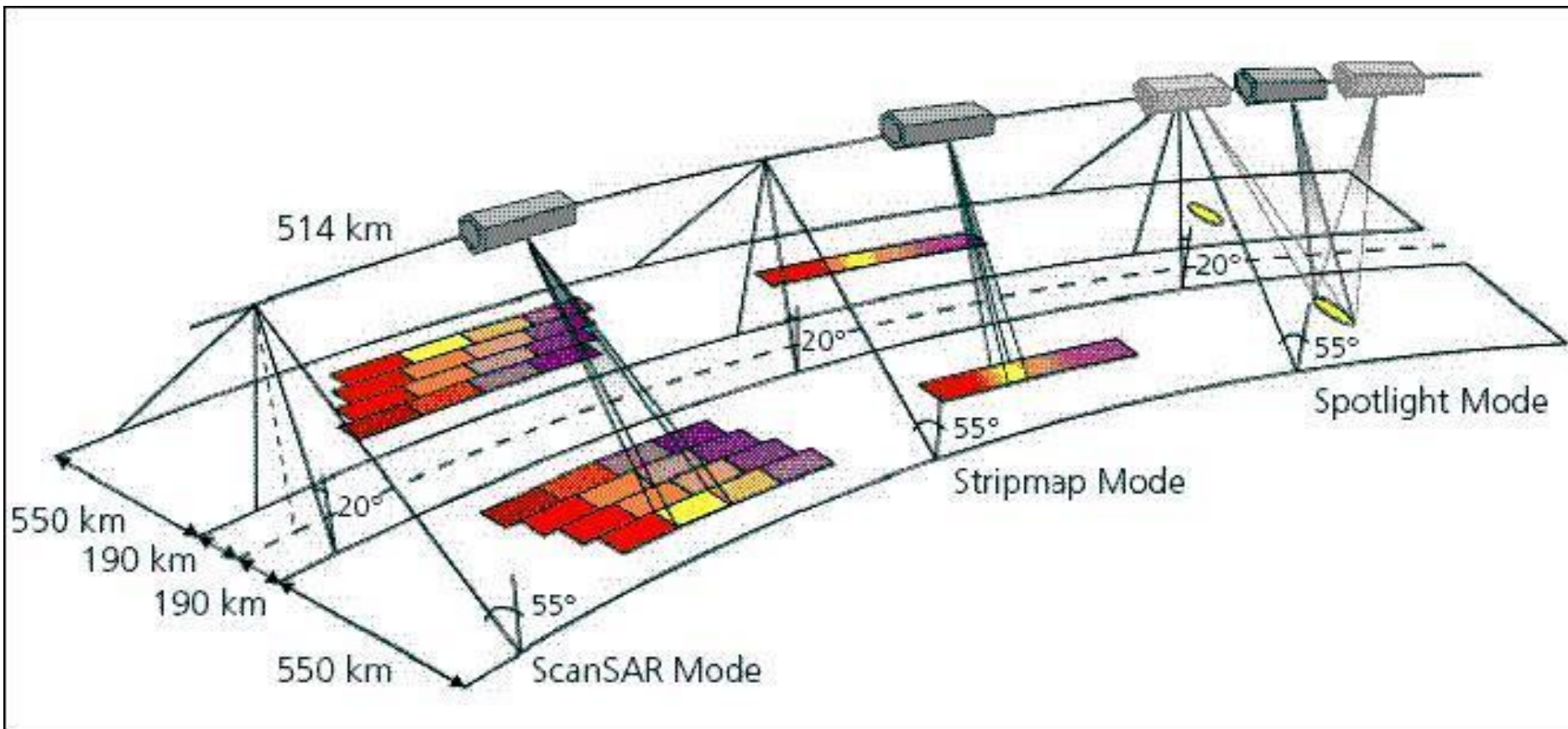
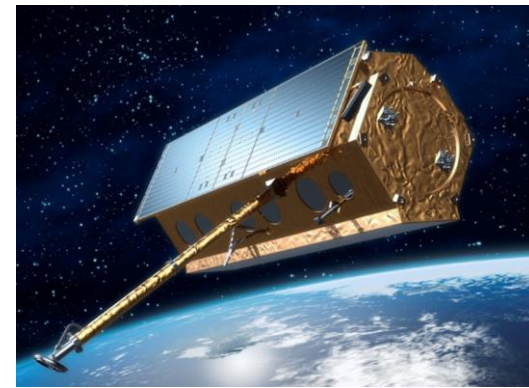
☐ **CCRS Thematic Data Sets [Online]**  
Various composite and landcover time series of Canada

