

# Introduction to Planet.com

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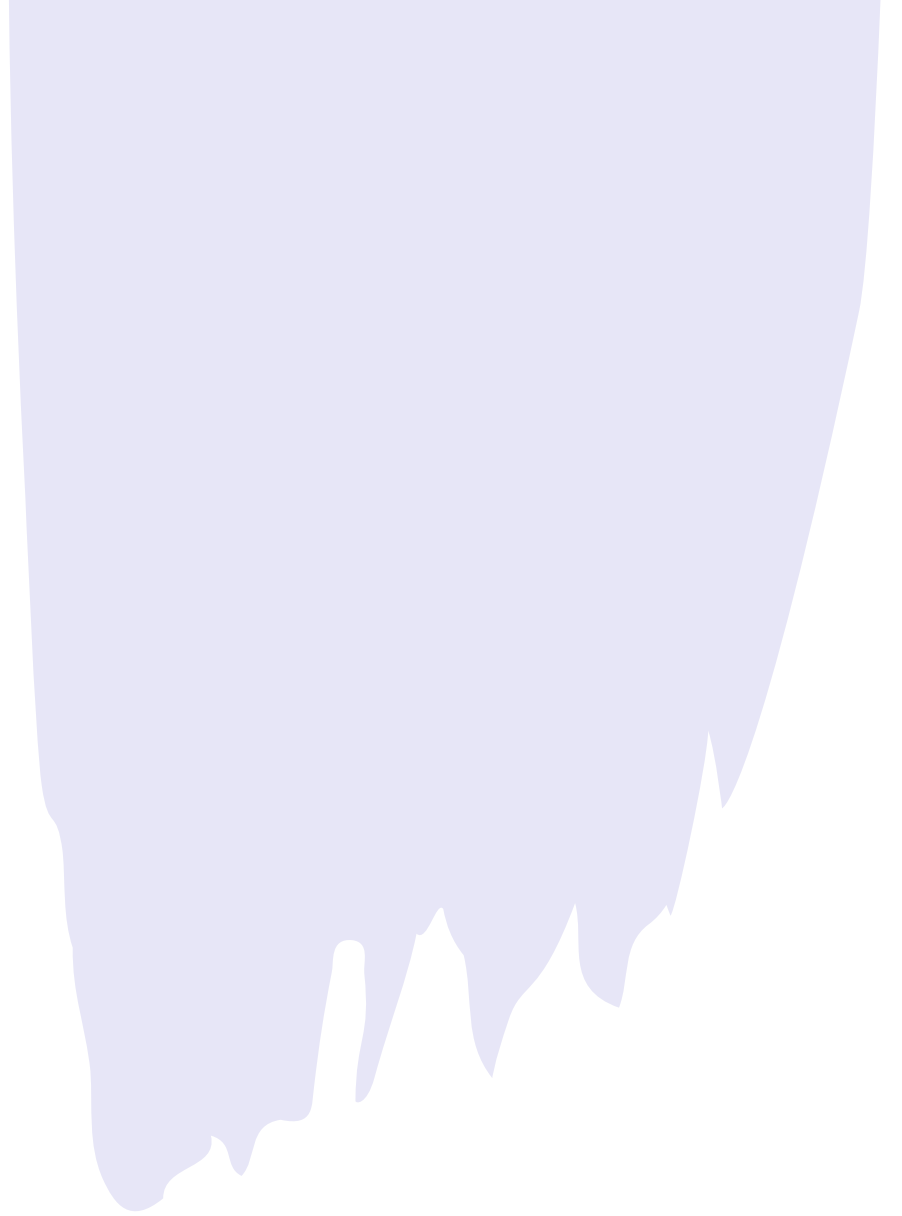
[GIS@CARLETON.CA](mailto:GIS@CARLETON.CA)



# Learning outcomes

- What is Planet.com?
- Planet.com data options
- Create time lapse animation or before/after swipe using Planet Stories
- ArcGIS Pro Planet.com add-in
  - Set up and sign in
  - Load a Planet.com base map in ArcGIS Pro
  - Search for Planet.com imagery in ArcGIS Pro

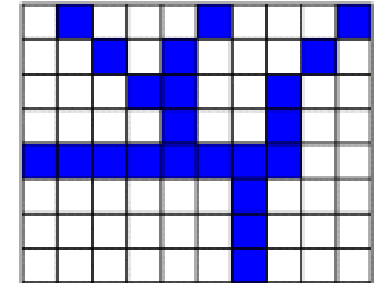
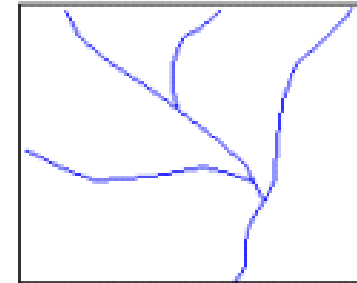
**What is  
Planet.com?**



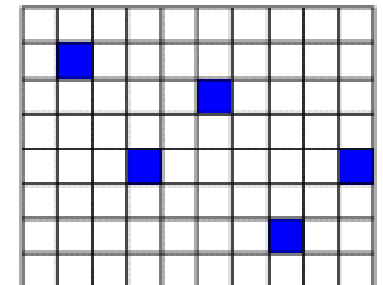
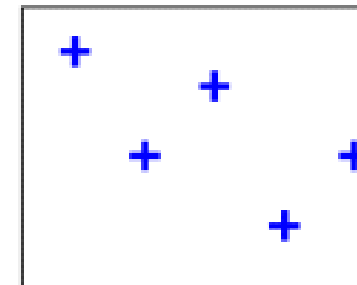
# Two types of GIS layers

- Vector: points, lines, and polygon geometries
  - File types include DWG, shapefiles, Google Earth KML
- Raster: continuous grids made up of pixels
  - File types include TIFF & JPEG
  - **Satellite images are raster files**

