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## The Use of Slew-to-Cue PTZ Cameras Integrated with Avian Radar for Aviation Safety at Airports

## Traditional Benefits and Challenges of Avian Radar



## Traditional Benefits of Cameras

- Visual monitoring of critical safety areas
- Record of camera footage
- Remote viewing

## Traditional Challenges With Cameras

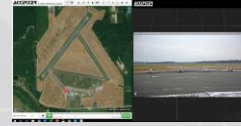
- Field of view, range, and resolution are limited
- Multiple cameras may be required for adequate coverage
- Requires careful positioning and deployment
- Must anticipate where the camera needs to be pointed before the incident occurs
- Hours of historical camera footage can be time consuming to review, and requires training to ensure consistent assessments of footage between reviewers
- Real-time view requires complete attention from the operator

## Slew-to-Cue PTZ Camera Integration with Avian Radar

By integrating an avian radar system with a PTZ camera system you can get more benefit from both devices than if each device were deployed alone, overcoming many of the traditional challenges with the existing technology



Inspect multiple areas of interest with a single camera asset



ACCIPITER CLOUD SURVEILLANCE™

42°58'37.07" N -79°19'42.33" W

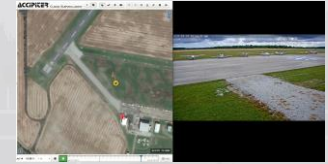
Dec 04 15:58:20 1.0x Dec 03 15:58 Dec 04 15:58 Live