4. Select Data Options

5. Submit Search



# TerraSAR-X/TanDEM-X



Overview of the TerraSAR-X scanning modes - Revisit time: 11 days



Imaging Mode	Standard Scene Size <sup>a</sup> [km]	Maximum Acquisition Length [km]	Slant Range Resolution <sup>b</sup> [m]	Azimuth Resolution <sup>b</sup> [m] <sup>c</sup>	Polarisation	Full Performance Range [°]
Staring SpotLight (ST)	4 x 3.7 <sup>d</sup>	3.7	0.6	0.24	Single (VV or HH)	20° to 45°
HighRes SpotLight 300 MHz (HS300)	10 x 5 <sup>c</sup>	5	0.6	1.1	Single (VV or HH)	20° to 55°
HighRes SpotLight (HS)	10 x 5	5	1.2 1.2	1.1 2.2	Single (VV or HH) Dual (HH & VV)	20° to 55°
SpotLight (SL)	10 x 10	10	1.2 1.2	1.7 3.4	Single (VV or HH) Dual (HH & VV)	20° to 55°
StripMap (SM)	30 x 50 single pol 15 x 50 dual pol	1,650	1.2 1.2	3.3 6.6	Single (VV or HH) Dual (HH & VV, HH & HV, or VV and VH)	20° to 45°
ScanSAR (SC)	100 x 150	1,650	1.2 (at 150 MHz)	18.5	Single (VV or HH)	20° to 45°
Wide ScanSAR (WS)	270 x 200 <sup>c</sup>	1,500	Depending on range bandwidth 1.7 - 3.3	40	Single (VV, HH, HV or VH)	15.6° to 49°

## TerraSAR-X imaging modes



# TerraSAR-X Image Products

**SSC - Single Look Slant Range Complex:** data are represented as complex numbers containing amplitude and phase information. It is compatible with the SLC product available from RADARSAT-2.

**MGD - Multi Look Ground Range Detected:** multi look product with reduced speckle and approximately square resolution cells. For the slant to ground range projection the WGS84 ellipsoid and an average, constant terrain height value are used.

**GEC - Geocoded Ellipsoid Corrected:** multi looked, resampled and projected product. The image is represented in map geometry with ellipsoidal corrections only, thus no terrain correction is performed.

**EEC - Enhanced Ellipsoid Corrected:** multi looked, resampled and projected product. However, image distortions caused by varying terrain height are corrected using an external Digital Elevation Model (DEM). It features the highest level of geometric correction available and is thus quickly interpretable and combinable with other sources of information.

# TerraSAR-X/TanDEM-X Data Access

- EOWEB<sup>®</sup> GeoPortal (EGP) is used to check the data archive and program future acquisitions.
- The data are not free. However users may be able to submit proposals to DLR to access a limited number of images for research

The screenshot displays the EOWEB GeoPortal (EGP) interface. At the top, there is a header with the DLR logo, navigation links (Home, Impressum, Contact), and the text "Cluster Angewandte Fernerkundung". Below the header, there are links for "Login", "Register", and "Help", along with the status "You are not logged in.".