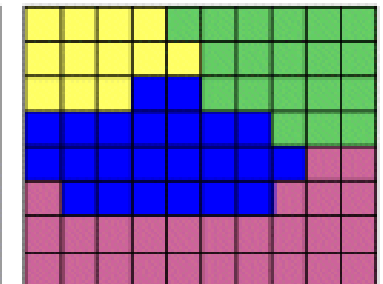
Lines



Points

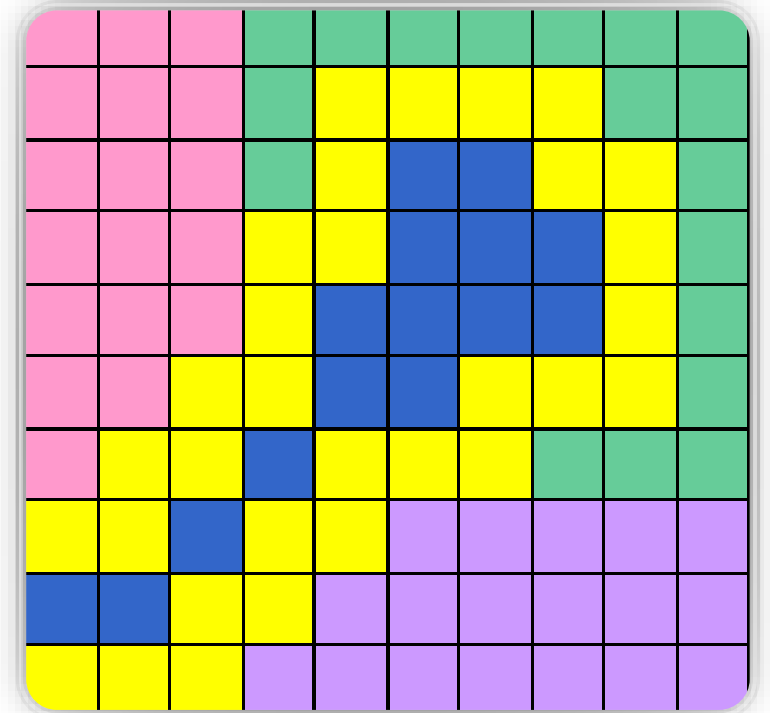


Polygons



# Raster layers

- **Raster** - Type of digital image represented by reducible and enlargeable grids or pixels.
  - Air photos, **satellite images**, Digital Elevation Models (DEMs)
  - Various file formats:
    - GeoTiff
    - JPEG
    - JPEG2000
    - MrSID



# Raster layers



- Numerous file formats but often JPEG or TIFF
  - [Image Formats help guide](#)
- Raster resolution is the size of each individual pixel
  - E.g. 10cm resolution means each pixel is 10cm x10cm, 1km resolution means each pixel is 1km x 1km, etc.
- **2021 orthophotos** - City of Ottawa (6cm)
- **2019 orthophotos** - City of Ottawa (20cm)
- **2017 orthophotos** - City of Ottawa (20cm)
- **2017 near infrared photos** - City of Ottawa (20cm)
- **2015 orthophotos** - City of Ottawa (6cm)
- **2014 orthophotos** - National Capital Commission (20cm)



# Planet.com

“Planet's mission is to image the entire Earth every day, and...[they] operate history's largest commercial fleet of earth observation satellites, collecting daily, high resolution imagery, everywhere on Earth.”



# Planet.com is an imagery database that Carleton Library subscribes to

- Current Carleton researchers can [request an account](#)
- Subscription includes download quota measured in km<sup>2</sup>
  - Quota is impacted when images are ordered
  - Base maps and Planet Stories are not included in quota so are unlimited
- Can access data from Planet.com website or through add-in tools in ArcGIS Pro or QGIS



# Our subscription to Planet.com imagery includes:

- **Planet Scope**

- Near daily since 2017, some areas since 2014
- ~3.7m resolution
- Up to 15km off coasts (no open ocean but sea ice is included)
- Monthly

- **SkySat archive**

- On-demand imagery by researchers/organizations around the globe (not Carleton) since 2016
- ~0.5m resolution
- 180-day publication delay

- **Visual Basemaps**

- Variety of time intervals (weekly, monthly, quarterly)
- ~3-5m resolution
- Useful as backdrop or to view change over time

# Accessing Planet.com

- Login – <https://account.planet.com/>
  - From Planet.com main page, click the menu and then scroll to bottom for login link
- Planet Stories – <https://www.planet.com/stories/>
- Basemaps Viewer – <https://www.planet.com/basemaps/>
- Planet Explorer – <https://www.planet.com/explorer/>
  - We will be using ArcGIS Pro add-in for base maps and exploring imagery –  
<https://developers.planet.com/docs/integrations/arcgis/>

# Planet.com resources

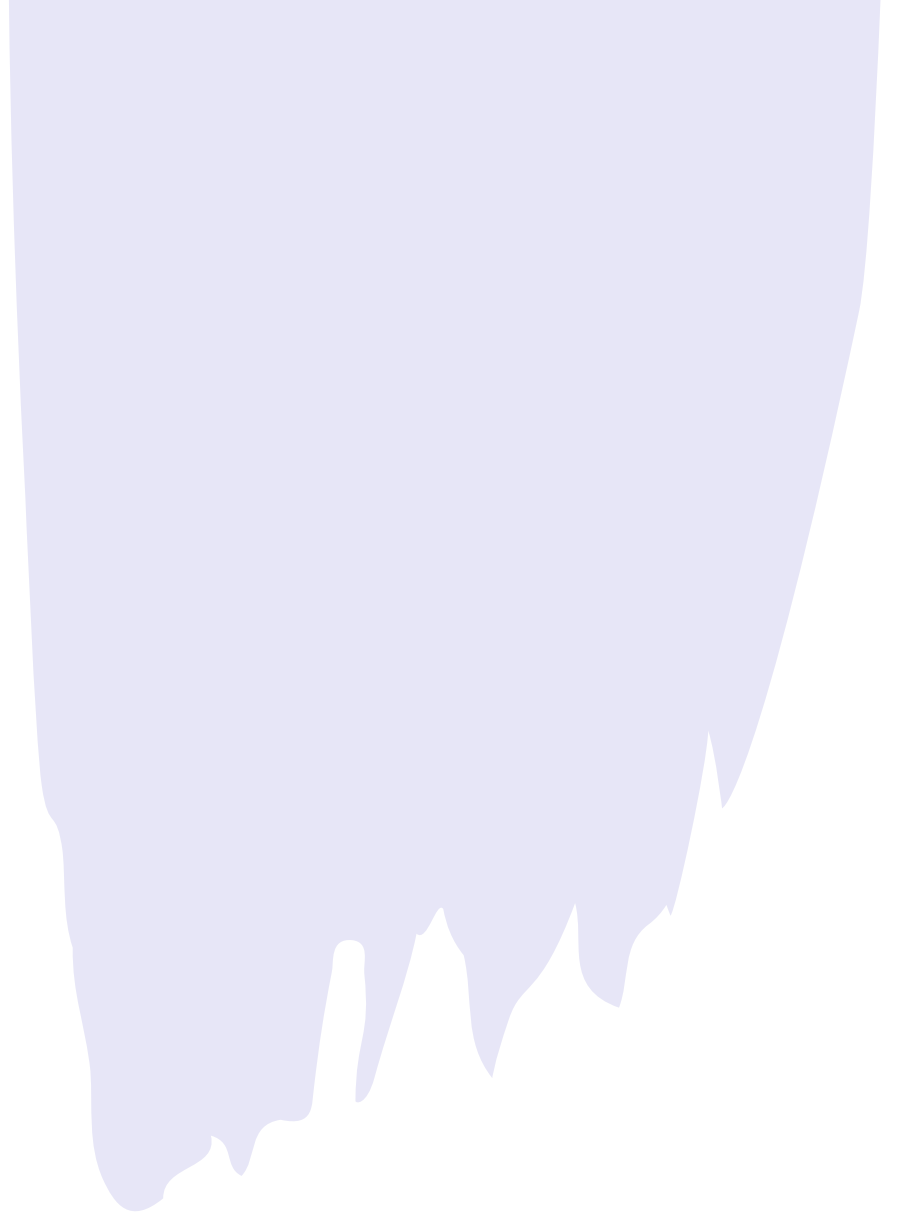
- Planet University - <https://university.planet.com/>
  - Online tutorials and workflows
- Planet School - <https://developers.planet.com/planetschool/>
  - Planet 101 and Videos & Webinars sections have good overviews

