USGS 3DEP Contractor Acquisition and Production Status Application May 16, 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

Н	History tables		
 Data to be entered by c Each contactor organization Each contractor can only USGS can see all data 	 Maintained by a Python script Only visible to USGS 		
projectsPTS IDnamecontractortask order numbersq minotestechnical point of contact	1:m	flightlinesflightline IDPTS IDline milesacquisition statusacquisition datepostpone reasonnotesdata_extentsPTS IDsq milesdata volumeCRS EPSGQuality levelDelivery dateStatus datenotes	line_status_historyflightline IDPTS IDline milesacquisition statusacquisition statusacquisition datepostpone reasonnotesextent_status_historyPTS IDsq milesdata volumeCRS EPSGQuality levelDelivery statusDelivery datenotes

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 your named user account in in your normal Esri environment.
- 2) In the Catalog, click the Portal tab, click the My Groups icon and search for "3DEP_project_features_Contractor_View".

Catalog	~ 4 ×
Project Portal Computer Favorites	=
$\langle \widehat{\mathbf{x}} \rangle \sim \widehat{\mathbf{x}} \rangle$	
My Groups	
$$ $$ $$ $$ $$ $$ $$ 3DEP_project_features_Contractor_View	× ×

3) In the search results, right click the found layer and add it to a new map.

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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: <u>https://pro.arcgis.com/en/pro-app/latest/help/editing/overview-of-desktopofhttps://pro.arcgis.com/en/pro-app/latest/help/editing/overview-of-desktopediting.htmdesktop-editing.htm
 </u>
- 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.

eoprocessing		* ů ×
•	KML To Layer	\oplus
arameters Environi	ments	(?)
Input KML File		
C:\Users\kay11482\C	DneDrive - Esri\Documents\ArcGIS\Projects\U	SGS_DSM\project 🧰
Output Location		
USGS_DSM		
Output Data Name		
USGS_DSM_new		

- 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.

Geoprocessing	* ů ×
e append	× • (+
Append (Data Management Tools) Appends multiple input datasets into an existing target dataset. be feature classes, tables, shapefiles, rasters, or annotation or dir	Input datasets cai 🛩 * mensions feature
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- iii. Specify the following parameters:
 - □ For Input Datasets, select your feature class.
 - I 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.

Seoprocessing	* *
€	Append G
This tool modifies the Ta	irget Dataset
Parameters Environments	(
Input Datasets 🛇	
my_flight_lines	• 🖆
	• 🚘
Expression	
🗃 Load 🛛 🗧 Save 🗙	
	-
	SQL 🌑 🧔
your expression directly.	+ Add Clause
Target Dataset	+ Add Clause
Target Dataset flightlines	+ Add Clause
Target Dataset flightlines Field Matching Type	+ Add Clause
Target Dataset flightlines Field Matching Type Use the field map to reconci	+ Add Clause I alie field differences
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Target Dataset flightlines Field Matching Type Use the field map to reconcil Field Map Output Fields (+) flightline_id pts_id_prj line_miles	+ Add Clause ile field differences Source Properties Merge Rule First C:\dev\USGS\KML\MN_Becker Ine_miles
Target Dataset flightlines Field Matching Type Use the field map to reconcil Field Map Output Fields (+) flightline_id pts_id_prj line_miles acq_status (0)	+ Add Clause ile field differences Source Properties Merge Rule First C:\dev\USGS\KML\MN_Becker line_miles
Target Dataset flightlines Field Matching Type Use the field map to reconci Field Map Output Fields (+) flightline_id pts_id_prj line_miles acq_status (0) acq_date (0)	Add Clause Ile field differences Source Properties Merge Rule First C:\dev\USGS\KML\MN_Becker Iline_miles Add New Source
Target Dataset flightlines Field Matching Type Use the field map to reconcil Field Map Output Fields (+) flightline_id pts_id_prj line_miles acq_status (0) acq_date (0) notes (0)	Add Clause Ide field differences Source Properties Merge Rule First C:\dev\USGS\KML\MN_Becker Ine_miles Add New Source
Target Dataset flightlines Field Matching Type Use the field map to reconcil Field Map Output Fields (+) flightline_id pts_id_prj line_miles acq_status (0) acq_date (0) notes (0) GlobalID (0)	Add Clause Ide field differences Source Properties Merge Rule First C:\dev\USGS\KML\MN_Becker Iine_miles Add New Source