The main content area is divided into several sections:

- Catalogue**: Includes tabs for "UserSet" and "ShopCart".
- Collections**: A list of data types with checkboxes: "Atmospheric Sensors", "Thematic Maps", "Optical Sensors High Resolution", "Optical Sensors Medium Resolution", "Digital Elevation Model (DEM)", and "Synthetic Aperture Radar Data".
- Query Mode**: A dropdown menu set to "Standard".
- Date**: Fields for "From" and "To" dates, with a "Choose a Date" dropdown and a "Step by range" button.
- Area**: A section for defining the search area, including a "Rectangle" dropdown, "Center Lat/Long (format dd:mm)" fields, and "Extension Lat/Long (format dd:mm)" fields.

A globe map is displayed in the center, showing the Earth with a grid overlay. At the bottom, there is a "Start Search" button and a "Results" section.

# TerraSAR-X/TanDEM-X Data Access

## Future Products / Acquisitions

**Collections :**

☐ Deselect all ☐ Expand/collapse 1 Collection selected

- ☐ TSX-1\_DLR
- ☒ TSX-1
  - ☐ TSX-1.SAR.L1b-ScanSAR
  - ☐ TSX-1.SAR.L1b-Stripmap
  - ☐ TSX-1.SAR.L1b-High-Resolution-Spotlight
  - ☒ TSX-1.SAR.L1b-Spotlight


**Query Mode:**

**Date:**

**Area:**

**Advanced Criteria:**

Polarization Mode	Any
Polarization Channels	HH
Pass Direction	Ascending
Looking Direction	Any
Relative Orbit	0 - 167

 **Start Search**

**Shop Cart** **Order Monitoring**

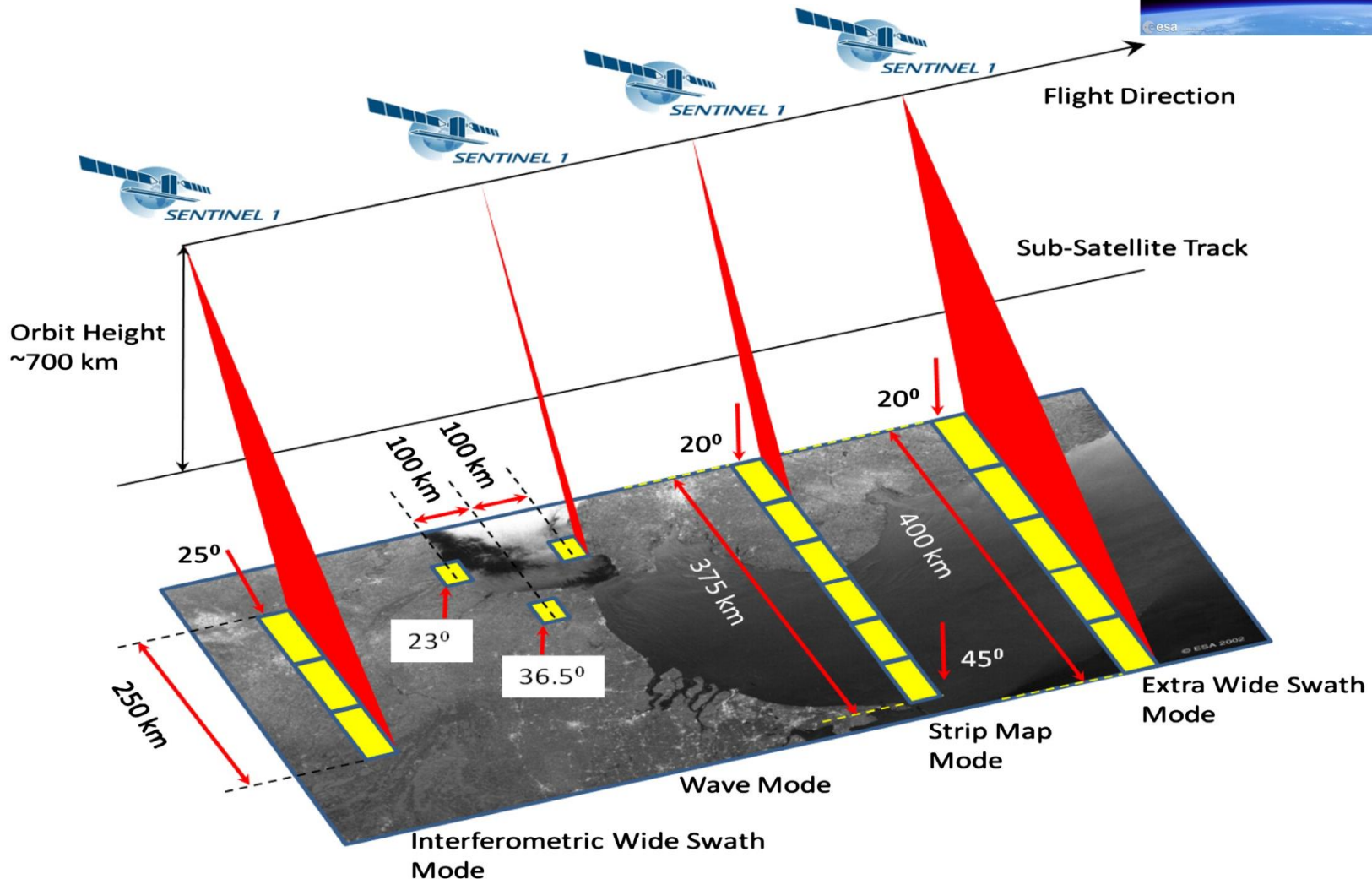
**Catalogue** **Future Products / Acquisitions** **User Set**