**Link to materials for this and other Winter  
2024 Trajectories sessions**

<http://tinyurl.com/TrajectoriesGIS>

# Planet Stories

HANDS-ON IN BROWSER



# Planet Stories

<https://www.planet.com/stories/>



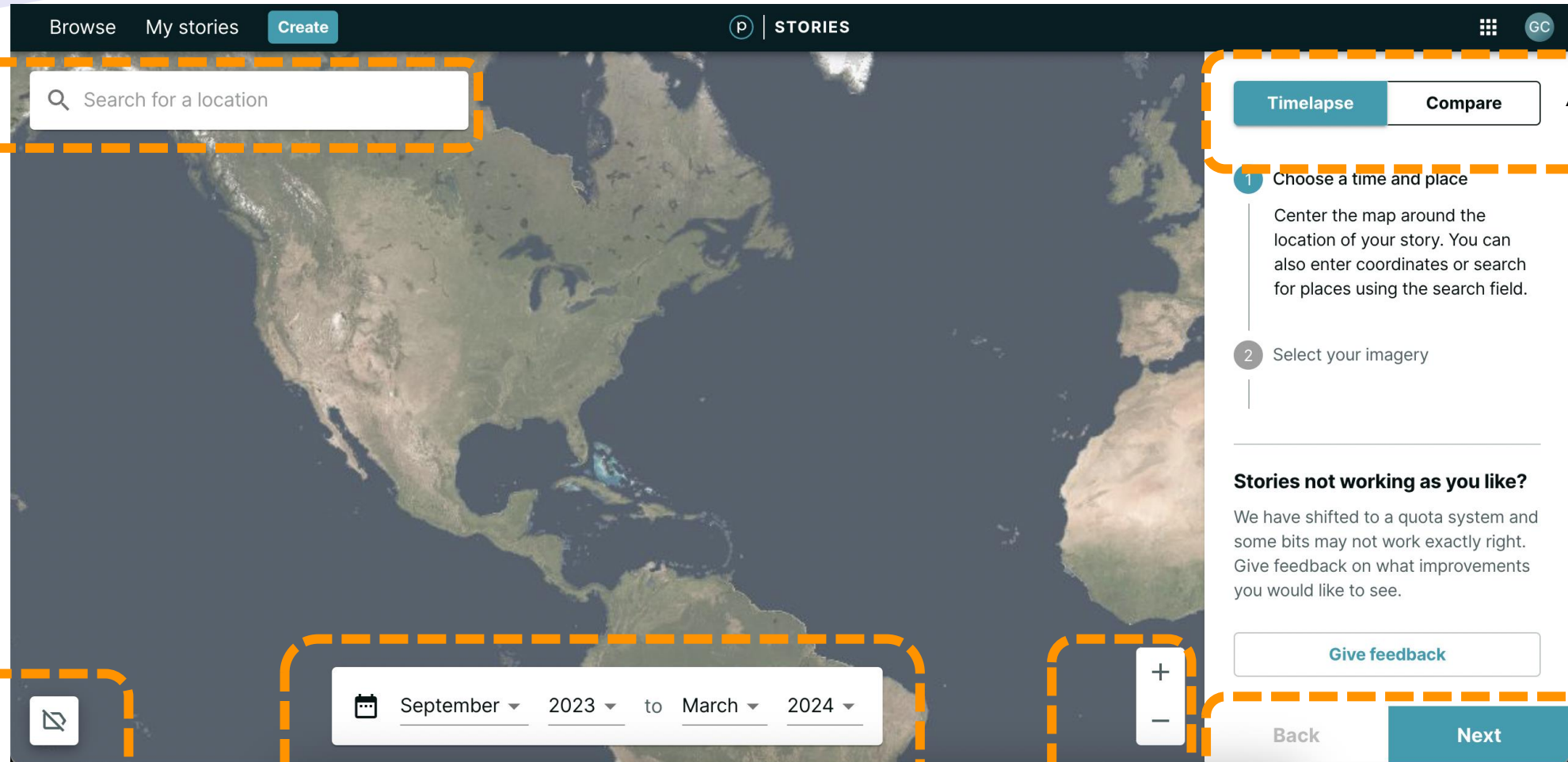
- Timelapse of Tesla's Gigafactory being built in Texas, 2020
- Before/after comparison of tulip fields near Lisse, Netherlands, 2023



# Planet Stories

- Two types of stories
  - **Timelapse** includes many images (animation)
  - **Compare** includes 2 images (before/after swipe)
- Works best with visible, notable changes
  - If you'd like ideas, NASA's Earth Observatory Image of the Day series may be helpful
  - <https://earthobservatory.nasa.gov/topic/image-of-the-day>

# Planet Stories



Search

Search for a location

Timelapse

Compare

Animation  
or swipe

1 Choose a time and place

Center the map around the location of your story. You can also enter coordinates or search for places using the search field.

2 Select your imagery

### Stories not working as you like?

We have shifted to a quota system and some bits may not work exactly right. Give feedback on what improvements you would like to see.

[Give feedback](#)

Map  
labels

September 2023 to March 2024

Image date range

Zoom

Back

Next

Next to  
search

# Planet Stories

Sort, filter (if possible), size of preview images

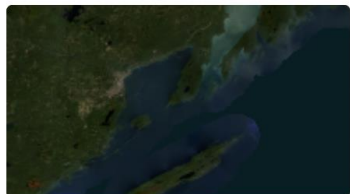
Browse My stories **Create** P | STORIES GC

6 images found Auto-select Sort Mosaics Filters Size slider

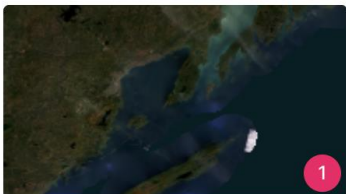
**Timelapse** **Compare**

Select images to include. Click them in order you want them to appear.