ACCIPITER ACCIPITERRADAR.COM

2019-12-04 03:58:19 PM wall-e

Live

Manual slew-to-cue to review on runway bird activity



**ACCIPITER** CLOUD SURVEILLANCE

42.97646 -79.32806

Jul 14 10:55:27 1.0x Jul 13 15:28 Jul 14 15:28 Live



## Manual slew-to-cue of TUVU



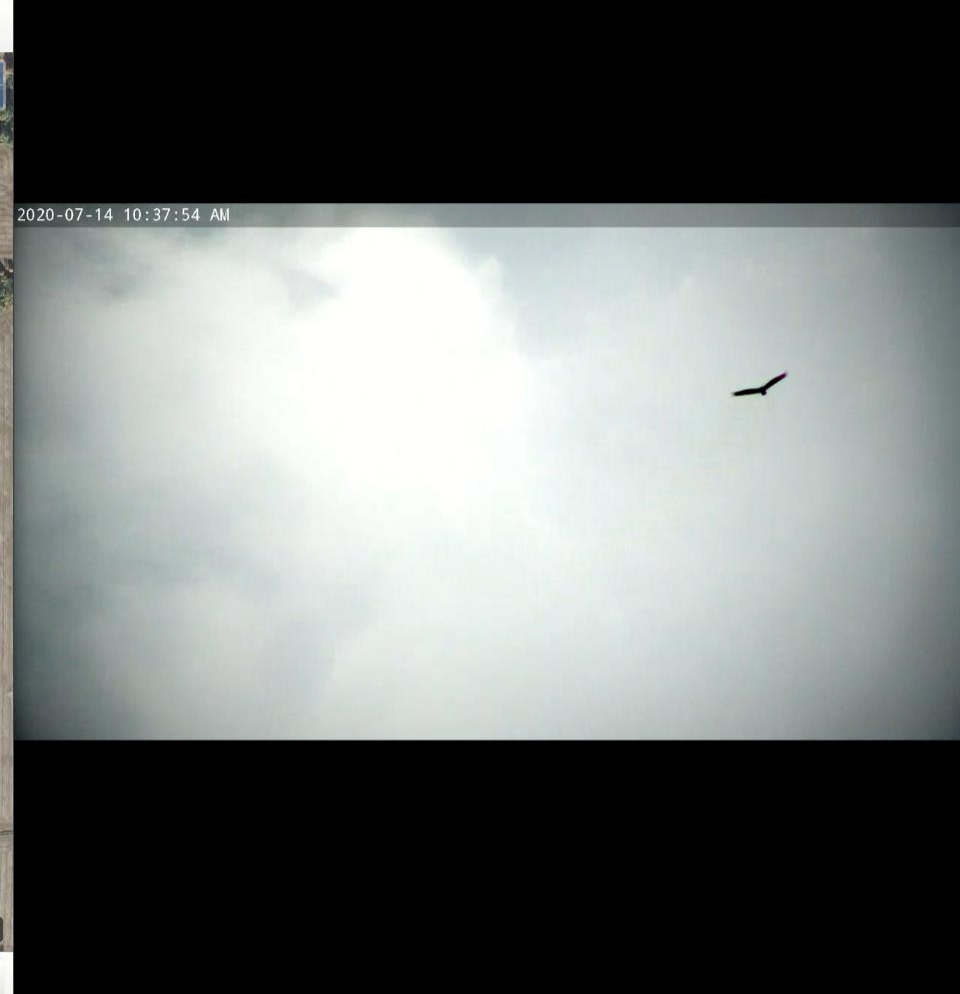
ACCIPITER® CLOUD SURVEILLANCE™

Track ID 0  
Locator ID VM234  
Heading 253 °  
Position 42.97814 -79.32326  
Size 0.01 m²  
Speed 12.7 mph  
Altitude ~459 ft  
Start Time Jul 14th 2020 10:37:43 -0400  