**Collections :**

☐ Deselect all ☐ Expand/collapse 0 Collections selected

- ☐ TSX-1
  - ☐ TSX-1 SAR L0 Spotlight future products
    - ☐ TSX-1 SAR L0 Spotlight future coverages
    - ☐ TSX-1 SAR L0 Spotlight future scenes
  - ☐ TSX-1 SAR L0 High Resolution Spotlight future products
    - ☐ TSX-1 SAR L0 High Resolution Spotlight future coverages
    - ☐ TSX-1 SAR L0 High Resolution Spotlight future scenes
  - ☐ TSX-1 SAR L0 Stripmap future products
    - ☐ TSX-1 SAR L0 Stripmap future coverages
    - ☐ TSX-1 SAR L0 Stripmap future scenes
  - ☐ TSX-1 SAR L0 ScanSAR future products
    - ☐ TSX-1 SAR L0 ScanSAR future coverages
    - ☐ TSX-1 SAR L0 ScanSAR future scenes

# Sentinel-1A / 1B



**Overview of the Sentinel-1 scanning modes- Revisit time: 6 days**



# Sentinel-1 Image Modes and Products

Acq. Mode	Product Type	Resolution Class	Resolution Rng x Azi [m]	Pixel Spacing Rng x Azi [m]	Num Looks Rng x Azi
SM	SLC		1.7x4.3 to 3.6x4.9	1.5x3.6 to 3.1x4.1	1x1
	GRD	FR	9x9	3.5x3.5	2x2
		HR	23x23	10x10	6x6
		MR	84x84	40x40	22x22
IW	SLC		2.7x22 to 3.5x22	2.3x14.1	1x1
	GRD	HR	20x22	10x10	5x1
		MR	88x87	40x40	22x5
EW	SLC		7.9x43 to 15x43	5.9x19.9	1x1
	GRD	HR	50x50	25x25	3x1
		MR	93x87	40x40	6x2
WV	SLC		2.0x4.8 3.1x4.8	1.7x4.1 2.7x4.1	1x1
	GRD	MR	52x51	25x25	13x13

## Sentinel-1 imaging modes

### Product types

- **SLC - Single Look Complex:** Slant range Single Look Complex product
- **GRD - Ground Range Detected:** Ground range multi-looked that can be in one of three resolutions: Full Resolution (FR), High Resolution (HR), and Medium Resolution (MR)