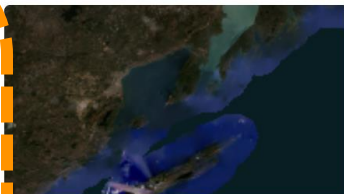
2023



September 2023



October 2023



November 2023



December 2023

2024



January 2024



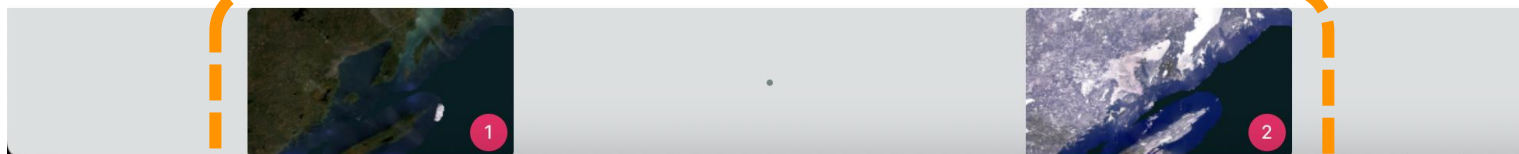
February 2024

- Choose a time and place  
Thunder Bay
- 2** Select your imagery  
Choose the images that best represent your story. If you need help deciding, you can get started by using Auto-select.

### Stories not working as you like?

We have shifted to a quota system and some bits may not work exactly right. Give feedback on what improvements you would like to see.

[Give feedback](#)



Selected images, in order

**Back**

**Next**

Next to preview

# Planet Stories

Browse My stories **Create** **P** | STORIES **GC**

October 2023 January 2024

planet.

Date labels

**Timelapse** **Compare**

- ✓ Choose a time and place  
Thunder Bay
- ✓ Select your imagery
- 3 Preview and publish  
Bask in the glory of what you created. Give your story a once-

**Stories not working as you like?**

We have shifted to a quota system and some bits may not work exactly right. Give feedback on what improvements you would like to see.

[Give feedback](#)