Last Update Jul 14th 2020 10:37:55 -0400  
Group Default  
Node Echodyne  
Sensor Radar  
Designation Unknown

Download KML

42.97725 -79.3223

Jul 14 10:37:55 1.0x Jul 13 15:43 Jul 14 15:43 Live



## Slew-to-cue fast flying starling

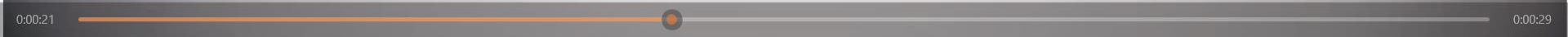


2021-09-04 09:38:56 AM 113.17 +18.70 1



## Automatic slew-to-cue flock of Canada Geese

2021-09-04 06:34:05 PM +109.38 +0.20 9999



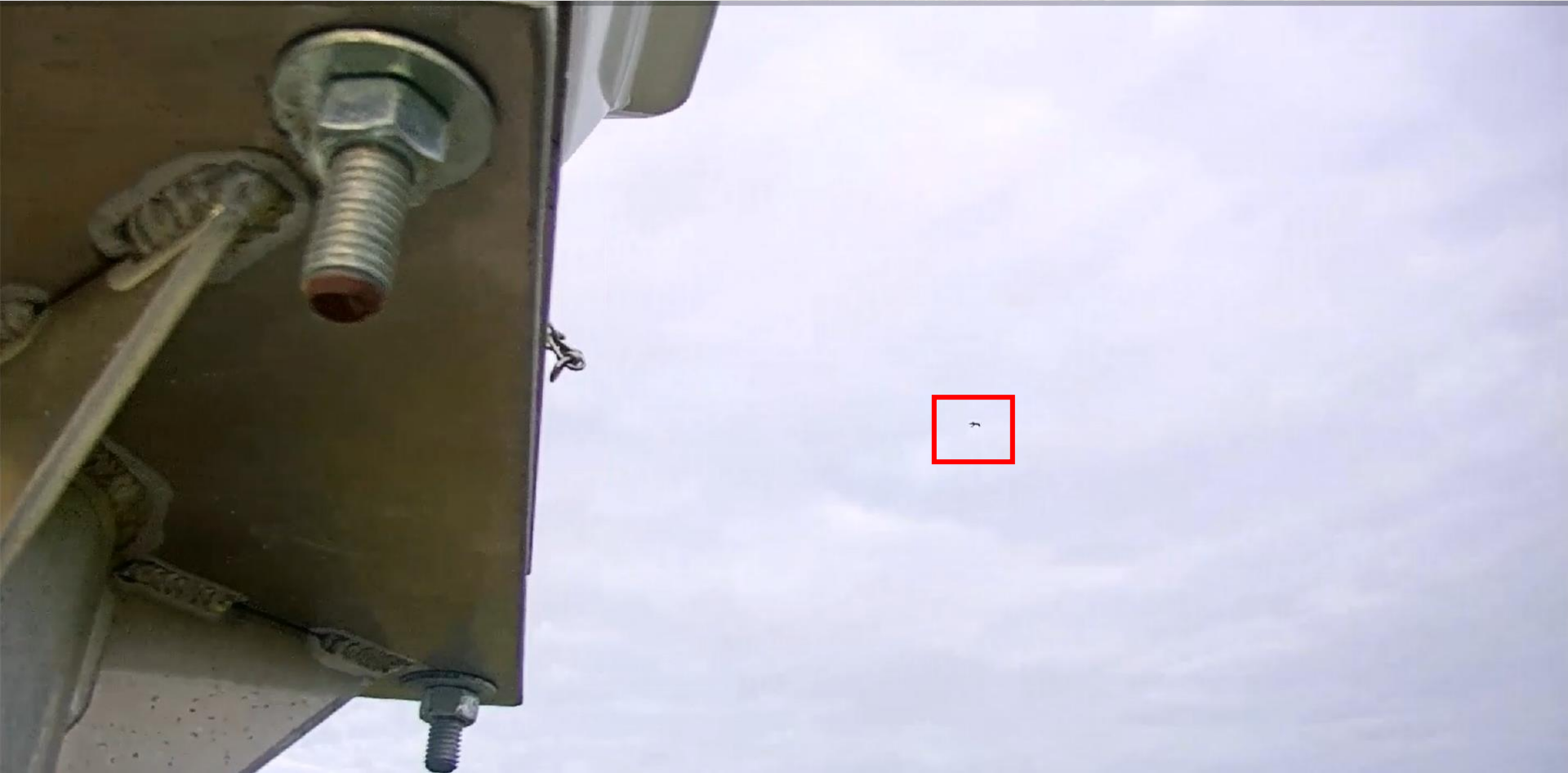
## Automatic slew-to-cue towering raptor



