

UAS/Drone Support for PSPS Events

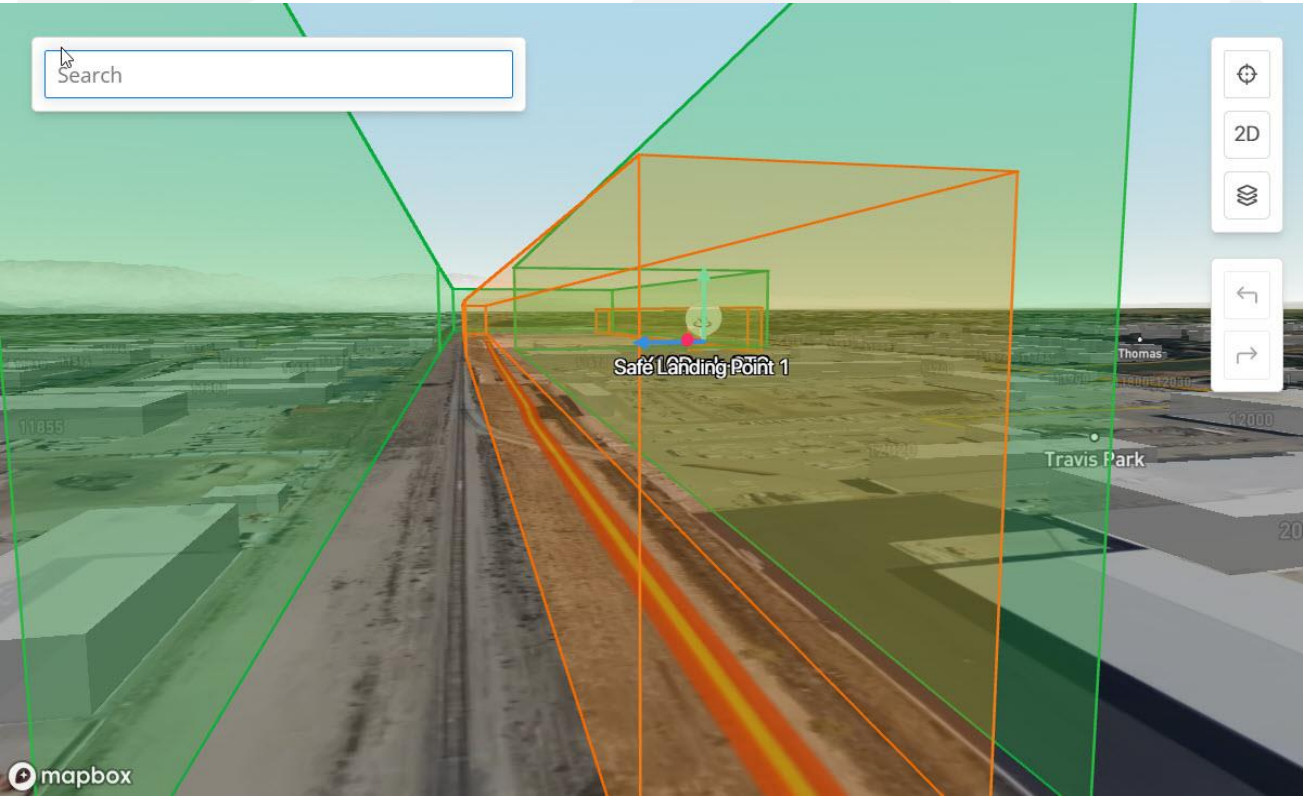
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Idaho Power UAS Operations

- UAS - Unmanned Aircraft System = Drone
- Started using UAS in 2010 to document fall Chinook redds
- Currently – 24 FAA licensed remote pilots
- 31 – FAA registered aircraft
- 2 – FAA BVLOS waivers
- 1 – FAA Wide Area Airspace Authorization for BOI airspace
- 1,525 flights YTD
- 256 flight hours YTD
- 1,300 flight miles YTD

Idaho Power UAS Operations

- 1 – Remote Dock-based Drone



Equipment used

- Skydio X10 drone with 300Z sensor
 - 64 MP visible light camera with 128X zoom
 - 640 X 512 radiometric thermal camera



Concept of Operations

1

Implement drone patrol in difficult/remote terrain for PSPS patrols

2

Utilize line workers intimate knowledge of feeder to identify areas (line segments) for potential drone patrols

3

Utilize a two-person crew (driver/visual observer, and remote pilot)

