

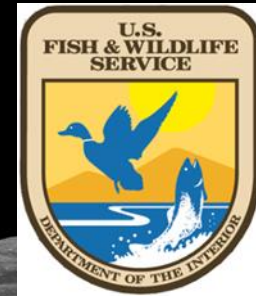
# DroneView:

## Remote Sensing & Mapping

Brian Huberty

Remote Sensing Leader

July 14, 2016



# Topics



UAS History

BIG UAS



UAS app

FAA sUAS



” Let’s go **back**

about 60 years. ”

# U.S. Army Combat Surveillance 1957-1965



Col. Walter Halloran  
U.S. Army - retired



# USA SURVEILLANCE UNIT



BAD TÖLZ — LENGGRIES

*Photos*



# Topics



UAS History

BIG UAS



UAS app

FAA sUAS



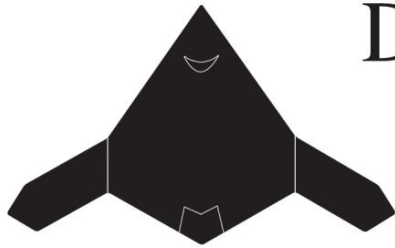
# Topics:

History UAS

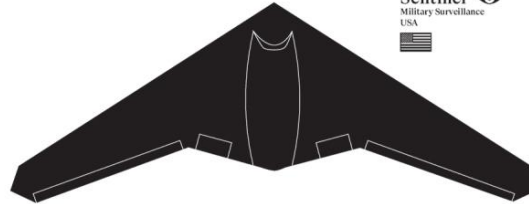
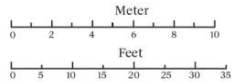
BIG UAS

FAA sUAS

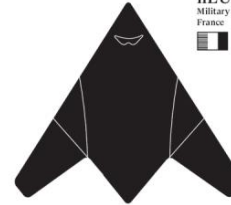
# DRONE SURVIVAL GUIDE



**X47C**   
Military Surveillance / Attack  
USA



**Sentinel**   
Military Surveillance  
USA



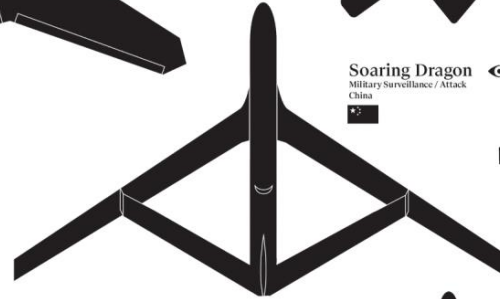
**nEUROn**   
Military Surveillance / Attack  
France



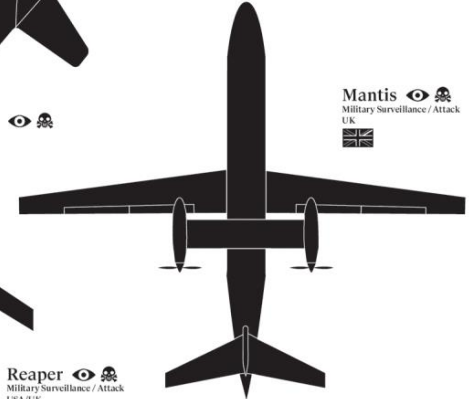
**X45C**   
Military Surveillance / Attack  
USA



**Global Hawk**   
Military Surveillance  
USA



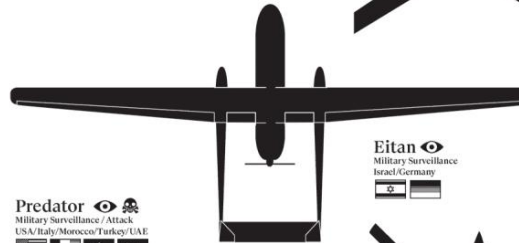
**Soaring Dragon**   
Military Surveillance / Attack  
China



