Section 3

Video: Acquiring drone data with Site Scan for ArcGIS

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Time	Caption
0:00	♪ [music] ♪
0:08	The Site Scan for ArcGIS flight app is a tablet app that simplifies
0:12	the creation of flight plans for supported drones.
0:15	Images captured can be processed into 2D and 3D data products.
0:20	Site Scan allows users to quickly create autonomous flight plans
0:24	that are then sent to the drone.
0:26	There are several different flight templates to choose from to ensure
0:29	the best data capture method for the desired products.
0:32	Most flight templates include the drone flying over a region of interest
0:36	at specific flight lines while taking photos.
0:39	These photos are then taken at intervals required for
0:41	our processing engine to stitch into 2D and 3D data products,
0:44	like orthomosaics, digital surface files, point clouds, and 3D meshes.
0:49	Let's go through the flight modes.
0:52	Area Survey is the most basic flight mode.
0:54	Define a region of interest and Site Scan will create
0:57	the flight lines required to map the area.
0:59	Input the desired altitude for the flight and see the flight lines
1:02	change to accommodate the new distance above ground.
1:05	While a 3D data product will be produced,
1:08	the facades may not be fully captured if there were any vertical features
1:11	within the region of interest due to the default orientation
1:14	of the camera being pointed straight down.

1:16	If you do have vertical features, whether constructed or natural,
1:20	it would be better to use the next flight mode, Crosshatch Survey.
1:24	Crosshatch Survey is essentially two area surveys perpendicular,
1:28	except the default camera angle is 35 degrees.
1:31	This angle helps capture any vertical features that
1:34	exist within the region of interest.
1:36	Perimeter Scan is used to model a structure or a set of structures.
1:40	This flight mode is planned a little differently.
1:43	First, define the footprint of the area to model and then define
1:47	the offset the drone will fly away from the footprint.
1:50	Next, define how tall the object or objects are and the minimum
1:53	and maximum altitudes for the drone to fly around the region.
1:56	These parameters will define a set of altitude tiers for the drone to fly
2:00	on sideways, collecting oblique photos of the structure.
2:04	Vertical Scan is like Perimeter Scan in that it is a way
2:07	to acquire data on a vertical subject.
2:09	However, Vertical Scan is used when you cannot fly
2:12	around an object or if the object has a slope.
2:15	With Vertical Scan, you plan a line as the facade of interest
2:18	and then define whether that facade has a slope,
2:20	whether it be a fixed slope or a variable slope.
2:23	Then, like Perimeter Scan, you define the height of the slope
2:27	and the minimum and maximum altitudes for the drone to fly.
2:30	Sometimes, it is necessary to capture a right-of-way or a corridor.
2:34	With Corridor Scan, instead of defining a polygon
2:37	as the region of interest, you define a polyline.
2:41	This polyline should be the center line of the corridor to be captured.
2:45	Next, define the width of the corridor to be captured.

2:48	This information will add the appropriate number of flight lines
2:51	to be able to fully capture the corridor.
2:53	Depending on the country, it can be against regulations to fly
2:56	over moving vehicles when capturing a road corridor.
2:59	To help with this issue, you can choose
3:02	not to fly directly over the corridor.
3:04	This option essentially places two vertical scans on either side
3:07	of the corridor, keeping the drone flying on the sides
3:10	instead of directly over the region of interest.
3:13	Pano is an automated flight mode that does not produce
3:16	any geospatial data products.
3:18	It instead creates a stitched 360-degree photo that can be viewed
3:21	and shared on the web or viewed in the Site Scan flight app.
3:24	These photos can be great for sharing updates with stakeholders
3:27	or for getting a true bird's-eye view of a location.
3:30	The Terrain Follow feature ensures that the drone always
3:33	remains at a set altitude above ground.
3:35	This feature is not only used to keep the drone
3:38	a safe distance away from the terrain.
3:40	It also increases the quality of the processed dataset by keeping
3:43	the acquired photos at a constant distance above the ground,
3:46	therefore keeping a constant ground sampling distance, or GSD.
3:50	Now that we understand the flight modes,
3:52	let's walk through a quick flight.
3:54	First, it's usually a good idea to preplan
3:57	the flight before heading out to collect.
3:59	I can take my time planning the flight and request any
4:01	airspace authorizations beforehand if required.