4

Practice identified areas for potential drone patrols to determine effectiveness of drone patrol

5

Notate line segments that can be patrolled by drone and time or mileage saved

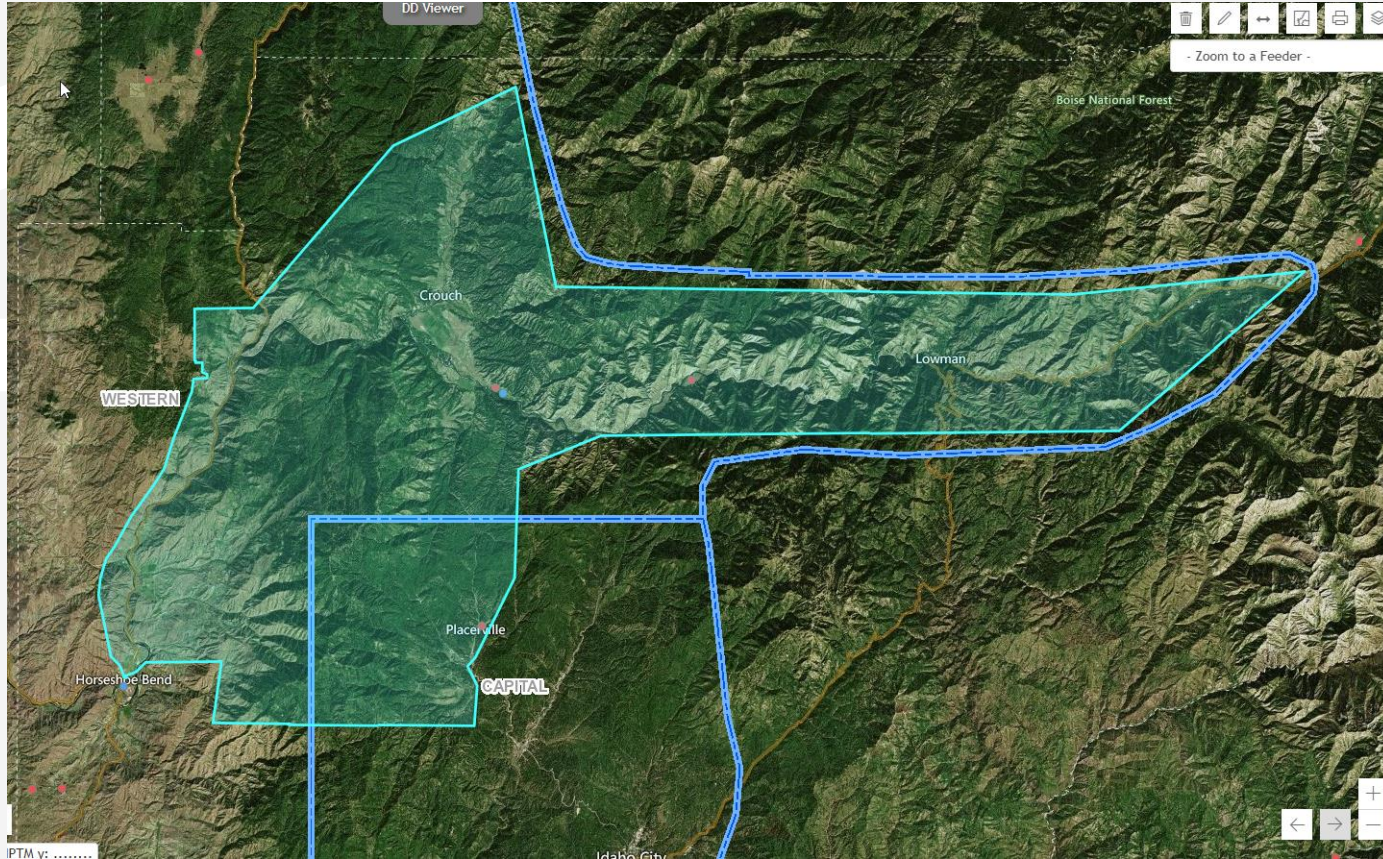
Concept of Operations

- Predetermined list of line segments to fly
 - HBND41 Feeder
 - Mock PSPS Event
- GISO 675773 – GISO 6758238. Can we utilize a drone in this portion of the trunk? (Porter Creek to Placerville)
- GISO 4997877- To the end of the single phase tap (Pumpkin Creek)
- GISO 5016079 – GISO 325295 include single phase going up the hill to the West (Banks)
- GISO 322047- to the end of the single phase tap across the river. Can we patrol this with a drone from the highway side of the river?
- GISO 322797- to the end of the single phase tap across the river. Can we patrol this with a drone from the highway side of the river?
- GISO 324839 – GISO 324913. Can we use a drone in this area where the line leaves the highway between these GISO points?
- GISO 4147608 – GISO 328620. Can we use a drone in this area where the line leaves the highway and is across the river? (Kirkham/Archie Creek)
- GISO 329890 – GISO 330181. Can we use a drone in this area where the line leaves the highway? (5 mile creek)