2021-09-04 01:33:53 PM +88.62 +18.84 898



# Automatic slew-to-cue of a bird in flight



# What's this bird?



**ACCIPITER** CLOUD SURVEILLANCE™



**REPLAY**



Oct 14 13:56:19 5.0x [Pause] Oct 14 12:45 [Live]

# What's this bird?

2021-10-14 02:57:45 PM



# What's this bird?

2021-10-14 02:54:46 PM +155.05 +23.52 1979

# What's this bird?





# When you're good with animals, but a bad wildlife photographer



## Identifying birds in images



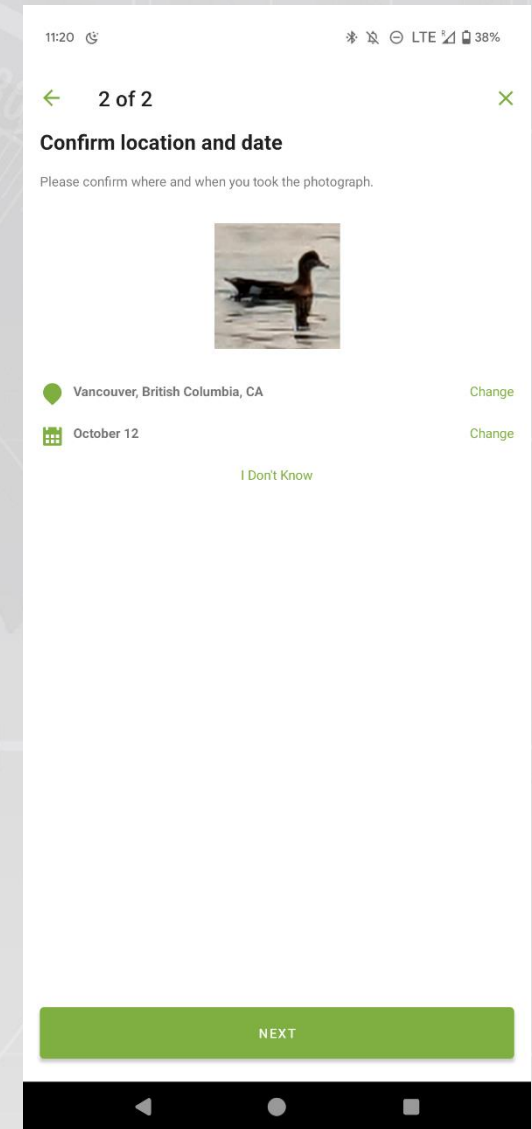
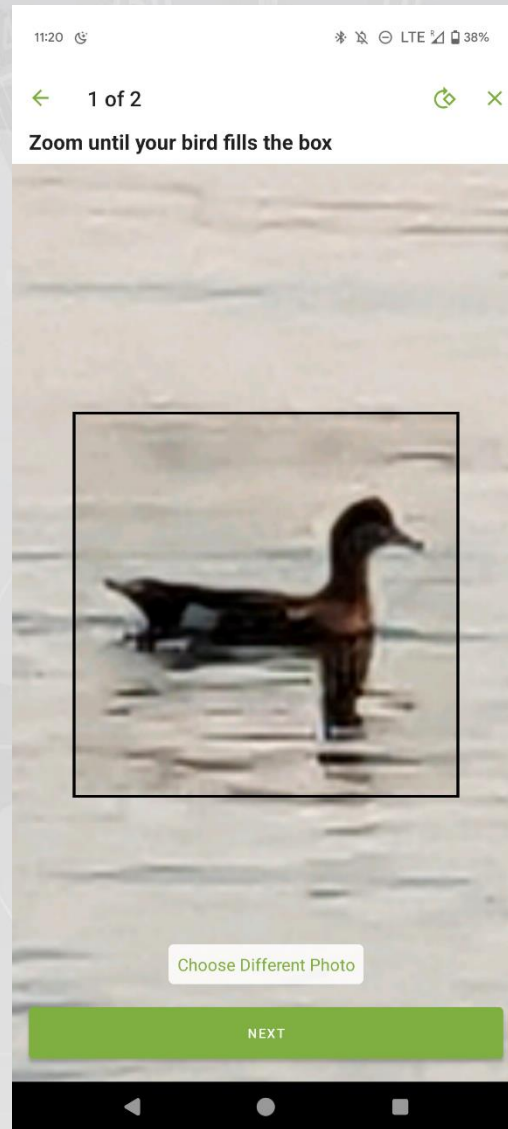
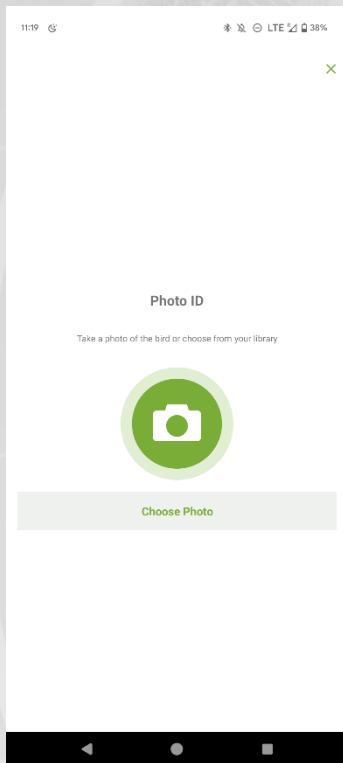
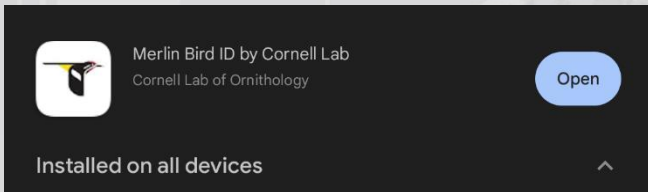
**Photo Credit: Sara Handrigan**

## Identifying birds in images



Photo Credit: Sara Handrigan

## Identifying birds in images



## Identifying birds in images


11:20 38%

**Best Matches**

**DETAIL** LIST

Vancouver, British Columbia, CA | October 12

**American Wigeon**



MALE

Breeding males have obvious white blaze on forehead and broad green slash behind eye. Females are plainer brown with rusty sides. Females are very difficult to distinguish from female Eurasian Wigeon; note col...



