USGS 3DEP Contractor Acquisition and Production Status Application
February 29, 2024

Purpose

This ArcGIS Online application is intended to convey the status of 3DEP acquisition and data production to USGS stakeholders. Contractors working on 3DEP projects will add content to an ESRI geodatabase. USGS users will access this content by way of two AGOL dashboards or through ArcGIS Pro.

The primary data layers involved in this application are the defined project area (DPA), flight line vectors, and data extent polygons. Flight line vectors are used to convey the status of aerial acquisition. Data extent polygons are intended to represent the spatial extents of production blocks of data that will be delivered to USGS at some point in the future.

Important Note About User Access

USGS administrators will send invitations to our contractors to join the 3DEP Contractors group. Users need to have an ArcGIS Online account and set their Member role so they can join external groups.

USGS 3DEP Contractor Acquisition and Production Status Application
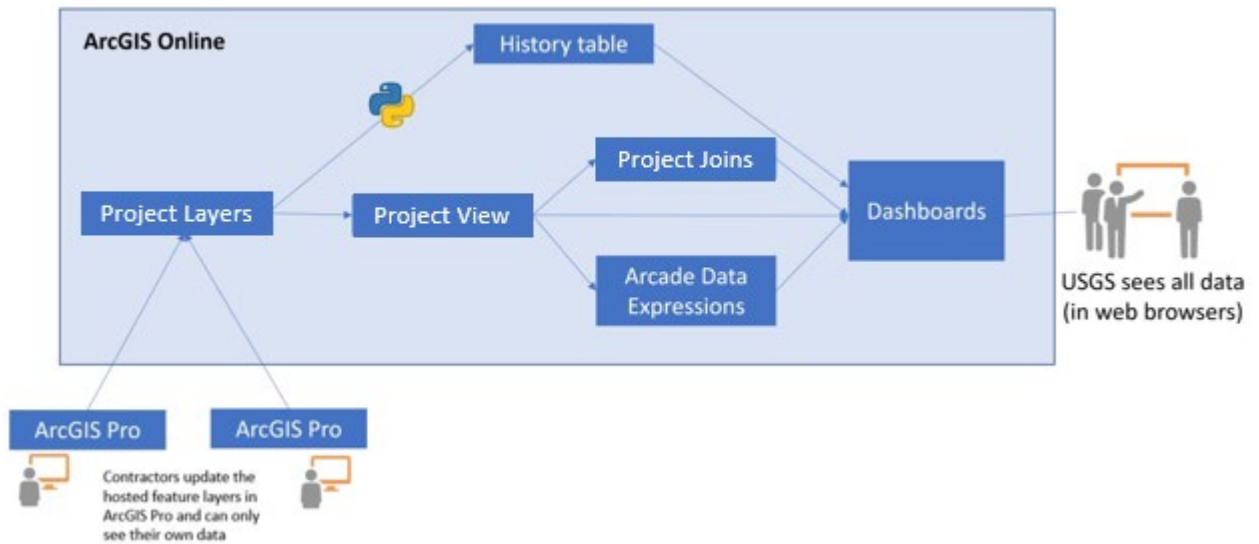# Data Entry and Visualization Guide

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1. Solution Overview and Data Structure

1.1   Solution Overview

Contractors update Hosted Feature Layers (HFL) in ArcGIS Pro. The HFL is setup to only allow contractors to see their data and edits. Nightly, a python script will run to detect changes in status field of the flightlines and data extent layers and update the history tables accordingly. A Hosted View Layer (HVL) is updated by the HFL. The Dashboard is fed by the HVL which allows USGS staff to view all data.

1.2   Technology Used

ArcGIS Pro	ArcGIS Pro is used to upload vector data by contractors to include project extents, flightlines, and production block extents.
ArcGIS Online	Data is stored in Hosted Feature Layers in ArcGIS Online. The contractor updates the hosted feature layer directly which only allows editors to view their own data. A view based on the hosted feature layer that shows all data is updated every time a contractor updates the hosted feature layer, which feeds into the dashboard.
Dashboards	After data is uploaded to ArcGIS Online, the dashboards are updated for USGS staff to review the data acquisition and input status.
Arcade Data Expressions	Arcade data expressions were used to aggregate data for display metrics on the dashboards such as total mileage complete vs anticipated
Python	A python script runs nightly to update history tables.