4:05	For this flight, I'm going to use Area Survey so that I can get an updated
4:09	basemap of the area that is undergoing a lot of construction.
4:12	I set the flight template and move the vertices to the extents
4:15	of the region of interest that I would like to map.
4:18	I don't need Terrain Follow because this is a flat area.
4:20	But this is where I would want to turn it on if I wanted to.
4:23	Next, I define the altitude above ground
4:26	at which I want to capture the data.
4:28	I'm going to keep it at 200 feet, which is the best compromise
4:31	between efficient, large-area coverage
4:33	and high-resolution ground sampling distance.
4:36	After all these settings look good, I'm going to
4:38	download the basemap for offline use.
4:40	That way, if I don't have an internet connection in the field,
4:43	I still have access to my basemap and 3D terrain data.
4:47	Next, I save my flight plan, making it available to me
4:50	and any other operators in my Site Scan organization.
4:53	Let's go out into the field and capture some data.
4:56	When we're at a safe location to set up,
4:58	I'm going to take the drone out of the case
5:00	and inspect each component to ensure airworthiness.
5:03	Critical items, like the propellers and their motor mounts, landing gear,
5:07	and gimbal connection, must be checked before each flight.
5:11	When the aircraft is ready for flight, I first turn on
5:13	the controller and then the aircraft.
5:15	Plug the tablet into the drone's controller
5:18	using a standard tablet USB cable.
5:21	The Site Scan app should automatically recognize that the drone is connected,

5:25	and the telemetry will be visible at the top of the app.
5:28	Now that we're ready for takeoff, I will go into the Flight Plans area
5:31	of the app and find the flight plan that I had previously saved.
5:34	I will open the flight plan and verify the plan settings.
5:37	Everything looks good, so I will go to the Fly screen.
5:40	The app will automatically go through the vehicle preflight checks.
5:43	After I have four green items, I can swipe to take off.
5:47	After the swipe, the mission is loaded into the autopilot,
5:50	the propellers will start spinning, and the drone
5:52	will take off to the desired altitude.
5:54	During the flight, it is the pilot's job to ensure
5:57	that the drone does not leave visual line of sight
5:59	and that the mission is progressing normally.
6:01	When the flight is complete, the drone will return home and land automatically.
6:05	Now, it is time to retrieve the photos from the drone.
6:09	Retrieving the photos can be done in two ways--
6:11	wireless transfer from the drone
6:13	or by using an SD card reader for the tablet.
6:16	Wireless transfer can be easier for smaller flights, but it can be slower
6:20	if there were many images taken.
6:22	Using an SD card reader is the quickest way to retrieve the images.
6:26	After the images have been imported into the flight,
6:29	it is time to load the images for processing.
6:31	If using the Site Scan cloud for processing, I first ensure that
6:35	the tablet is connected to the internet by LTE or Wi-Fi.
6:39	Then I go into the Flights page, select the flight to upload,
6:42	then tap the Upload To Manager button.
6:44	After the images are uploaded, cloud processing will automatically start.

6:49	If I'm using ArcGIS Drone2Map to process the data,
6:52	I will plug the tablet into the computer and use
6:54	the Photo Transfer tool to find the images in the appropriate
6:57	camera roll folder and import them into the Drone2Map project.
7:00	We've now seen how to use the Site Scan for ArcGIS flight app
7:04	to plan the appropriate flight for the desired region of interest,
7:07	save the flight plan for use in the field--including downloading
7:10	all basemap and terrain data locally for offline use--
7:13	perform the flight in the field,
7:15	transfer the photos acquired by the drone to the tablet,
7:19	and finally process into 2D and 3D data products.