# Any Home Alone 2 fans?

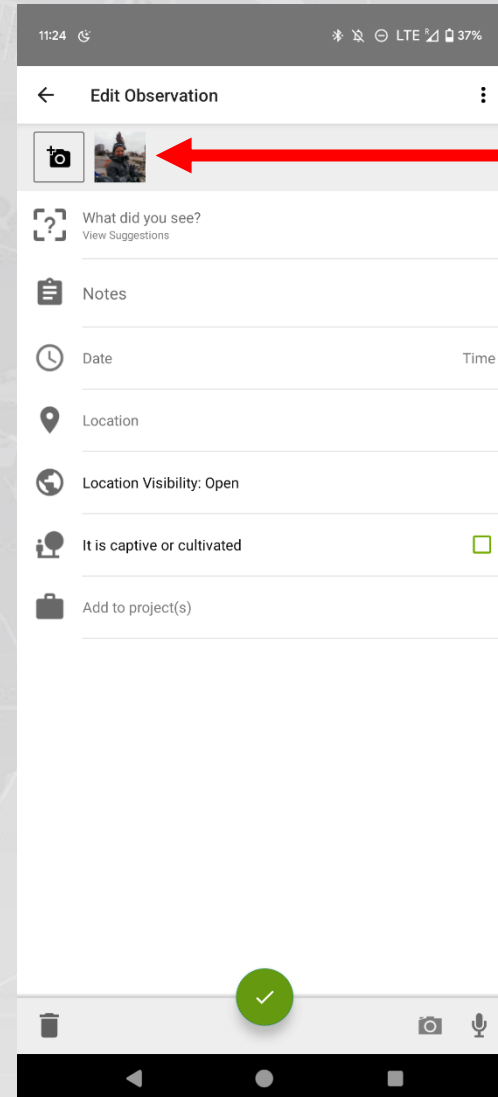
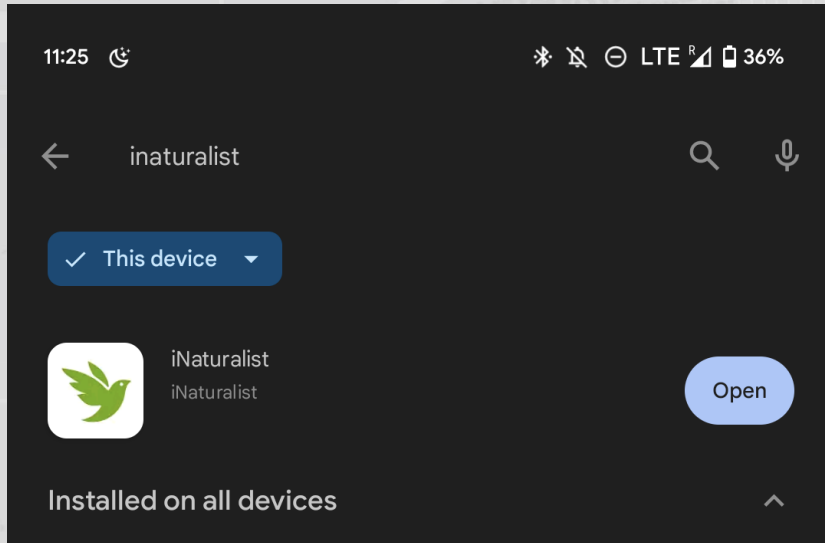
## Identifying birds in images



## Identifying birds in images



## Identifying birds in images



## Identifying birds in images

11:24 LTE 37%

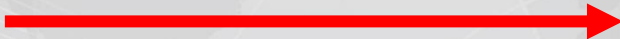
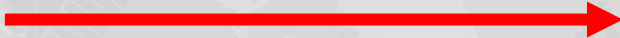
Species Search