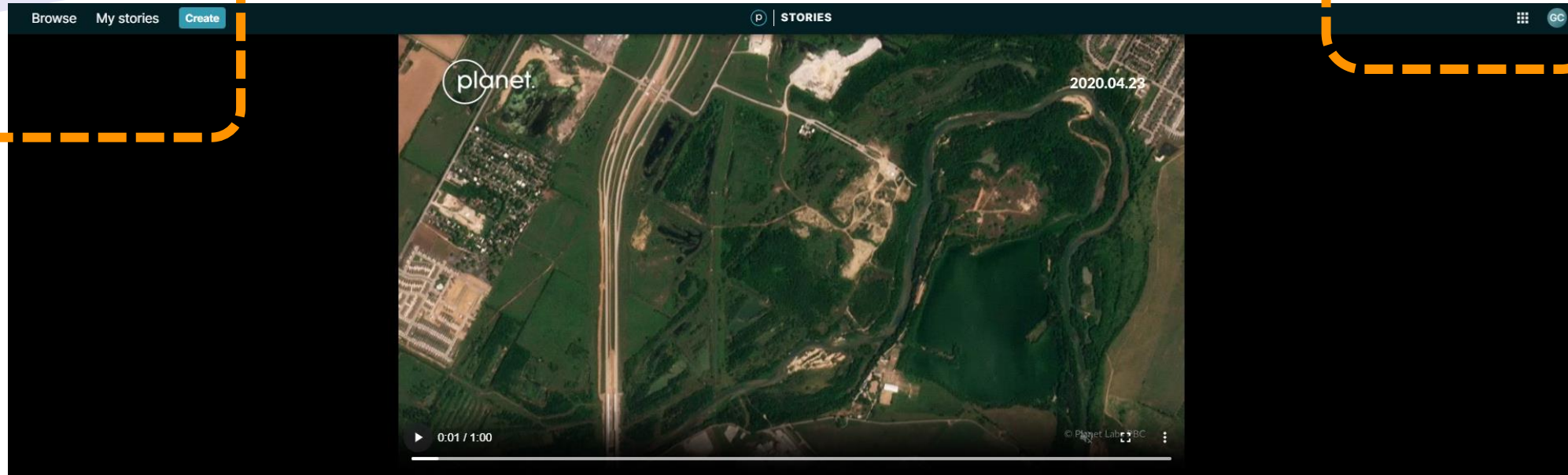
**Back** **Finish** Finish or go back



# Planet Stories

Find or  
create  
stories

Account &  
other Planet  
apps



 **Gigafactory, Texas**  
by GIS Carleton

Published on Jan 30, 2024

 Share  Embed  Explore

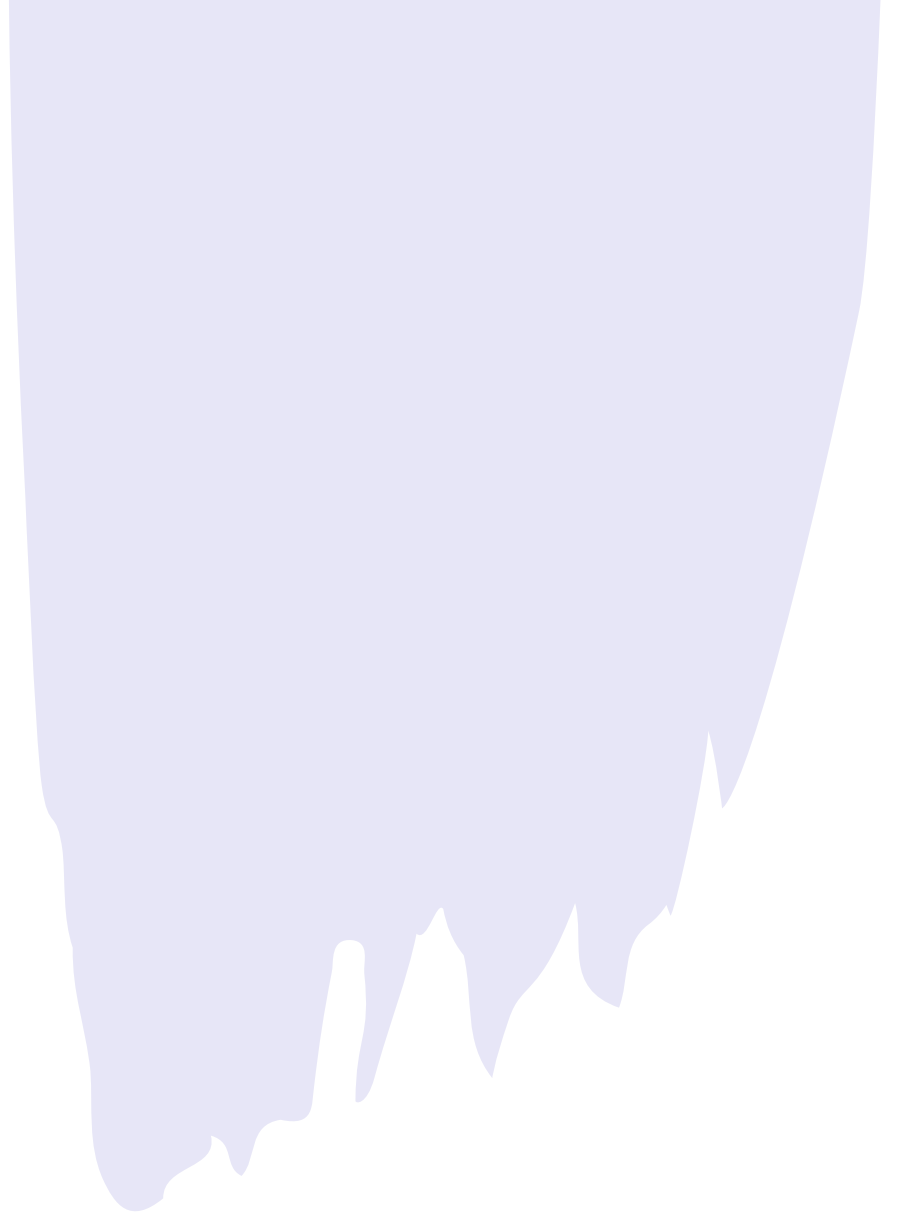
Get sharing  
link

The views expressed here do not reflect those of Planet Labs PBC



# Planet Visual Basemaps

HANDS-ON IN ARCGIS PRO



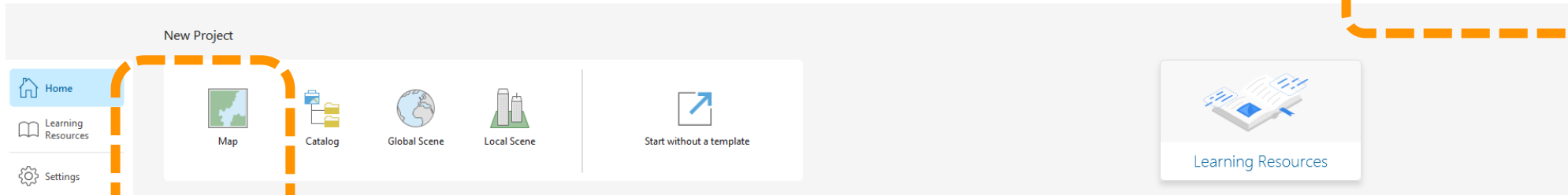


# Planet Visual Basemaps

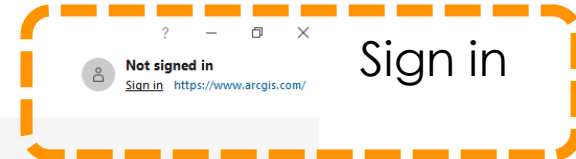
- Multiple ways to access including:
  - Browser-based Basemaps Viewer - <https://www.planet.com/basemaps/#/zoom/2.57>
  - Add-ins (plugins) for [ArcGIS Pro](#) or [QGIS](#)
- We'll use the ArcGIS Pro add-in
  - Helpful if you want to add a basemap or imagery to a map you're creating
  - Can also use the add-in to download other Planet.com imagery

# Planet Visual Basemaps

ArcGIS Pro

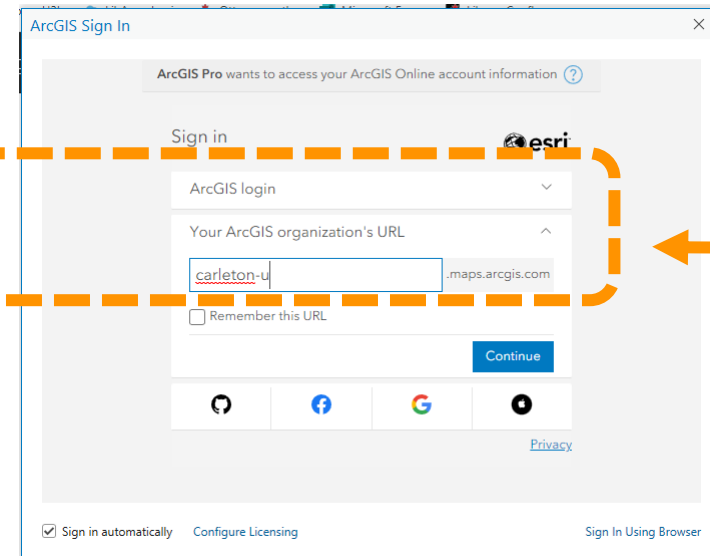


Create a new map



Sign in

Don't forget to input carleton-u



# Planet Visual Basemaps

Planet Imagery add-in tab

Login to Planet



# Planet Visual Basemaps

Click Planet Basemaps

Planet Basemaps pane will open.

Select Global Monthly.

The screenshot displays the Planet Imagery software interface. The top menu bar includes 'Project', 'Imap', 'Insert', 'Analysis', 'View', 'Edit', 'Imagery', 'Share', 'Planet Imagery', and 'Help'. The 'Planet Imagery' menu is currently selected, showing options like 'Vector Tile Layer', 'Account', and 'Planet Information'. A 'New version available' notification is present in the top right. The main workspace shows a world map with labels for 'NORTH AMERICA', 'EUROPE', 'ASIA', 'SOUTH AMERICA', 'AFRICA', and 'ANTARCTICA'. The 'Planet Basemaps' pane is open on the left, featuring a search filter, a list of basemap results, and a 'Select Basemap' dropdown menu. The 'Global Monthly' option is selected in the dropdown. The 'Catalog' pane on the right shows a search bar and a list of project resources including 'Maps', 'Toolboxes', 'Databases', 'Styles', 'Folders', and 'Locators'. The status bar at the bottom indicates the current location as 124.4420039°E 72.0509784°N.

# Planet Visual Basemaps

- **Explore** is basically a preview
  - Will create a timeline if you select more than one basemap option
- **Order** will enable you to download the basemap
  - Does not impact data download quota

Results are in reverse chronological order.

Check off the ones you'd like to view.

Click Explore Selected to view.