1.3   Summary of Feature Layers and Feature Tables

Hosted feature layer	History tables
• **Data to be entered by contractors** • **Each contactor organization use one AGOL account** • Each contractor can only see and edit their own data	• Maintained by a Python script • Only visible to USGS
• USGS can see all data	

1.4 Layer and table schema

1) **Projects**: the defined project area for a contracted lidar acquisition.

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID)*
- pts_id_prj *(type: esriFieldTypeInteger, alias: PTS ID)*
- name *(type: esriFieldTypeString, alias: Name, length: 255)*
- contractor *(type: esriFieldTypeString, alias: Contractor, length: 255)*
- task_order_number *(type: esriFieldTypeString, alias: Task Order Number, length: 255)*
- sq_mi *(type: esriFieldTypeSingle, alias: SqMi)*
- notes *(type: esriFieldTypeString, alias: Notes, length: 1000)*
- tpoc *(type: esriFieldTypeString, alias: Technical Point of Contact, length: 256)*
- GlobalID *(type: esriFieldTypeGlobalID, alias: GlobalID, length: 38)*
- Shape__Area *(type: esriFieldTypeDouble, alias: Shape__Area, SQL Type: sqlTypeDouble)*
- Shape__Length *(type: esriFieldTypeDouble, alias: Shape__Length, SQL Type: sqlTypeDouble)*
- CreationDate *(type: esriFieldTypeDate, alias: CreationDate, length: 8)*
- Creator *(type: esriFieldTypeString, alias: Creator, length: 128)*
- EditDate *(type: esriFieldTypeDate, alias: EditDate, length: 8)*
- Editor *(type: esriFieldTypeString, alias: Editor, length: 128)*

2) **Flight Lines:** aerial acquisition flight lines for a project.

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID, length: 0)*
- flightline_id *(type: esriFieldTypeInteger, alias: flightline_id)*
- pts_id_prj *(type: esriFieldTypeInteger, alias: pts_id_prj)*
- line_miles *(type: esriFieldTypeSingle, alias: line_miles)*
- acq_status *(type: esriFieldTypeString, alias: acq_status, length: 255, **Coded Values: [done: Done], [qc_ip: QC In-Progress], [not_done: Not Done], [postponed, Postponed]***
- acq_date *(type: esriFieldTypeDate, alias: acq_date, length: 8)*
- notes *(type: esriFieldTypeString, alias: notes, length: 1000)*
- GlobalID *(type: esriFieldTypeGlobalID, alias: GlobalID, length: 38)*
- postpone_reason *(type: esriFieldTypeString, alias: postpone_reason, length: 255, **Coded Values: [Postponed-HW: Postponed-HW], [Postponed-Av: Postponed-Av], [Postponed-Wthr: Postponed-Wthr], [Postponed-Env: Postponed-Env], [Re-Acquire: Re-Acquire]***)
- Shape__Length *(type: esriFieldTypeDouble, alias: Shape__Length, SQL Type: sqlTypeDouble)*
- CreationDate *(type: esriFieldTypeDate, alias: CreationDate, length: 8)*
- Creator *(type: esriFieldTypeString, alias: Creator, length: 128)*
- EditDate *(type: esriFieldTypeDate, alias: EditDate, length: 8)*
- Editor *(type: esriFieldTypeString, alias: Editor, length: 128)*

3) Data Extents: production blocks of data in-work and anticipated for delivery. Ideally, these should be the same as the work-units delivered to USGS.