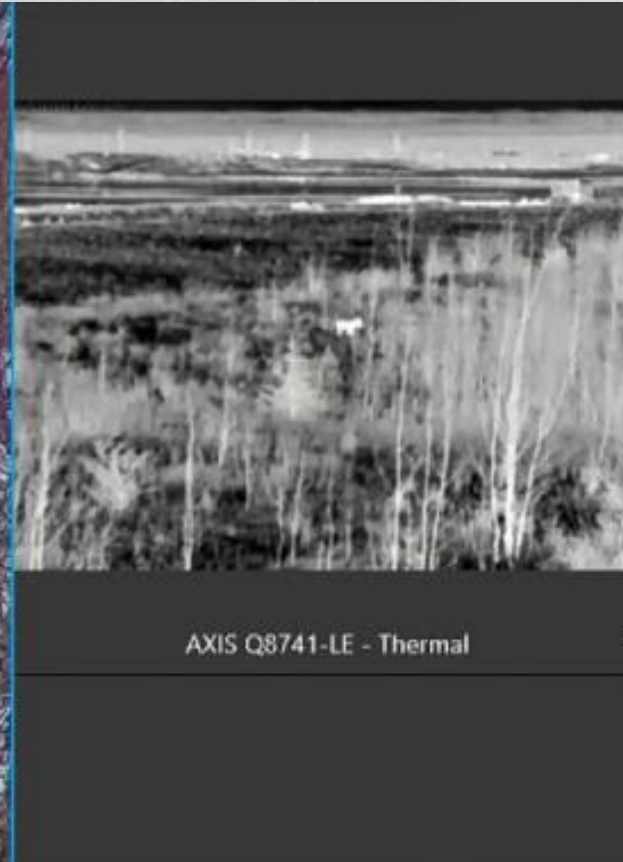
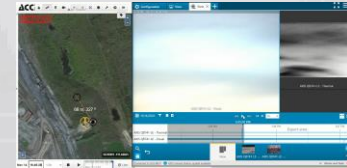
We're pretty sure it's in this genus:

- Old World Pigeons  
Genus *Columba*

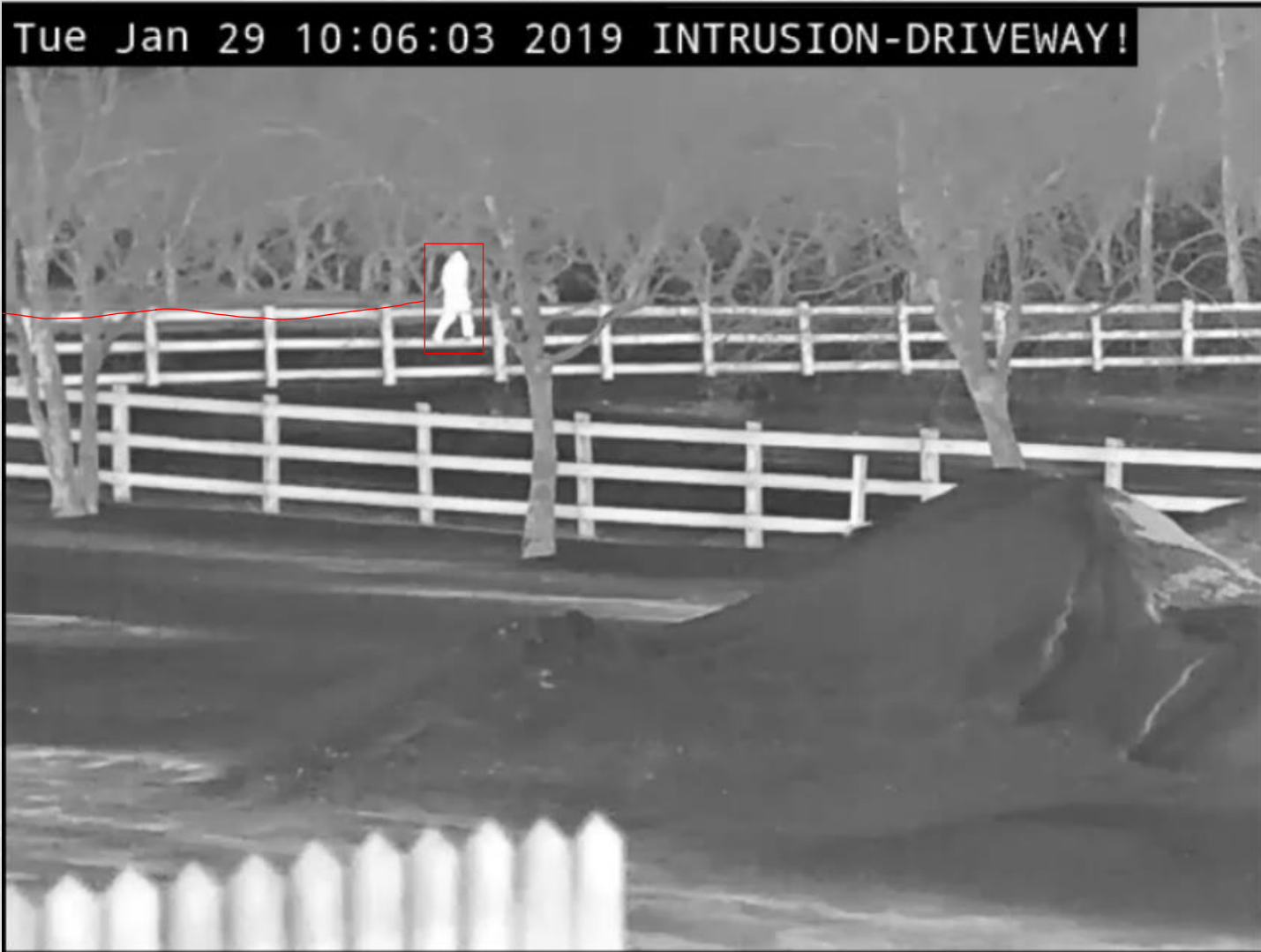
Top suggestions Filters

- Rock Pigeon  
*Columba livia*  
Visually Similar
- Hill Pigeon  
*Columba rupestris*  
Visually Similar
- Spot-winged Pigeon  
*Patagioenas maculosa*  
Visually Similar
- South American Fur Seal  
*Arctocephalus australis*  
Visually Similar
- Brown Fur Seal  
*Arctocephalus pusillus*  
Visually Similar
- Stock Dove  
*Columba oenas*  
Visually Similar
- Eurasian Jackdaw  
*Corvus monedula*  
Visually Similar

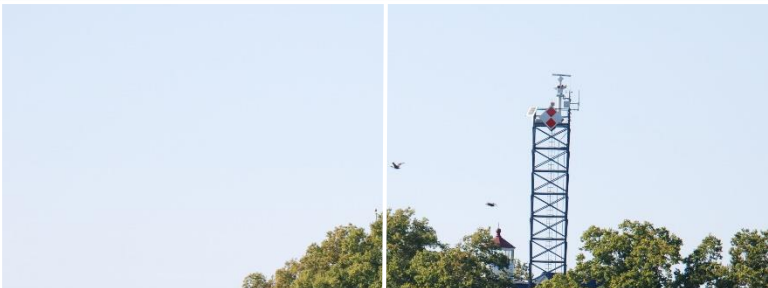




## Slew-to-Cue PTZ Camera Integration with Avian Radar



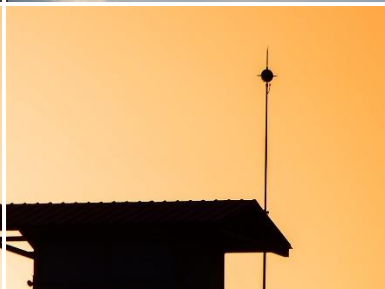
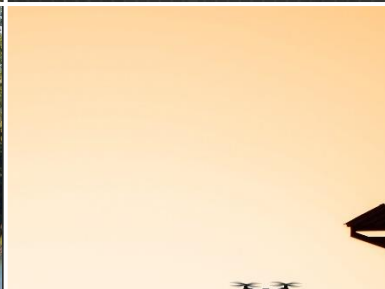
# Why does this matter?



**HOMELAND  
SECURITY**



**AVIATION  
SAFETY**

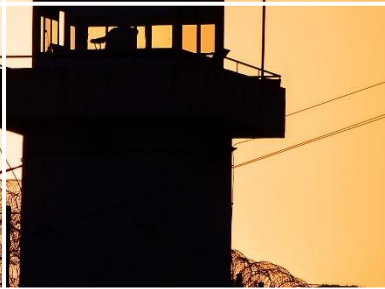


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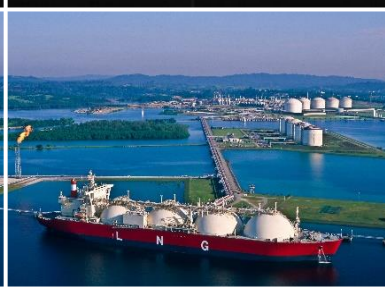


**ENVIRONMENT  
PROTECTION**

**DRONE  
MANAGEMENT**



**DECISION  
SUPPORT**



**CRITICAL  
INFRASTRUCTURE  
PROTECTION**

**PUBLIC  
SAFETY**