

## **TRAINING SESSION 7:**

### Managing and accessing your imagery with ArcGIS

# **User Guide**

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#### Managing and access your imagery with ArcGIS

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#### Section 1

Load imagery from metadata

- 1. Open ArcGIS Pro and load the Managing and access your imagery with ArcGIS project.
- 2. Open the Sentinel2 Map view.
- 3. In Catalog (View on the right hand side of the project), expand the **Folders** item and navigate to Data (This will be the primary folder with all the data for this training session).
- 4. Expand the

**S2B\_MSIL2A\_20230821T073619\_N0509\_R092\_T35JQH\_20230821T114309** Sentinel 2 folder.







- 5. Expand the MTD\_MSIL2A.xml file Catalog ~ 4 × Project Portal Computer Favorites = p .. E Search Project 🖌 📷 Maps AP Maxar Sentinel2 Service b 😸 Toolboxes D Tatabases D 🔂 Styles 4 😽 Folders b Managing and accessing your imagery with arcgis 4 📻 Data D Champagne\_Sports\_Resort MRF S28\_MSIL2A\_20230821T073619\_N0509\_R092\_T35JQH\_20230821T1143 P RasterFunctionTemplates S28\_MSIL2A\_20230821T073619\_N0509\_R092\_T35JQH\_20230821T11 P AUX\_DATA I CATASTRIP GRANULE P 🗃 HTML t info MTD\_MSIL2A.xml 1 💀 Aerosol Optical Thickness 1 🐻 BOA Reflectance D 🐻 BOA Reflectance 10m P 🐯 BOA Reflectance 20m 1 🐼 BOA Reflectance-60m 1 Multiband P 😡 SCL-20m D SCL-60m 🕅 🐼 Water Vapor INSPIRE xml Locators
- 6. Note the icon of the data:



7. Load the **BOA Reflectance 10m** raster. You can right click on the layer and select the option to add to current map or drag the layer into map space.





- 8. Use the **Bookmarks** to zoom to the location of the conference.
  - Project Map Insert Analysis View Edit Paste Copy Path Experie & Bookmarks Champagne Sport...
- 9. In the **Raster Layer** ribbon you can change the stretch, band combination, resampling and other settings of the image being displayed.



- 10. Change the stretch type.
- 11. Change the resampling.
- 12. Change the band combination.
- 13. Apply DRA and zoom in and out to see the change.





14. On the **Imagery** ribbon select the **Raster Functions** icon to open the Raster Functions dialog.



15. Search for the **Clip** tool.

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	> Surface				~	
16. On the <b>Raster</b> drop down.	select t	he Ser	ntinel 2	, imade	e in the m	ap space
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17. Run the clip tool to clip your image to the current display extent.

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18. When running the tool, there are a few options to select between creating a new layer or exporting the result.

Output Layer Type		
Raster Layer		*
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	Save As	10:20

19. Click the Create New Layer button to execute.





Load data from a service

- 1. In ArcGIS Pro, open the **Service** map
- 2. On the **Map** ribbon select the Add Data option and then the Data From Path option.



- 3. In the **Path** input dialog, paste the following service in and then click Add: https://landsat2.arcgis.com/arcgis/rest/services/Landsat8\_Views/ImageServer
  - a. The project folder includes a text file with the path available to copy and paste in.

Add Data From Path	×
Add data using a path for a service URL, portal item, data file, or cata	log path.
Path	
https://landsat2.arcgis.com/arcgis/rest/services/Landsat8_Views/Ima	ageServer
Service type	
An ArcGIS Server Web Service *	
> Custom request parameters 1	
Learn more about adding data from paths Ad	d Cancel





4. When the service loads, you will see there is a renderer enabled for Agriculture.



- 5. Double click the layer in the contents pane to open the **Properties**.
- 6. Navigate to the **Processing Templates** section and change the template to **Natural Color** with **DRA**.