# Sentinel-1 Data Access

<https://scihub.copernicus.eu/dhus/#/home>

The screenshot displays the Copernicus Open Access Hub interface. At the top, the ESA and Copernicus logos are visible alongside the text "Copernicus Open Access Hub". A search bar with the placeholder "Insert search criteria..." is located at the top left. Below it, the "Advanced Search" panel is open, showing filters for "Sort By" (Sensing Date), "Order By", "Sensing period" (From 2018/10 to 2018/11), and "Ingestion period". The "Mission: Sentinel-1" section is active, with filters for "Satellite Platform" (S1A\_\*), "Polarisation", "Relative Orbit Number (from 1 to 175)", "Product Type", "Sensor Mode", and "Collection". The "Mission: Sentinel-2" section is inactive. The background features a map of the Ottawa region, with a yellow rectangular selection box highlighting a specific area. The map includes labels for various locations such as Mont-Laurier, Maniwaki, Rivière-Rouge, Saint-Donat-de-Montcalm, Sainte-Agathe-des-Monts, Rawdon, Sorel-Tracy, Joliette, Contrecoeur, Verchères, Saint-Jérôme, L'Assomption, Varennes, Montreal, Montreal-Est, Longueuil, La Prairie, Saint-Jean-sur-Richelieu, Napierville, Hemmingford, Cornwall, Massena, Ingleside, Glen Becker, Morrisburg Station, Ogdensburg, Brockville, Black Lake, Lan'sdowne, Elginburg, Perth, Smiths Falls, Merrickville, Kemptville, Manotick, Russell, Embrun, Carleton Place, Almonte, Carp, Nepean, Stittsville, Wakefield, Lefavre, Grenville, Hawkesbury, Dalketh, Vaudreuil-sur-le-Lac, Sainte-Justine-Station, Salaberry-de-Valleyfield, Howick, Huntingdon, Avonmore, and Swanton. The interface also includes a search icon, a home icon, and a user profile icon in the top right corner.



# Sentinel-1 Data Access

The screenshot displays the Copernicus Open Access Hub interface. At the top, the ESA and Copernicus logos are visible alongside the text "Copernicus Open Access Hub". A search bar at the top left contains the text "Insert search criteria...". Below the search bar, a sidebar on the left shows search results for Sentinel-1 SAR data. The results are displayed in a list format, showing the number of products (1 to 4 of 4), the order by (Sensing Date), and the request details (footprint, mission, instrument, and sensing date). The first result is for a Sentinel-1 SAR-C image with a footprint of approximately 75.73519871933392 to 45.23932673113649, -74.12893787693025 to 45.23932673113649, -74.12893787693025. The second result is for a Sentinel-1 SAR-C image with a footprint of approximately 75.73519871933392 to 45.23932673113649, -74.12893787693025 to 45.23932673113649, -74.12893787693025. The third result is for a Sentinel-1 SAR-C image with a footprint of approximately 75.73519871933392 to 45.23932673113649, -74.12893787693025 to 45.23932673113649, -74.12893787693025. The fourth result is for a Sentinel-1 SAR-C image with a footprint of approximately 75.73519871933392 to 45.23932673113649, -74.12893787693025 to 45.23932673113649, -74.12893787693025. The main map area shows a map of the St. Lawrence Valley region in Quebec, Canada, with a red polygon highlighting the search area. The map includes labels for various cities and towns, including Saguenay, Quebec, Trois-Rivieres, Victoriaville, Drummondville, Saint-Jerome, Montreal, Longueuil, Sherbrooke, Saint-Jean-sur-Richelieu, Cornwall, Plattsburgh, Saint-Albans, Burlington, Montpelier, Brockville, Kingston, Belleville, Peterborough, Barrie, and Richmond. The map also shows the St. Lawrence River and Lake Simcoe.