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID, length: 0)*
- pts_id_prj *(type: esriFieldTypeInteger, alias: pts_id_prj)*
- sq_mi *(type: esriFieldTypeSingle, alias: sq_mi)*
- data_volume *(type: esriFieldTypeSingle, alias: data_volume)*
- crs_epsg *(type: esriFieldTypeInteger, alias: crs_epsg)*
- quality_level *(type: esriFieldTypeString, alias: quality_level, length: 255,* **Coded Values: [**QL3**: QL3], [**QL2**: QL2], [**QL1**: QL1], [**QL0**: QL0])**
- delivery_status *(type: esriFieldTypeString, alias: delivery_status, length: 255,* **Coded Values: [**Anticipated**: Anticipated], [**Actual**: Actual])**
- delivery_date *(type: esriFieldTypeDate, alias: delivery_date, length: 8)*
- notes *(type: esriFieldTypeString, alias: notes, length: 255)*
- GlobalID *(type: esriFieldTypeGlobalID, alias: GlobalID, length: 38,)*
- Shape__Area *(type: esriFieldTypeDouble, alias: Shape__Area, SQL Type: sqlTypeDouble)*
- Shape__Length *(type: esriFieldTypeDouble, alias: Shape__Length, SQL Type: sqlTypeDouble)*
- CreationDate *(type: esriFieldTypeDate, alias: CreationDate, length: 8)*
- Creator *(type: esriFieldTypeString, alias: Creator, length: 128)*
- EditDate *(type: esriFieldTypeDate, alias: EditDate, length: 8)*
- Editor *(type: esriFieldTypeString, alias: Editor, length: 128)*

4) Line_status_history

Same as Flight lines, except this is a table with no geometries.

5) Extent_status_history

Same as Data Extents, except this is a table with no geometries.

2 Contractor Data Entry Workflow

Note, USGS administrators will send invitations to our contractors to join the 3DEP Contractors group. Users need to have an ArcGIS Online account and set their Member role so they can join external groups.

There are three primary vector features that need to be merged with the master geodatabase. These are the defined project area, flightlines, and data production block extents. The production block extents, or data extents, reflect the perimeter of tiles that are in production and anticipated for delivery to USGS. At this time, the data extents features are not expected to be identical to USGS work units, though it is okay and desirable for these two to be the same.

Contractors can enter their data into the master layers. The recommended workflow is using ArcGIS Pro.

2.1 Add the master USGS layers into ArcGIS Pro

1) Open ArcGIS Pro and log into a named user account in usgs.maps.arcgis.com, and make this the active portal.
2) In the Catalog, click the Portal tab, click the My Organization icon and search for the ID **dfcbd51c9a6b45f286ec1d7c989300f5**
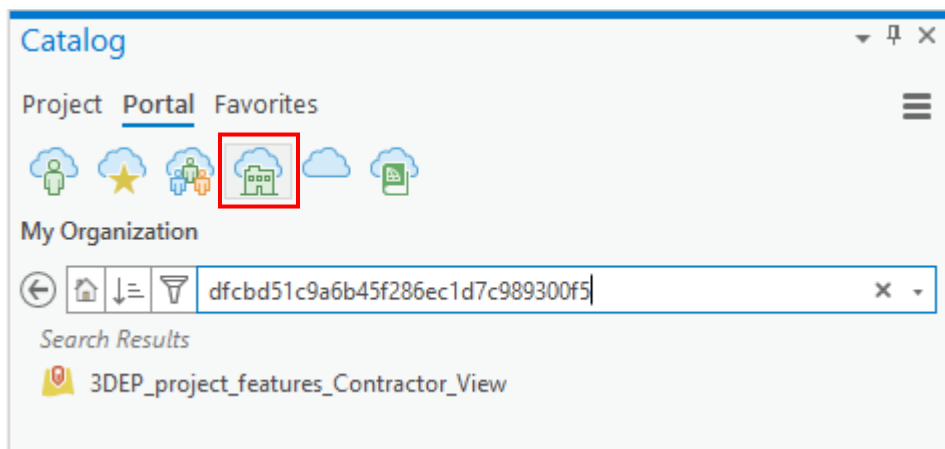
3) In the search results, right click the found layer and add it to a new map.
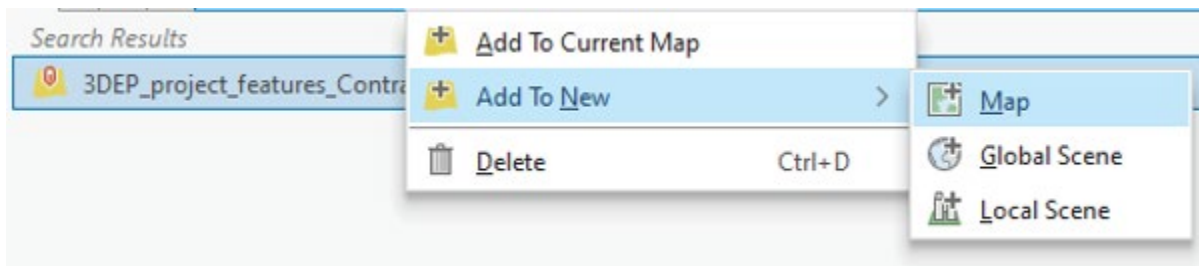
Note, you can only see your own data in the master layers.