The screenshot shows the Planet Basemaps interface. At the top, there is a navigation bar with tabs for Project, Map, Insert, Analysis, and View. Below this is a ribbon with icons for Image Search, Planet Basemaps, Planet Inspector, Planet Tasking, and Order Status. The main panel is titled 'Planet Basemaps' and contains a search filter 'Surface reflectance basemaps only' (unchecked), three buttons for 'One off', 'Series', and 'All' (selected), a 'Select Basemap' section with a 'Filter' input field and an 'Apply' button, and a 'Name' dropdown menu set to 'Global Monthly'. Below this is a 'Results' section titled 'Select Basemaps to Add to Map or Order' showing a list of results in reverse chronological order: 'February 2024' (checked) and 'January 2024' (unchecked). At the bottom, there are two buttons: 'Explore Selected (2)' and 'Order (2)'. The interface also shows a 'Contents' tab and a 'Planet Basemaps' tab.

# Planet Visual Basemaps

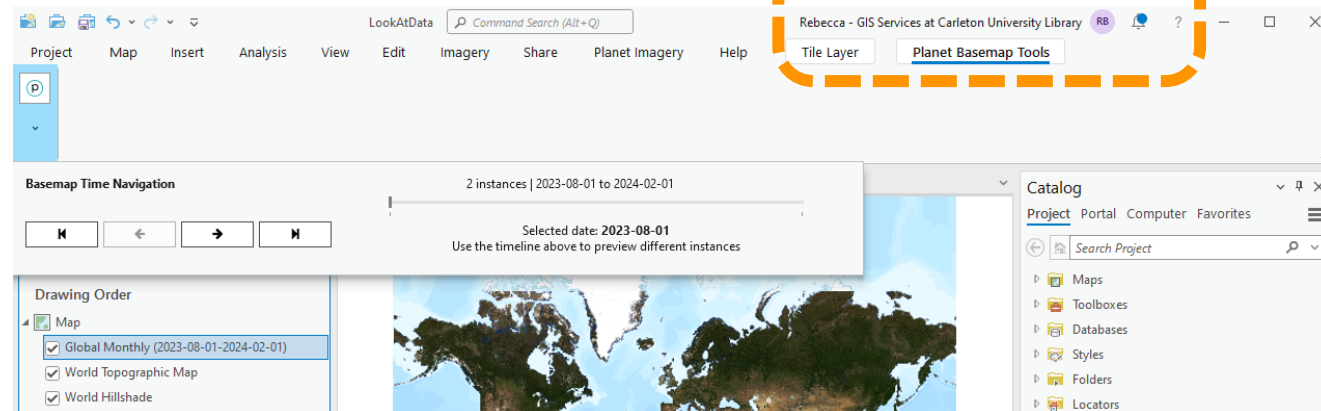
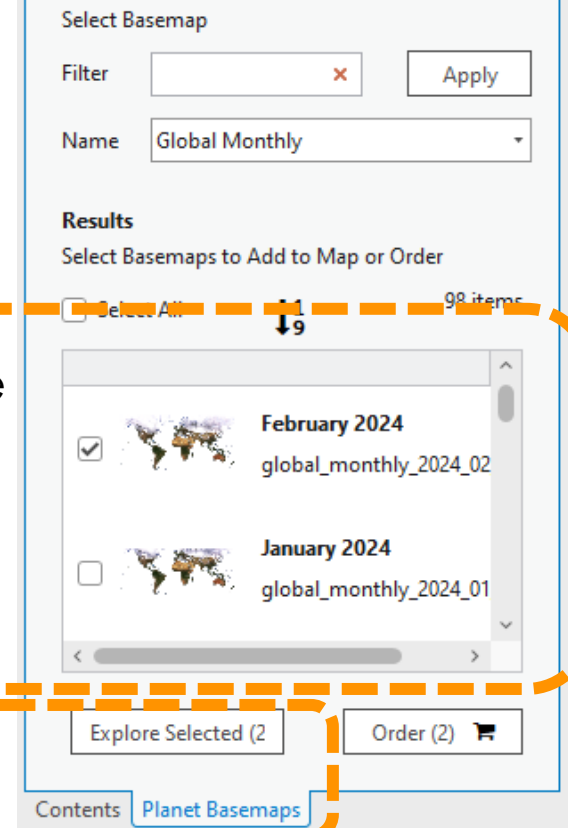
- **Explore** is basically a preview
  - Will create a timeline if you select more than one basemap option

Results are in reverse chronological order.

Check off the ones you'd like to view.

Click Explore Selected to view.

Click to view time slider





# Planet Visual Basemaps

- **Order** will enable you to download the basemap or part of it
  - Zoom into area of interest
  - Extent or Draw specific area
  - Does not impact data download quota
- Parts of basemap called *Quads*

Extent is easiest if zoomed in. Can also Draw.

Find Quads when ready to search.

Hover over quads to view footprints (coverage). Check off options and click Next.

Planet Basemaps

Order Partial Basemap  
Specify your Area of Interest  
Use the AOI tools to select a portion of the basem

Extent Draw

Selection Upload

{ "coordinates": [[[-52.738256,47

Total AOI area (sqkm): 24.18

Find Quads

Quads found: 2

2023-07-01

<input type="checkbox"/>		723-1332 100 % covered.
<input checked="" type="checkbox"/>		724-1332 100 % covered.

Back Next

Contents Planet Basemaps

1:57,934 5,871,543.22W

# Planet Visual Basemaps

- Give order a name and *Submit Order*
- Open Planet Status Panel
- When it's ready, click *Download* and save in project folder
  - Click on a folder to save it in
- Go to Catalog pane and add it to your map