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- 7. Note the time slider that became available when you loaded the service.
- 8. Explore the time slider in an area of interest (not all dates have imagery).
- 9. You have the ability to filter the data using a definition query's.
- 10. Select any location on the map and look at the **Pop-up** and the number of images returned.





- 11. Open the properties of the layer and create a new definition query limiting the cloud cover to below 1% (1) and for imagery captures after 1 January 2023. The SQL code is available in the Links text file in the data folder.
  - a. CloudCover < 1 And AcquisitionDate > timestamp '2023-01-01 15:30:02'

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Range Mosaic Processing Templates						Apply Canc	el
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12. Select any location on the map and look at the pop-up and the limited number of images returned.





Load data from file

- 1. Open the **Raster Functions** map tab.
- 2. From the data folder, drag the MSS\_20221215\_CSR.tif into the map space
  - a. C:\EsriTraining\MAIA\Data\Champagne\_Sports\_Resort\Maxar\_20221215\Clipped \_Imagery\MSS\_20221215\_CSR.tif
- 3. A World view satellite image is loaded into the map space.
- 4. In the content pane, right click on one of the bands to see the list of bands available.



5. As we have a multispectral image, we can also look at some of the options in the **Raster** Layer tab under the **Band Combination** icon.



- 6. To prep our data for NDVI analysis, we want to extract the Red and Near-Infrared.
  - a. NDVI is a dimensionless index that describes the difference between visible and near-infrared reflectance of vegetation cover and can be used to estimate the density of green on an area of land (Weier and Herring, 2000).
- 7. In the Raster function tab, search for the **Extract Bands** function.
- 8. From the Raster drop down, select MSS\_20221215\_CSR.tif





9. Change the **Method** to **Band Names**.

Raster Functions		? ~ # X
$\odot$	Extract Bands Properties	
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Best Match		~

- 10. Clear the **Combination** input box.
- 11. Then select from the **Band** drop down the Red and then Near Infrared bands.

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Missing Band Action		
Best Match		4

- 12. Click the **Create New Layer** button to execute.
- 13. In the Raster function tab, search for the **NDVI** tool and run it with band 1 and 2 on the newly created image layer.
- 14. From the Raster drop down, select Extract Bands\_MSS\_20221215\_CSR.tif
- 15. Make the Visible Band ID = 1
- 16. Make the Infrared Band ID = 2

Raster Functions €	NDVI Properties	? ~ <del>1</del> >
General Parameters		
Raster		
Extract Bands_MSS_2022121	5_CSR.tif	
Visible Band ID		
1		v
Infrared Band ID		
2		*

17. Optionally you can enable the **Scientific Output** option.



- 18. Your result should be a grey scale image or look like the following:
  - a. If you get a grey scale image, change the color scheme in the symbology options.



19. To explore the functions that have been run on the data to create these virtual layers, you can right click on the **NDVI\_Extract** Bands layer and select the **Edit Function Chain**:







20. A new window will open up where you can view the chain of functions and edit them if required.



21. To export the functions that have been run on the data to create these virtual layers, you can right click on the NDVI\_Extract Bands layer and select the **Save Function Chain** option:







22. Save the function chain to be used with other imagery when it gets updated.

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Name		
Custom NDVI		
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A raster function templa	lė;	
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- 23. Once saved you can find your custom function chain in the custom tab of the **Raster Functions** dialog:
  - a. (Make sure to clear the search bar to list all your custom function chains)

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- 24. To update the function chain you can right click on the function chain and select the edit option.
- 25. Add a Stretch function onto the end of the chain by dragging function from the Raster Functions dialog into the chain space.





26. Drag a line from the **NDVI** to the **Stretch Function** to link the two items.



- 27. Double click the **Stretch** function the modify the parameters.
- 28. Under the Statistics group, enable the **Estimate Statistics** and the **Dynamic Range Adjustment** and click **OK**.

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Learn more about this raster funct	ion	
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29. In the editor window, click the **Save** button.