Horseshoe Bend (HBND41) Feeder

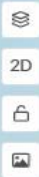


Horseshoe Bend (HBND41) Feeder



Google Earth Visualization





No Recording Available

Notations for line segments flown

HBND41 DRONE PATROL LOCATIONS

GISO#325287--Single phase tap headed Northwest on the west side of the river behind Banks Store and Cafe. Can park at parking lot (44.08516,-116.11578) and drone the whole tap to the end. Open at F-176. Saves about 2.5 hours of hiking.

GISO#322047--single phase tap headed South across the river off Banks/Lowman rd., then Northeast along S. Fork rd. Can send the drone across the river and drone tap to the end. Have to follow along with truck on Banks/Lowman rd. Open at the F-605. Saves roughly five miles of driving on a bad access road.

GISO#322797--Single phase tap headed across the river off Banks/Lowman rd. Can send the drone across the river and drone the entire tap without moving the truck. Open at the F-700. Saves about 8.5 miles of driving on a bad road.

GISO#4147608-328620--Kirkham Hot Springs to Archie Creek. Can send the drone across the river at the hot springs parking lot then follow along Hwy. 21 with truck. Can drone the entire line. Lost visual of the line a few times because of thick timber but back tracked and found it. Would open at the X-743, which would keep everyone off to the end of the line. Would save at least a 2 hours of patrol time. Kirkham rd. is pretty bad and have to take it slow. Then you have to drive back around to the Archie Creek side and hike 6 or 7 spans to get everything.

GISO#329890-330181--Helende Creek to Kettle Creek. It is possible to drone this stretch of line but not a first priority. Would have to start at NFD 526 rd., drone part of it then drive to Kettle Creek and drone the rest. Could do the same with a truck, binoculars and a minimal amount of hiking. Open at the X-781.

GISO#324839-324913--No drone access here. It's too vertical off of the Hwy. to get up and over to the line.

GISO#675731-6758238--Porter Creek to Granite Creek. This location isn't great for a drone. Need a side by side or four wheeler to drive the access road. It is a possibility to take an ATV in on the access road with the drone and fly portions of the line from the ATV. I think a helicopter would be the best bet here since the new distribution construction is built more like transmission and could be seen pretty well from the air.

GISO#4997877-To the end of the line--Hill Creek/Pumpkin Creek. This is a great one to drone. 1) Start at giso#328177 (parking area next to barn) Can drone everything north to the end of the line and west to the F-155 on Jerusalem rd. 2) Drive back to the F-155 (giso#327875) and drone everything west to giso#322146 (which is at the intersection of Cook Gulch rd./Hill Creek rd.) Open at the TX-151. This would save roughly 3 hours of patrol time.

GISO#5016131-5016079--This is south of Banks Store on the west side of the river where Church In. basically ends and bad access begins. This stretch works great for a drone. Start at pullout on Hwy. 55 (44.06860,-116.11972) launch drone across river, drive truck on Hwy.55 following drone. We were

able to use all of the pullouts on Hwy. 55 and stay with the drone. Open at the R-170. Saves about 2 hours of patrol time.

GISO#343236-To the end of the line--This is on Alder Creek at the F-296. 1) Start at the F-296 and drone everything west to the junction pole. 2) Then drive to giso#6920745, drone everything north to the junction pole. 3) Then drive to giso#343059 and drone everything south to the junction pole. Open at the F-296. Saves about 2 hours of patrol time. Lots of hiking involved.

Lessons Learned

- Two-person crews are necessary – driver/logistics and remote pilot
- Pre-mission planning in Google Earth
- IR & RGB side-by-side camera view helpful
- Geo fencing capabilities on Skydio X10 controller would enable 9 out of 10 identified line segments to be flown
- Routine practice of drone line segments with skilled pilots
- Truck mounted Starlink helpful for communications and livestreaming of drone video

Questions?