2.2 Add contractor data into the master layers

You can add your data using either of the following two ways:

- Manually edit the three layers; projects, flightlines, and data extents: Refer to ArcGIS Pro website for details: https://pro.arcgis.com/en/pro-app/latest/help/editing/overview-ofhttps://pro.arcgis.com/en/pro-app/latest/help/editing/overview-of-desktop-editing.htmdesktop-editing.htm

- Or append your data in batch: Refer to the rest of this section for details.

1) If your own data is in a KMZ/KML format, you need to convert the data to a feature class first by running the KML To Layer Geoprocessing tool.
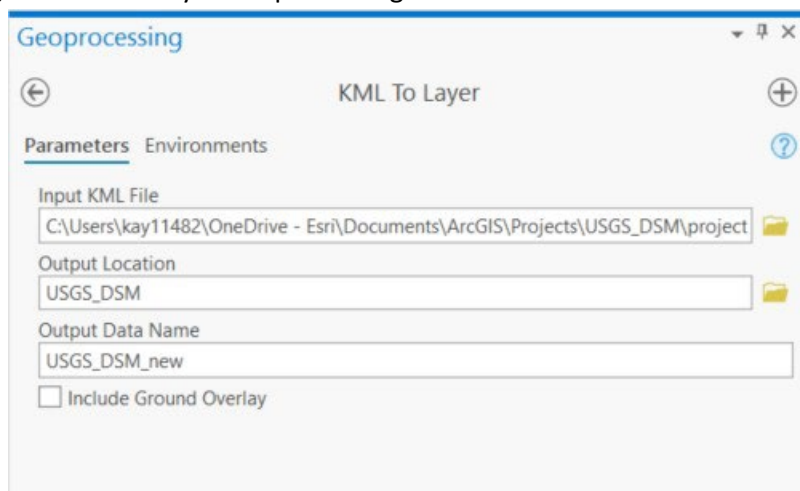

2) Make sure you have the required fields (refer to the schema or the data tables at the end of this document).
    - For projects: PTS ID, Name, Contractor, Technical Point of Contact …
    - For flight lines: PTS ID, Flightline ID, line miles …
    - For data extents: PTS ID, sq mi …

3) Once your KML data is in feature class format, or once you fill in the USGS provided feature class template with your data, you can then append your data to the master USGS layers by doing the following:
    i.   In the menu bar, click Analysis, click Tools.
    ii.   In the Geoprocessing pane, search for the Append tool and click to run it.
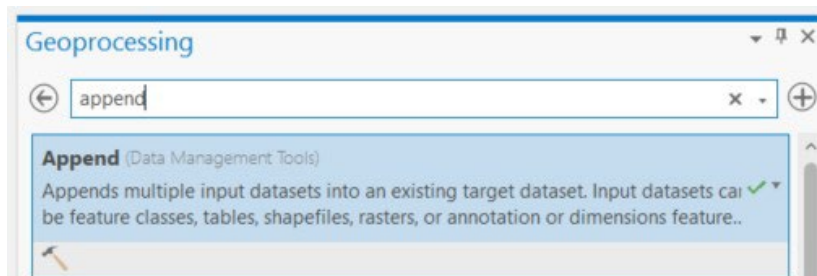
    iii.   Specify the following parameters:

- For Input Datasets, select your feature class.
- For Target dataset, point to the master layer in ArcGIS Online.
- For Field Matching Type, Choose "Use the field map to reconcile differences", use the Field Map section to match the fields in your feature class to the corresponding fields in the feature layer.
- Click "Run" at the bottom to append the data.
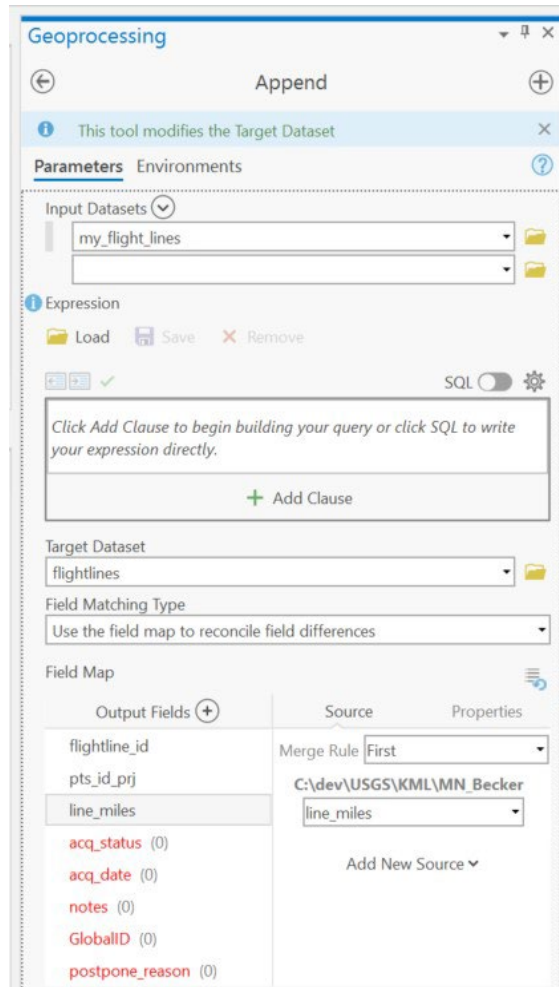
4) Repeat this process for Projects, Flightlines and Data Extents. Be sure to point to the corresponding layer in ArcGIS Online.

2.3 Edit contractor data in ArcGIS Online or ArcGIS Pro

There are many scenarios that contractors need to edit the data. Here are a few examples.

1) Use ArcGIS Online data view to edit flight line status and acquisition date.
   Go to https://usgs.maps.arcgis.com/home/item.html?id=dfcbd51c9a6b45f286ec1d7c989300f5#data
   - Select the layer from the Layer dropdown.
   - Double click a field to change its value.
   - Note in ArcGIS Online, the date fields are displayed in your local time.

2) Use ArcGIS Online Map Viewer to edit your data.
   - Go to https://usgs.maps.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=dfcbd51c9a6b45f286ec1d7c989300f5
   - On the map click a feature.
   - In the pop-up, select Edit.
   - Edit the attribute fields.
   - Click Close. Your edits are saved.
3) Using ArcGIS Pro to edit flight line status and acquisition date **one by one**:
   - In the Contents pane, open the attribute table of the master flight lines layer
   - Find the flight line for which you need to change its status
   - Click the acq_status and select a desired status from the dropdown list.
   - Click the acq_date and select a desired date. (Note: In ArcGIS Pro, dates are in UTC!).
   - On the top menu bar, Click Edit, and click Save to save your edits.
   - Go to https://usgs.maps.arcgis.com/home/item.html?id=dfcbd51c9a6b45f286ec1d7c989300f5#data to verify your edits are saved.

4) Using ArcGIS pro to edit flight line status **in a batch.**

- Select the flight lines on the map or by attributes. Make sure you select from the USGS master layer.

- In the attribute table of the master layer, click Show selected records.

- Make sure the selected records are correct, otherwise you may update the wrong flight lines.

- Right click the acq_status field and choose Calculate Field.

- Set the value to 'not_done', 'done', 'qc_ip', or 'postponed'.

- Click Apply.