30. Right click on your Custom function you have created and select the Export option. Save the file to your project folder:







Using custom function chains on new imagery

- 1. Open the **Processing Templates** map tab.
- 2. In your Catalog view, right click MMS\_20221215\_CSR.tif and select the Manage Processing Templates.

Catalog		
Project Portal Computer Favorites		
D Project		
<ul> <li>Maps</li> <li>Toolboxes</li> <li>Databases</li> <li>Managing and accessing your imagery with arcgis.gdb</li> <li>Sylves</li> <li>Folders</li> <li>Managing and accessing your imagery with arcgis</li> <li>Data</li> <li>Data</li> <li>Champagne_Sports_Resort</li> <li>Maxar_20221215</li> </ul>	Add To Current Map Add To New Load Data Build Pyramids Calculate Statistics	>
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	Edit Metadata	

3. Select the import arrow (Next to the search bar) Manage Processing Templates

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emplates	





4. Navigate to where you have you previously save the **Raster Function Chain** in the previous exercise and load it:

Manage Processi	ng Templates	~ 4 ×
	MSS_20221215_CSR.tif	
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Default Template		
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- 5. From **Catalog** add the image to the map space by dragging it in.
- 6. In the contents pane, open the **Properties** of the image and go to the processing templates.
- 7. On the drop down you will find the template previously created. Select your **Custom NDVI** template then select **OK**.

General Metadata Source Elevation	Processing Template Description	None None Custom NDVI		7	'領 ter
Display Cache Time	Help	-			
Processing Templates Joins Relates	Inputs	Palameter.	Value	×	Y + Y





**Creating Mosaics** 

- 1. Open the **Mosaic** map tab.
- 2. You can create a mosaic in a Geodatabase.
- 3. Expand the **Database** folder in the **Catalog** view.
- 4. Right click on the project database and select New Mosaic Dataset.



- 5. Give the mosaic a name.
- 6. Change the projection to the same as the input Sentinel2 scene.
  - a. You can click the Projections settings icon in the tool and search for WGS\_1984\_UTM\_Zone\_35S and select the appropriate projection.
- 7. Define the **Product Definition** from the drop down as **Sentinel 2 MSI**.
- 8. Update the **Pixel Type** to 16-bit unsigned.

Geoprocessing		~ Ŧ ×
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WGS_1984_UTM_Zone_35S		~ 🕲
Product Definition		
Sentinel 2 MSI		¥
Product Properties		
Pixel Properties		
Pixel Type		
16-bit unsigned		v

- 9. Click Run.
- 10. In the **Catalog** view, right click on the new mosaic.





11. Select the **Add Raster** option.

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Project Portal Computer Favorites			
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		Export	2
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- 12. Update the Processing Template to **BOA Reflectance-10m.**
- 13. On the Input Data option, select the folder and navigate to the folder where the metadata file resides:

\EsriTraining\MAIA\Data\S2B\_MSIL2A\_20230821T073619\_N0509\_R092\_T35JQH\_ 20230821T114309\S2B\_MSIL2A\_20230821T073619\_N0509\_R092\_T35JQH\_2023 0821T114309.SAFE\MTD\_MSIL2A.xml

File				
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Viosaic Post-processing	Organize V New Item V Project	Name AUX_DATA DATASTRIP GRANULE HTML rep_info MTD_MSIL2A.xml	Type Folder Folder Folder Folder Folder Raster Proc	

14. Select the .xml file.





15. On the Raster Processing group, tick the box for Calculate Statistics and Build Raster Pyramids.



17. Once the mosaic is created, explore the Mosaic Layer Ribbon

									Managing and	accessing your	imagery with aregis	P. Cennmand St	harch (Alt+Q)	
Project Map	Insert	A	nalysis View	Edit	Image	ery Share Help	Mosaic Layer	Data						
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Adding Processing templates to Mosaics

- 1. Stay on the **Mosaic** map tab.
- 2. Navigate the database where you created the mosaic and right click on the mosaic.
- 3. Select the option to Manage Processing Templates.