Insert search criteria...

Display 1 to 4 of 4 products. Order By: Sensing Date ↓

Select All

Request Done: ( footprint:"Intersects(POLYGON((-75.73519871933392 45.23932673113649,-74.12893787693025 45.23932673113649,-74.12893787693025 45.23932673113649,-75.73519871933392 45.23932673113649)))"

S1A SAR-C S1A\_IW\_RAW\_0SDV\_20181103T225242\_20181103T225315...

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products?Mission=Sentinel-1&Instrument=SAR-C&SensingDate=2018-11-03T22:52:42.0000000>

NO QUICKLOOK

S1A SAR-C S1A\_IW\_GRDH\_1SDV\_20181103T225221\_20181103T225246...

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products?Mission=Sentinel-1&Instrument=SAR-C&SensingDate=2018-11-03T22:52:21.0000000>

S1A SAR-C S1A\_IW\_SLC\_1SDV\_20181103T225220\_20181103T225247...

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products?Mission=Sentinel-1&Instrument=SAR-C&SensingDate=2018-11-03T22:52:20.0000000>

S1A SAR-C S1A\_IW\_RAW\_0SDV\_20181103T225217\_20181103T225250...

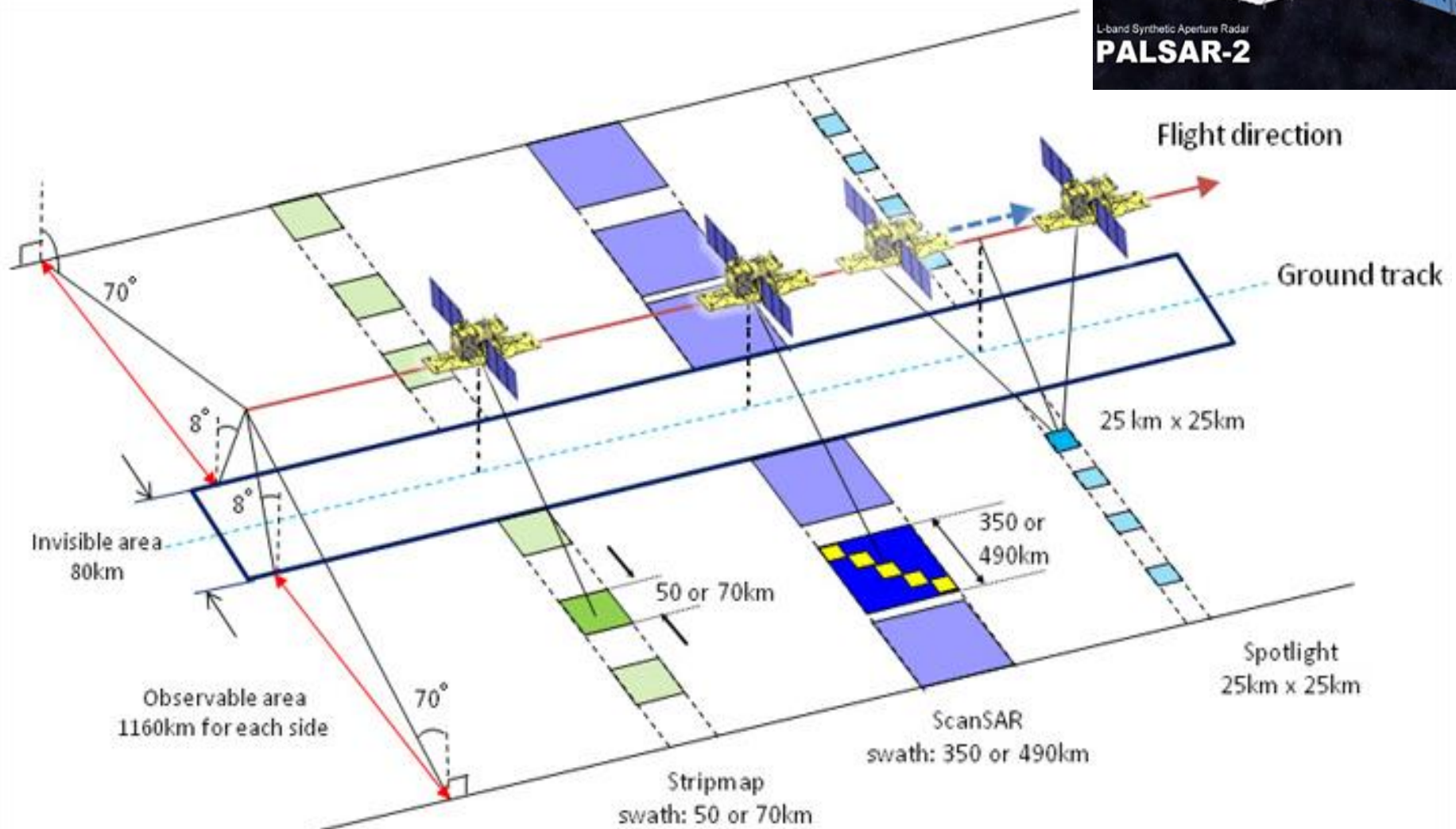
Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products?Mission=Sentinel-1&Instrument=SAR-C&SensingDate=2018-11-03T22:52:17.0000000>