**Mantis**   
Military Surveillance / Attack  
UK



**Avenger**   
Military Surveillance / Attack  
USA



**Eitan**   
Military Surveillance  
Israel / Germany



**Reaper**   
Military Surveillance / Attack  
USA / UK



**Herti**   
Surveillance  
UK



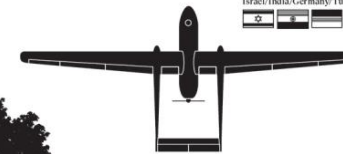
**Predator**   
Military Surveillance / Attack  
USA / Italy / Morocco / Turkey / UAE



**Hummingbird**   
Military Surveillance / Attack  
USA



**Barracuda**   
Military Surveillance  
France / Germany



**Heron**   
Military Surveillance  
Israel / India / Germany / Turkey



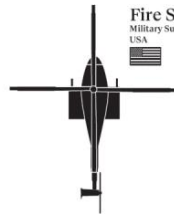
**Hermes**   
Military Surveillance  
Israel



**Shadow**   
Military Surveillance  
USA / NATO



**Rustom I**   
Military Surveillance  
India



**Fire Scout**   
Military Surveillance / Attack  
USA



**WASP III**   
Military Reconnaissance  
USA / NATO



**Scan Eagle**   
Military Surveillance  
USA / NATO



**Harpy**   
Military Attack  
Israel



**Killer Bee**   
Surveillance  
USA



**Raven**   
Military Reconnaissance  
USA / NATO



**Air robot**   
Domestic surveillance  
UK



**Aeryon Scout**   
Domestic Surveillance  
Canada



**AR Parrot**   
Consumer photography  
USA

# 2015 *Frozen* UAS Tour

*January 8-9, 2015*

Grand Forks, ND







# Remote Sensing Professionals





**Alan Palmer, UND Aerospace  
UAS Director**



ALTITUDE CHAMBER

UNDAER  
UNIVERSITY











CRJ-200

UND AEROSPACE  
UNIVERSITY OF NORTH DAKOTA











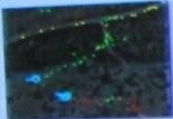
## VADER

### Vehicle and Dismount Exploitation RADAR



#### GMTI - SEARCH

- Wide Area - Vehicles
- Small Area - Dismounts
- Persistent Surveillance
- Cueing



#### GMTI - TRACK

- Real Time Downlink
- High Accuracy
- Vehicles and Dismounts
- Persistent Unique Vehicle Tracking (HRR)



#### DMTI - CONFIRM

- Confirm & Count People
- Cue EO / RF sensors
- Raw data output for ID



Based on airborne radar components and advanced real-time and forensic exploitation software, VADER primarily provides GMTI/DMTI data via a KU beyond-line-of-sight (BLOS) interface.



U.S. Customs and Border Protection

Office of Air and Marine







Pizza Delivery Phone























3.5 Ton  
ON CHASSIS

U.S. Customs and  
Border Protection

U.S. Customs and  
Border Protection

CBP  
006104

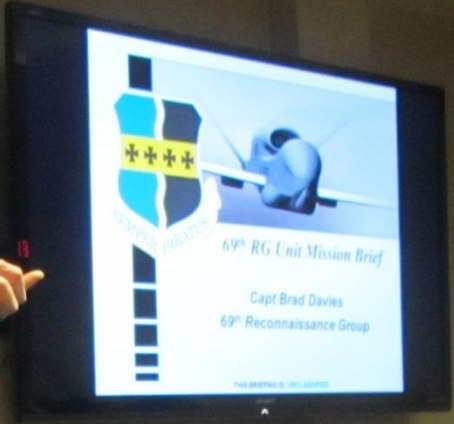
















- Block 0 (prototype) [retired]
- Block 10 (multi-INT) [retired\*]

---

- Block 20 (Comm) [3 aircraft]
- Block 30 (multi-INT) [18 aircraft]
- Block 40 (RADAR) [10 aircraft]

Beale AFB:

Block 30s

Grand Forks AFB:

Block 20s

Block 40s







# RQ-4B Block 40 – MP-RTIP



Multi Platform - Radar Technology Insertion Program

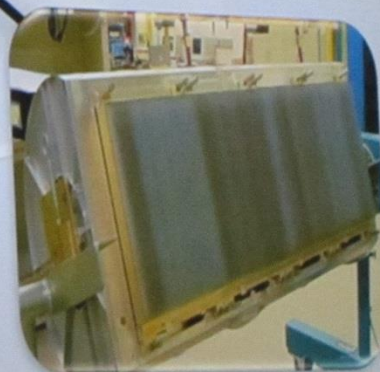


Active Electronically Scanned Array (AESA)