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 Map Viewer to edit your flight line data.
 - Go to your company's ArcGIS Online Portal, <u>https://XXXXX.maps.arcgis.com/home/index.html#my</u>
 - The XXXXXX is most likely your company name.
 - Click on Groups and click on "View Details" on the "3DEP Contractors" group.

Home Gallery Map	Scene Notebook	Groups Content	Organization		Q Å :::	Barry Miller bymiller@usgs.gov_USGS
Groups				My groups	Featured groups	My organization's groups
+ Create group	Q Search my groups					
Filters	1-2 of 2					Title
Only show groups with new O	3DEP Cor Group for L	tractors ISGS staff and contractors to coll d: May 10, 2024 🖂 Viewable	aborate on 3DEP project materi	ials		
~ Owner	Lux upoute		are any	organization		
bymiller@usgs.gov_USGS Another organization member	JN Joshua Nimetz					View details
Someone outside the organization Current members are from	3 3DEP USC ArcGIS Onl Last update	S Management ne 3DEP Contractor Acquisition d: Apr 18, 2024 😭 Viewable	and Production Status Applicati by: Organization	ion		
my organization only Another organization	JN Joshua Nimetz					View details

• In the Overview page, click on the "3DEP_project_features_Contractor_View" layer under "Featured group content".

3DEP Contractors 🥒	0.	erview	Content	Members	Settings
Edit thumbnail Group for USGS staff and contractors to collaborate on 3DEP project materials owned by jnimetz@usgs.gov_USGS Any organization	🖉 Ed	it	A C	Invite members dd items to group reate Web App 、	P
Description Add an in-depth description of the group. Featured group content	₽ Ed	it	Details Created: June 23 Viewable by: Org Contributors: Me Members list: Vis & 27 @ 1 F1 ¥ [3]	8, 2021 ganization embers sible to all group (members
			Owner	isgs.gov_USGS	🔓 Change owner
3DEP_project_features_Contr. &R_feature tayer Created: Jan 19, 2022 Updated: Sep 5, 2023			Membership ✓ You are a mer	mber	+ Leave group
Ver court. 1597 primetalburga.gov 窗☆… Click "Open in Map Viewer"			Tags DSM		🥒 Edit
P_project_features_Contractor_View 🥢	Overview	Data	Visualizati	ion Usaç	ge Setti
			_		

			Open in Map Viewer 🗸 🗸
/ Edit thumbnail	Flightline and data extent features	/ Edit	Open in Scene Viewer
	Feature Layer (hosted, view) by jnimetr@usgs.gov_USGS Item created: Jan 19, 2022 Item updated: Sep 5, 2023 View count: 1,961	[Open in ArcGIS Desktop 🐱
		[Export Data 🐱
Add to Favorites		[Share
Description		🖉 Edit	Metadata 🗸 🗸

- On the map click a feature.
- In the pop-up, you may need to toggle between features to select the flight line using the left and right arrow in the top of the pop-up.
- In the pop-up, select Edit.