NO QUICKLOOK

25 << < page: 1 of 1 > >>

CLOSE

# ALOS-2 / PALSAR-2



Overview of the PALSAR-2 scanning modes



Observation Mode	Spotlight	ScanSAR			Stripmap *			Full (Quad.) Polarimetry *	
		[28MHz]	[14MHz]	[490km]	[3m]	[6m]	[10m]	[6m]	[10m]
Obs. Mode ID (code)	SBS	WWS/WWD	WBS/WBD	VBS/VBD	UBS/UBD	HBS/HSD	FBS/FBD	HBQ	FBQ
Width (East-West) (Length of Range Direction)	25km	350.5km	350.5km	489.5km	55km (max)	55km (max)	70km (max)	40-50km	30km
Length (North-South) (Length of Azimuth Direction)	25km	355km	355km	355km	70km	70km	70km	70km	70km
Time Duration of Azimuth Direction	N/A	52 sec	52 sec	52 sec	10 sec	10 sec	10 sec	10 sec	10 sec
Range Resolution*1	3.0m	47.5m(5look)	95.1m(5look)	44.2m(2look)	3.0m	6.0m	9.1m	5.1m	8.7m
Azimuth Resolution*1	1.0m	77.7m(3look)	77.7m(3look)	56.7m(1.5look)	3.0m	4.3m	5.3m	4.3m	5.3m
Pixel Spacing Levels 1.5/3.1	0.625m	25m			2.5m	3.125m	6.25m (2look)	3.125m	6.25m (2look)
Pixel Spacing Level 2.1	0.625m/1.25m/2.5m	25m/50m/100m			2.5m/5.0m /10.0m	3.125m/6.25m /12.5m	6.25m /12.5m	3.125m/6.25m /12.5m	6.25m /12.5m
Polarization	Single (HH, HV, VH, or VV)	Single (HH, HV, VH, or VV) Dual (HH+HV or VH+VV)			Single (HH, HV, VH, or VV) Dual (HH+HV or VH+VV)			Full (Quad.) Polarimetry (HH+HV+VH+VV)	

**PALSAR-2 imaging modes - Revisit time: 14 days**

23

# PALSAR-2 Image Products

Level	Definition
Level 1.1	This is complex number data on the slant range following compression of the range and azimuth. As one-look data, it includes phase information and will be the basis for later processing. In wide-area mode, image files are created for each scan.
Level 1.5	This is multi-look data on the slant range from map projection amplitude data, with range and azimuth compressed.
Level 2.1	Geometrically corrected (orthorectified) data using the digital elevation data from Level 1.1.
Level 3.1	Image quality-corrected (noise removed, dynamic range compressed) data from Level 1.5.