Scalable RADAR

Provides Enhanced GMTI

Improves RADAR Imaging Modes



SHARP

















# Topics



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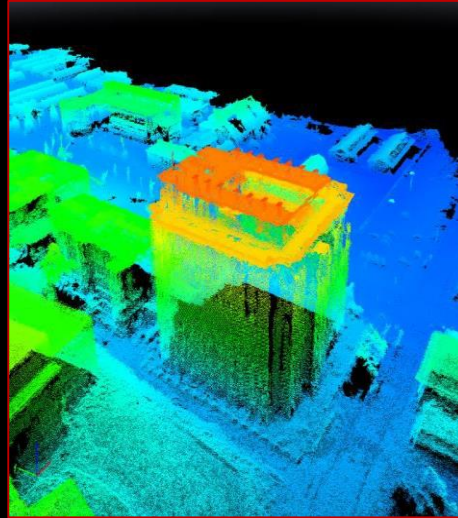


# UAS – Data Examples

Orthos



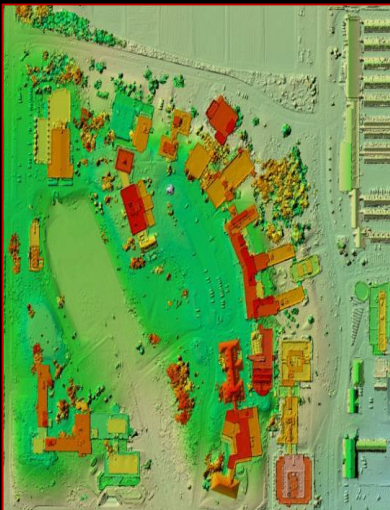
Point Cloud



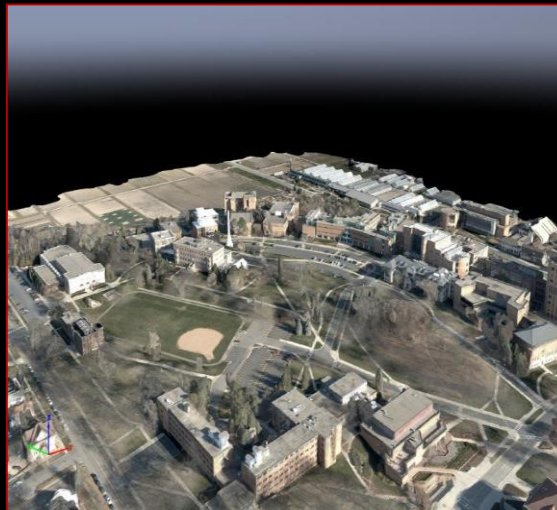
Vertical



Surface Model



3D Mesh



Oblique



# UAS – Applications

- Mapping
  - Landcover
  - Land Use
  - Topographic
  - Change
- Volumetric
  - Construction
  - Geomorphic
  - Inventory
- Inspection
  - Civil Engineering
  - Utilities
  - Insurance
- Precision Ag
  - Diagnostic and Prescriptive
- Cultural Resource Management
- Forestry
  - Urban
  - Inventory
- Fish & Wildlife
  - Tracking
  - Population
- Conservation Biology
  - Mitigation Monitoring
- Event Response
  - Disaster
  - SAR
  - WX
- Photography
- Cinematography
- Advertising
  - Tourism



# Topics



UAS History

BIG UAS



UAS app

FAA sUAS



# Final Points

**Drones are not new**

**BIG UAS:**

Military > commercial = slow!

**Local R&D**

**sUAS growth**



# QUESTIONS?

## DroneView

Brian\_huberty@fws.gov

### Thanks to

Walter Halloran, U.S. Army Retired

Dan Heins, UMN UAS Center

UND Aerospace

Customs Office of Air and Marine

USAF 69th Observation Squadron