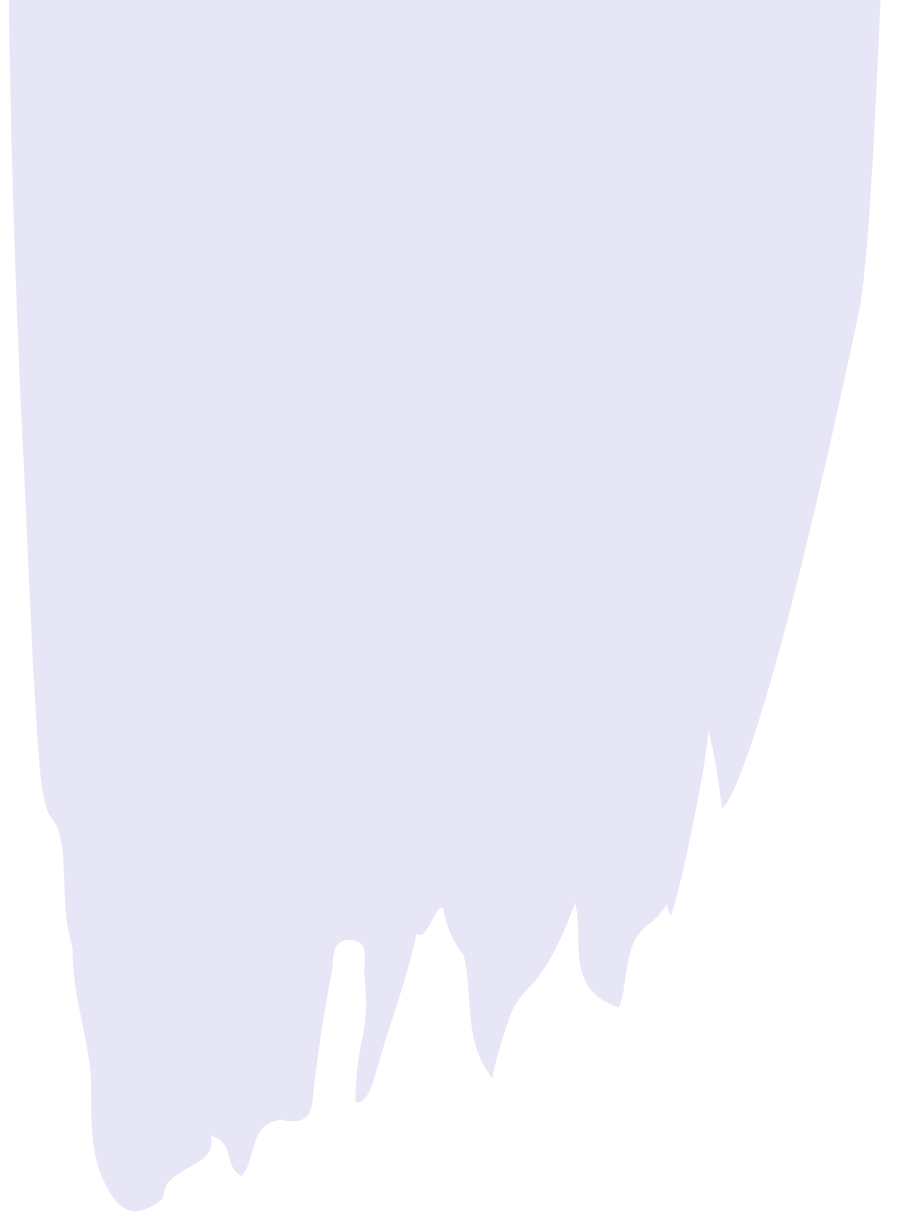
The image illustrates the workflow for ordering and downloading Planet Visual Basemaps in ArcGIS Pro. It consists of three main panels:

- Planet Basemaps Panel:** Shows the 'Order Partial Basemap' dialog. The 'Order name\*' is set to 'StJohns\_July2023'. A 'Global Monthly' basemap is selected, with 1 instance and a date range of 2023-07-01-2023-07. The estimated total quad size is 382 sqkm. Buttons for 'Close' and 'Submit Order' are visible at the bottom.
- Planet Order Status Panel:** Displays the status of the order 'StJohns\_July2023'. It shows 'Placed On: Mar 06 2024 14:44:53', 'Imagery Source: Basemap', and 'Asset Count: 1 Quads'. A 'Download' button with a downward arrow is prominent. A 'Refresh' button is also present next to a checkbox for 'Only orders ready for download'.
- Catalog Panel:** Shows the project's file structure. The 'LookAtData' folder is expanded, showing the downloaded basemap as a folder named '2023-07-01\_724-1332.tif'. Inside this folder, four individual bands are listed: 'Band\_1', 'Band\_2', 'Band\_3', and 'Band\_4'.

Orange arrows indicate the flow from the 'Planet Basemaps' panel to the 'Planet Order Status' panel, and then from the 'Planet Order Status' panel to the 'Catalog' panel.

# Planet Image Search

HANDS-ON IN ARCGIS PRO



# Planet Image Search

- Multiple ways to access including:
  - Browser-based Planet Explorer – <https://www.planet.com/explorer/>
  - Add-ins (plugins) for [ArcGIS Pro](#) or [QGIS](#)
- We'll use the ArcGIS Pro add-in
  - Pros and cons to both add-ins and Planet Explorer so ultimately up to you
  - If want to add an image to existing map, a bit easier to use the add-in

# Planet Image Search

Click Planet Image Search

Planet Image Search pane will open.

Select area of interest.

Click Filters!

The screenshot displays the Planet Imagery software interface. The top menu bar includes Project, Map, Insert, Analysis, View, Edit, Imagery, Share, Planet Imagery, and Help. The Planet Imagery pane is active, showing a 'Preview, Download or Stream' section with options for 'Extent', 'Draw', 'Selection', and 'Upload'. A search bar contains the coordinates: `{"coordinates": [[[-22.329267, 63.8163]]]`. Below the search bar, it indicates 'Total AOI area (sqkm): 366.58'. There are also 'Filters' and 'Search' buttons. The map shows a region in Iceland with a red dashed box indicating the area of interest. Labels on the map include 'Vogar', 'Suðurnes', 'Grindavík', 'Hafnarfjörður', and 'National park of Reykjanes Peninsula'. The bottom status bar shows a scale of 1:345,311 and coordinates 2,486,918.88W 9,346,137.16N m.



# Planet Image Search

The screenshot shows the Planet Imagery Search interface within a GIS application. The main window is titled "Planet Image Search" and features a "Preview, Download or Stream" section. Below this, there are several filter options:

- Date Range (UTC):** 2024-02-08 15 to 2024-02-16 15
- High Resolution (<2m):**
  - SkySat scene
  - SkySat collect
- Medium Resolution (2m-10m):**
  - PlanetScope scene
  - RapidEye basic scene
  - RapidEye ortho tile
- Non-Planet Data Sets (>10m):**
  - Sentinel-2 tile

At the bottom of the filter section, there are "Clear All" and "Back" buttons. The map area shows a coastal region with labels for "Vogar", "Suðurnes", "Grindavík", and "Hafnarfjörður". A "National park of Reykjanes Peninsula" is also visible. The catalog on the right side of the screen shows a tree view with folders like "Maps", "Toolboxes", "Databases", "Styles", and "Folders". Under "Folders", there is a "LookAtData" folder containing several files, including "LookAtData.gdb", ".backups", "GpMessages", "ImportLog", "LookAtData.atbx", and "2023-07-01\_724-1332.tif".

Lots of filters!

Ones to pay attention to:

- Date Range
- Resolution
- Cloud Coverage

Click *Back* when happy with selections.



# Planet Image Search

Hover over results to see footprints and image metadata

- Includes resolution, cloud cover %, etc.