Slant range  
products

(Similar  
to SLC)

Ground range  
detected  
product

# PALSAR-2 Data Access

## The Earth Observation Data Utilization Promotion Platform

The screenshot displays the PLATFORM web interface for Earth Observation Data. The left sidebar contains search filters, and the main area shows a map of the Ottawa region with a red bounding box.

**PLATFORM**  
衛星データ利用促進プラットフォーム

Top navigation: Top page, Support, Cart, Account, Log in, Language

Search: By ID, Upload

**STEP1: Search Targets**

- ☐ Earth Observation Data
  - ☒ ALOS-2 PALSAR-2
  - ☐ ALOS PRISM
  - ☐ Terra ASTER
- ☐ Added Value Data
  - ☐ Polarimetric Images
- ☐ Vector Data
- ☐ Numeric Data
- ☐ Feature Data

**STEP2: Search Range**

Search Range

W -75.390166 N 45.630931 E -74.758452 S 45.326651

**STEP3: Query Parameter**

Earth Observation Data

Observation date: 2018-11-15 - 2018-11-22

**PALSAR-2 Setting**

- ☐ Obs Mode
- ☐ Polarization
- ☐ Off-nadia[deg]

Observation Direction: Any

Orbit Direction: Any

Browse Image: Any


Map: Google Streets, Move map, Box Select, Polygon Select, Polygon Edit, Upload


Map labels: Maniwaki, Rivière Rouge, Mont-Tremblant, Papineau-Labelle Wildlife Reserve, Ottawa, Chelmsford, Cornwall, Kingston, etc.

Image Source: [https://satpf.jp/spf/?sb=search&sensor=ALOS-2\\_PALSAR-2&item=sb1\\_sar\\_palser2](https://satpf.jp/spf/?sb=search&sensor=ALOS-2_PALSAR-2&item=sb1_sar_palser2)



# Alaska Satellite Facility Data Portal

Find a DAAC



Vertex is the [Alaska Satellite Facility's](#) data portal for remotely sensed imagery of the Earth.

[Vertex](#) | [Interactive Tours](#) | [Help](#) | [ASF Home](#)

[Earthdata Login](#) | [Download Queue](#) | [Contact](#)

Geospatial | Granule | Missions

Geographic Region

Option 1: Click on map and move cursor


Option 2: Enter coordinates:  
Polygon counterclockwise, decimal degrees, (long,lat)  
e.g., -102,37.59,-94,37,-94,39,-102,39,-102,37.59

Dataset

Select: All | None

Dataset	Info
<input checked="" type="checkbox"/> Sentinel-1B	<a href="#">2016-now</a>
<input checked="" type="checkbox"/> Sentinel-1A	<a href="#">2014-now</a>
<input type="checkbox"/> SMAP	<a href="#">2015-now</a>
<input type="checkbox"/> UAVSAR	<a href="#">2008-now</a>
<input type="checkbox"/> ALOS PALSAR	<a href="#">2006-2011</a>
<input type="checkbox"/> RADARSAT-1	<a href="#">1995-2008</a>
<input type="checkbox"/> ERS-2	<a href="#">1995-2011</a>
<input type="checkbox"/> JERS-1	<a href="#">1992-1998</a>
<input type="checkbox"/> ERS-1	<a href="#">1991-1997</a>
<input type="checkbox"/> AIRSAR	<a href="#">1990-2004</a>
<input type="checkbox"/> SEASAT	<a href="#">1978-1978</a>

Optional Search Criteria



+

-


Clear Search Area

World Map

South Polar

☒ Satellite

☐ Map



Google

Imagery ©2018 NASA, TerraMetrics | [Terms of Use](#)

Number of Frames

1

2-5

6-10

10-20

21+

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