- Go to https://usgs.maps.arcgis.com/home/item.html?id=dfcbd51c9a6b45f286ec1d7c989300f5#data to verify your edits are saved.
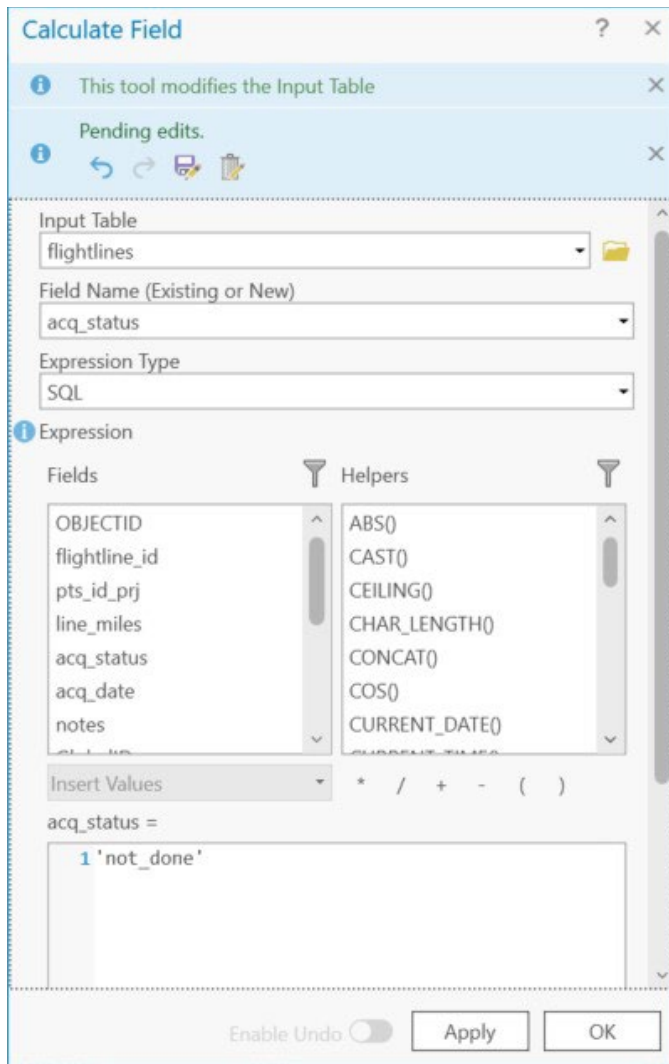
Note: Here is an explanation for all populated attribute values and a list of coded values. In free text fields, please use proper case and not all caps. Description in red.

Projects:

pts_id_prj [project tracking system (pts) id provided by USGS]		**Task Order Number** [official GPSC task order number for the contract]
Name [official USGS name for a project]		**SqMi** [area of the project in square miles using the source projection]
Contractor [lidar mapping company name]		**Technical Point of Contact** [USGS project manager]

Flightlines:

flightline_id [unique flightline id determined by contractor]		acq_date [date of flight line acquisition]	
pts_id_prj [pts id provided by USGS]		postpone_reason	
line_miles [length of each flight line calculated in miles using the source projection]		Actual code same as display value	
acq_status		Postponed-HW [hardware-related]	
Actual code value	**Display**	Postponed-Av [aviation-related]	
done	Done	- Postponed-Wthr [weather-related]	
qc_ip	QC In-Progress	- Postponed-Env [environmental conditions-related]	
not_done	Not Done	- Re-Acquire	
postponed	Postponed		

Data Extents:

pts_id_prj [pts id provided by USGS]		delivery_status	
sq_mi [sq mi of data extent]		Actual code value same as display value	
data_volume [total of tiled LAZ in GB]		- Anticipated [initial selection]	
crs_epsg [- epsg code of grid projection and reference frame]		- Actual [change to 'Actual' when	
quality_level		delivery is imminent]	
Actual code value same as display value			
- QL0	- QL2		
- QL1	- QL3	delivery_date [anticipated or actual delivery date of data to USGS]	

Data Extents Polygons – these features are intended to convey the extent of production blocks of data in-work and anticipated for delivery to USGS. USGS understands these extents do not necessarily equate to USGS-defined work units. However, if work units are defined early enough in the process, USGS would like the data extents to be the same as the work units. The data extents should also be split by crs_epsg and quality_level where possible. If your data is in LAS format, please use a conversion factor of 20% to estimate the LAZ file size.