**Select 1 image** and then Order

- The Order button will say how many are selected.
- It took 15 minutes for one clipped image

The screenshot displays the Planet Image Search web application interface. The top navigation bar includes tabs for Project, Map, Insert, Analysis, View, Edit, Imagery, Share, Planet Imagery, and Help. The Planet Imagery tab is active, showing a 'Welcome to Planet' message and the user's email 'gis@carleton.ca'. The main interface is divided into a left sidebar and a central map area. The sidebar contains a 'Planet Image Search' panel with a search bar, filters, and a list of search results. One result is selected, and its metadata is displayed in a table. The map area shows a satellite image of a coastal region with a red dashed box indicating the search area. The metadata table provides detailed information about the selected image.

Image Metadata	
Source	PlanetScope scene
Cloud percentage UDM2	1%
Ground sample distance	4.1m
Off-nadir angle	0.9°
Sun azimuth	169.8°
Sun elevation	11.8°
Item ID	20240211_130154_28_24b7
Ground control	True
Quality category	standard
Satellite ID	24b7
Instrument	Super Dove
Publishing Stage	finalized

# Planet Image Search

- Give order a name and *Continue*
- Select type of asset
  - Visual is sufficient if just want to look at it
  - Other options for analysis (4-8 bands)
- *Clip Items to AOI* – or not! It might be faster! – and review
- Order
  - This is when the data quota kicks in, so make sure!

The image shows a three-step workflow in the Planet Image Search interface:

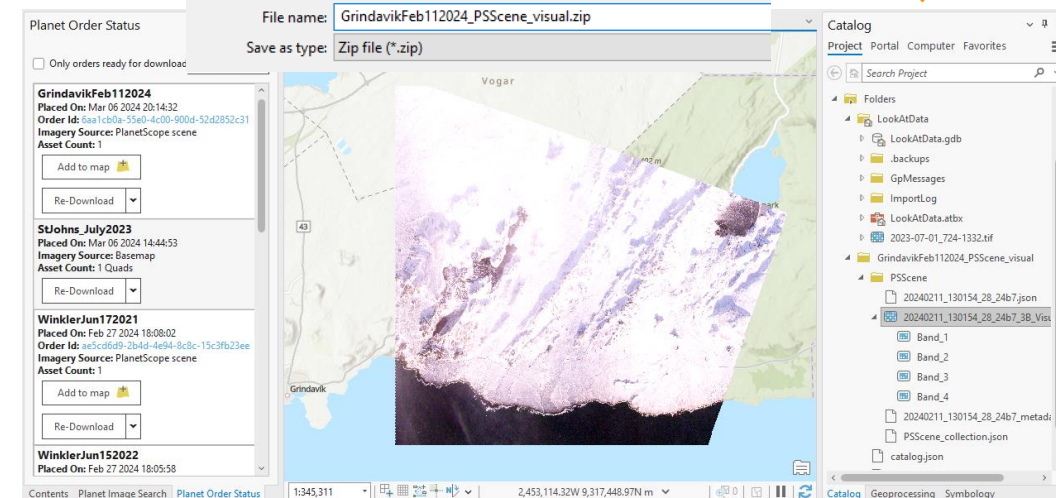
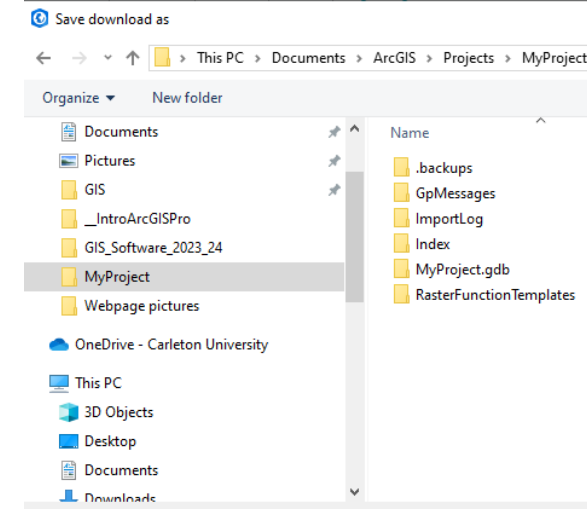
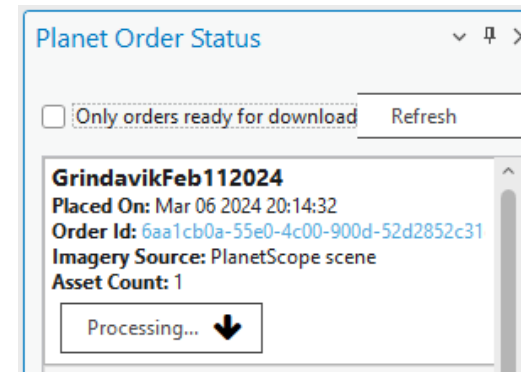
- Step 1: Name Order** - The user enters the order name "GrindavikFeb112024" in a text field. The interface shows progress indicators for "Name Order", "Select Assets", and "Tools & Review".
- Step 2: Select Assets** - The user selects the "Visual" asset type from a list of "RECTIFIED ASSETS". The "Visual" option is checked, and the interface shows progress indicators for "Name Order", "Select Assets", and "Tools & Review".
- Step 3: Tools & Review** - The user reviews the order details, including the "Order Summary" (Order name: GrindavikFeb112024, Number of Orders: 1) and the "PlanetScope scene" (Visual). The interface shows progress indicators for "Name Order", "Select Assets", and "Tools & Review".

Key actions and options shown in the final step include:

- CLIPPING**: "Estimated area: 256 sqkm", "Only get imagery delivered within your AOI", and a "Clip Items to AOI" button.
- METADATA**: "STAC metadata provides a standardized format for describing geospatial information so that it can be more easily worked with in tools like ArcGIS." and a "STAC" button.
- REVIEW ITEMS**: "We recommend deselecting items that appear to have no pixels" and a "Deselect All" button.
- Order Summary**: "Order name: GrindavikFeb112024", "Number of Orders: 1", and a note: "\* Each asset will be placed as a separate order".
- PlanetScope scene**: "Visual" asset type, "GeoTIFF" and "Clip" options.
- Buttons**: "Back" and "Order" buttons at the bottom.

# Planet Image Search

- Planet Order Status panel may show *Processing...* for a while
  - Especially if clipping to AOI
- Can click Refresh button
  - It took 15 minutes for 1 clipped image** when prepping this workshop
- When it's ready, click *Download* and save in project folder
  - Click on a folder to save it in
  - It downloads as a .zip file but also unzips it for you**
- In Catalog, right-click your project folder and Refresh
- Should now see folder with image in it, which you can add to map.



# Questions?

DON'T HESITATE TO EMAIL US  
[GIS@CARLETON.CA](mailto:GIS@CARLETON.CA)