ESRI
EXTERNAL

Geospatial Video OIType

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Oriented Imagery Catalog Management

380 New York Street
Redlands, California 92373-8100 USA
909 793 2853
info@esri.com
esri.com

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Introduction

The Geospatial Video OICType is a custom python image type that extends the capability of the Oriented Imagery management tools to support video files. This OICType will add video files to an Oriented Imagery Catalog (OIC) if they are accompanied by an appropriately formatted geospatial video log file containing metadata such as the video camera location and orientation. Information regarding the format is included below.

The geospatial metadata file is typically recorded simultaneously with the video, on board the same platform as the camera, and contains essential parameters regarding the location, orientation, and field of view of the camera, time synchronized with the video file. This information allows ArcGIS Oriented Imagery to determine the region being observed by the video. The format of these files is the same format that is used as input to the ***Video Multiplexer*** using in the Full Motion Video (FMV) capability of ArcGIS Pro Image Analyst Extension. While the FMV ***Video Multiplexer*** fuses the metadata with the video to create a MISB compliant file, with oriented imagery the metadata is stored in the oriented imagery catalog which then references the video without making modifications.

Once the OIC is created, it can be accessed by the Oriented Imagery Viewer on the Web. Similar to other oriented imagery you can select a location and the system will identify the appropriate image (video frame) covering that location with a video play button. Pressing play will play the video from that location and the footprint of the video can also be seen on the map or scene.

Installation & Usage

To use this OICType follow these instructions.

1. Copy the following files to c:\Image_Mgmt_Workflows\OrientedImagery\Types\
- GeospatialVideo.py
- GeospatialVideo.oictype
2. Start ArcGIS Pro.
3. Create a new Oriented Imagery Catalog.
4. Add Images to the OIC using the Geospatial Video OICType

Input Data Description

There are three parameters required as input for this OICType. Detailed explanation of the parameters can be found below.

- **Metadata File**: The CSV file with geospatial metadata.
- **Video File**: The video file that will be used in the Oriented Imagery Catalog.
- **Frames Step (In Seconds)**: The frame interval to be used to define OIC exposure points.

Metadata File

The input metadata file must be an ASCII file in CSV (comma separated variable) format, with the following minimum fields defined:

- UnixTimeStamp
- SensorLatitude
- SensorLongitude
- SensorEllipsoidHeight (ellipsoidal height), or optionally SensorAltitude (orthometric height)
- PlatformHeading
- PlatformPitch
- PlatformRoll
- HorizontalFOV
- VerticalFOV
- SensorRelativeAzimuth
- SensorRelativeElevation
- SensorRelativeRoll

More information regarding the structure of the metadata file can be found here. This references the Full Motion Video (FMV) capability of ArcGIS Pro with the Image Analyst extension, one possible source for the video metadata files. The metadata files input to the ***Video Multiplexer*** geoprocessing tool are in the proper format for this OICType. Information regarding the use of FMV in ArcGIS Pro is included here.

A second potential source for metadata files in a compatible format is the "Geospatial Video Log" file generated by ***ArcGIS Flight***. ***ArcGIS Flight*** is the iPad app for planning and piloting flights of commercial drones, part of the ***ArcGIS SiteScan*** system and available here for Esri customers with an ArcGIS named user type account of *Field Worker* or higher. Geospatial Video Log files are automatically generated by ***ArcGIS Flight*** for every video captured by a compatible drone. Documentation on these files is available here.

This OICType is intended to support video files from moving platforms, but will also support stationary surveillance systems.

Video File

For *Video File*, you must input the path and filename for the video file to be used by Oriented Imagery viewer. This video file must be in a cloud-based storage location and must be accessible via URL. In this version, the current tools do not support upload of video files, so your videos must already be stored in the cloud.

Oriented Imagery supports the following video file formats:

- MP4

- MOV
- WebM
- OGG

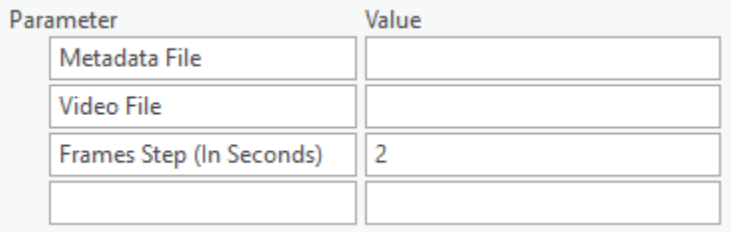
Frames Step (In Seconds)

This parameter defines the interval (in seconds), of the frequency for video frame metadata to be included in the Oriented Imagery Catalog. The default value of 2 will sample the metadata file to enter location information for an 'exposure point' (key frame from the video) every two second of video time into the OIC. If this parameter is left blank or is 0 (zero), it will result in adding every record from the metadata file into the OIC.

This parameter is useful for particularly long video with a lot of frames.

Workflow to Create and Populate the OIC

1. **Run *Create Oriented Imagery Catalog***
   This will create a new Oriented Imagery Catalog. See tool help for more information.
2. **Run *Add Images to Oriented Imagery Catalog***
   - Select the newly created OIC as Input Oriented Imagery Catalog
   - Select **GeospatialVideo** as the Input Type
   - Enter the Parameters for the following.



Metadata File:
Eg. D:\project\sample\DJI_0229_2020-10-13_11-52-40_videolog.csv
NOTE: If you copy and paste the path, make sure not to include a "\" slash at the end and remove any quotation marks.

Video File:
http://<bucketName>.s3.amazonaws.com/videofile/VID_0001.MP4
NOTE: If you copy and paste the path , make sure not to include a "/" backslash at the end and remove any quotation marks.

Frame Step (in Seconds):
Enter a value to sample the metadata file to populate the 'exposure points' of the OIC.

   - Select **GeospatialVideo_Defaults** Imagery Type.

This will define some of the default values to be used in case it cannot be calculated by the OICType.

3. **Click on Run to start the add process.**

   NOTE:

   The OICType will be using the World Elevation Service to sample ground heights at the sensor location to calculate and interpolate the average height above ground (AvgHtAG) for the exposure points added to the OIC. Please make sure you are signed in to ArcGIS Online before running this process.

Workflow to publish the Oriented Imagery Catalog (OIC)

Once all the data has been added to the OIC, follow these steps if you desire to publish the OIC.

For detailed info regarding each step refer to the user document in c:\Image_Mgmt_Workflows\OrientedImagery\Documentation (local storage location after download from https://github.com/Esri/oriented-imagery)

1. Run *Create Coverage Features* (Optional)
2. Run *Create Coverage Map* (Optional)
3. Run *Publish Oriented Imagery Catalog* (Optional)

Known limitations

1. The current Oriented Imagery management tools do not support copying of video files from local storage to cloud storage.
2. The beginning of the geospatial records in the metadata file must be synchronized with the beginning of the video file. If an offset exists, the UNIXTimeStamp field in the metadata file may be edited, but use caution when editing metadata files as noted in this blog.
3. This OICType currently supports archived video files only. Support for realtime video streams may be added in the future.