	State Hinbway 91	UI0
< >		1≣ 2 of 2
307	ē /	×
🕼 Edit 🕀 Zoom to		
OBJECTID	6796	
flightline_id	307	
pts_id_prj	300212	
line_miles	59.294727	
acq_status	QC In-Progress	
acq_date	3/20/2024, 11:00 AM	
notes	Barry added the PTS ID	

- Edit the attribute fields.
- Note in ArcGIS Online, the date fields are displayed in your local time.
- Click Update. Your edits are saved.
- 2) 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.

	projects	🛙 flightlines 🗙	my_flight	_lines		
Fiel	d: 📮 Add 📘	Calculate Se	lection: 🔓 S	elect By Attri	butes 🧬 Zoom To 📲	Switch 📃
	OBJECTID *	flightline_id *	pts_id_prj *	line_miles	acq_status	acq_date
1	700	100001	100000	60	Not Done 🔹	<null></null>
2	701	100002	100000	61	<null></null>	<null></null>
3	702	100003	100000	61	Done	<null></null>
4	703	100004	100000	61	Not Done	<null></null>
5	704	100005	100000	61	Postponed	<null></null>

	projects 🛛 🗄	flightlines ×	my_flight	_lines		
Field	d: 📮 Add 📃	Calculate Se	lection: 🔓 S	elect By Attri	butes 💐 Zoom To	🛛 📲 Switch 🗐 Clear 🙀 Delete 📲 Copy
-	OBJECTID *	flightline_id *	pts_id_prj *	line_miles	acq_status	▲ acq_date
1	700	100001	100000	60	Not Done	1/21/2022 12:00:00 PM
2	701	100002	100000	61	Not Done	◀ January 2022 ►
3	702	100003	100000	61	Not Done	Su Mo Tu We Th Fr Sa
4	703	100004	100000	61	Not Done	26 27 28 29 30 31 1
5	704	100005	100000	61	Not Done	2 3 4 5 6 7 8
6	705	100006	100000	61	Not Done	16 17 18 19 20 21 22
7	706	100007	100000	61	Not Done	23 24 25 26 27 28 29 30 31 1 2 3 4 5
8	707	100008	100000	61	Not Done	
9	708	100009	100000	61	Not Done	Today: 1/19/2022
10	709	100010	100000	61	Not Done	(UTC) Coordinated Univ
11	710	100011	100000	61	Not Done	12:00:00 PM
12		100040	100000	14	11.10	

- 3) 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.

1	Selection:	2 1 1		Highlighted:	
D *	flightline_id *	pts_id_prj *	line_miles	acq_status	d-A-
	100001	100000	60	Not Done	T Sort Ascending
	100002	100000	61	Not Done	Sort Descending Custom Sort
	100003	100000	61	Not Done	
	100004	100000	61	Not Done	Hide Field
	100005	100000	61	Not Done	Freeze/Unfreeze Field
	100006	100000	61	Not Done	Calculate Field

nput Table			
flightlines			- 🧀
ield Name (Existing or N	ew)		
acq_status			
xpression Type			
SQL			
xpression			
Fields	T	Helpers	T
OBJECTID	^	ABS()	^
flightline_id		CAST()	
pts_id_prj	- 8	CEILING()	
line_miles		CHAR_LENGTH()	
acq_status		CONCAT()	
acq_date		COS()	
notes	~	CURRENT_DATE()	~
Insert Values	*	* / + - ()	
acq_status =			
			_

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]

Name [official USGS name for a project]

Contractor [lidar mapping company name]

Task Order Number [official GPSC task order number for the contract]

SqMi [area of the project in square miles using the source projection]

Technical Point of Contact [USGS project manager]

Flightlines:		
flightline_id [uniqu determined by cont	e flightline id tractor]	acq_date [date of flight line acquisition]
pts_id_prj [pts id p	provided by USGS]	postpone_reason
line_miles [length of calculated in miles projection]	of each flight line using the source	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 da	ta extent]	Actual code value same as display value
data_volume [tot	al of tiled LAZ in GB]	- Anticipated [initial selection]
crs_epsg [- epsg co and reference fram	ode of grid projection e]	- Actual [change to 'Actual' when
quality_level		delivery is imminent]
Actual code value sa	ame 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 inwork 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.