Toolboxes	📩 Add To Current Map	
Databases	* Add To New	
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DATASTRIP	a) Edit Mosaic Dataset Functions	
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Aerosol Optical Thickness	> cgr	Ctrl+X
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BOA Reflectance 20m	Fill such a set	co. marrie

4. Select the import arrow (Next to the search bar).

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Find Processing Templates	۹ - ۹
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The Grigman Tasker Sanabes with the editation Chain appares.	

5. Navigate to the **RasterFunctionTemplates** folder in your folder connections.

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Organize Vew Item V					E
嘢 <sub>x</sub> Raster Functions	Name		Туре	Date Modified	
🖌 📄 Project	fr Sentinel2_L2A_Aerosol Opti	cal Thickness Map.rft.xm	Raster Function Te	2023/06/30 08:52:12	2
Folders	* Sentinel2_L2A_Agriculture w	ith DRA.rft.xml	Raster Function Te	2023/06/30 08:52:12	2
🖌 🗟 Portal	f Sentinel2_L2A_Agriculture.rf	t.xml	Raster Function Te	2023/06/30 08:52:12	2
My Content	Sentinel2_L2A_Bathymetric	with DRA.rft.xml	Raster Function Te	2023/06/30 08:52:12	2
🕫 🚭 My Favorites	Sentinel2_L2A_Bathymetric.	ft.xml	Raster Function Te	2023/06/30 08:52:12	2
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- 6. Select all the xml files and click **OK**.
- 7. In the Contents pane, double click your mosaic to go to **Properties**.





- 8. Select the **Processing Templates** group.
- 9. On the **Processing Template** drop down, view the templates that you have just included in your mosaic.
- 10. If you find that some of the templates are returning a blank image, then apply **DRA** from the **Mosaic Layer** ribbon.
  - a. If your results present as a grey scale image, configure the symbology settings.





Publish an image service

- 1. Open the **AP** map tab.
- 2. Drag in the **CoT\_AP\_Mosaic** into map space.

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Project Portal Computer Favorites		≡
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Maps		
🖻 🗃 Toolboxes		
Databases		
D 🔯 Styles		
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Managing and accessing your imagery with arcgis		
🖻 🧰 Data		
🔺 🚞 Imagery Mosaic of CoT		
MRF		
🔺 🖯 CoT Mosaic.gdb		
CoT_AP_Mosaic		

- 3. View the mosaic and note that the source of this mosaic is from a file server.
  - a. This allows for the folder where the imagery is hosted to be registered with the server. This means we can publish the data and not have to copy it onto the server.





4. Right click on the **Mosaic** and select the **Share as Web layer** option.

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- 5. Update the name, Summary and Tags for the item.
- 6. Under the Layer and Data Type section, ensure the option to Reference registered data is selected.





7. Under the **Location** section, change the **Server and Folder** option to the image server:

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Share As Web Layer ? 🗸	, q	ı ×	
Share CoT_AP_Mosaic as a Web Layer			
General Configuration Content Messages			
Item Details			
Name			
CoT_AP_Mosaic			
Summary			
<u>CoI_AP_Mosaic</u>			
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Layer and Data Type ()			
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Reference registered data			
Copy all data			
Location			
Portal Folder			
Select or create folder	•		
Server and Folder			
https://ucws.esri-southafrica.com/image	•	G	
https://ucws.esri-southafrica.com/hosting (Hosting Server)			
Share with			
Everyone			
ArcGIS Enterprise			
Groups 🗸			
Finish Sharing			
✓ Analyze Publish ✓ 🗐 Jobs			

- 8. Click the **Analyze** button.
- 9. Note the warnings and explore the **Help** options.
- 10. Click the **Publish** option.
- 11. Navigate to your **Catalog** and select the **Portal** content.
- 12. Listed under your content you can search for your mosaic and drag in into the map to access it.



