



PENDLETON UAS RANGE


CIS Conference
March 2, 2018

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AGENDA



- What's a UAS/UAV/Drone?
- Why Become a UAS Test Range?
- What's a Test Range? Who Needs it?
- Critical Components: What's required?
- Process: How Do We Keep it Safe?
- Current Users
- Economic Impact
- Future Plans
- Q&A

WHAT'S A UAS (DRONE)?



UNMANNED AIRCRAFT SYSTEM (UAS): AN UNMANNED AIRCRAFT AND ITS ASSOCIATED ELEMENTS RELATED TO SAFE OPERATIONS, WHICH MAY INCLUDE CONTROL STATIONS (GROUND, SHIP, OR AIR-BASED), CONTROL LINKS, SUPPORT EQUIPMENT, PAYLOADS, FLIGHT TERMINATION SYSTEMS, AND LAUNCH/RECOVERY EQUIPMENT.

CONSISTS OF THREE ELEMENTS:

1. UNMANNED AIRCRAFT
2. CONTROL STATION
3. DATA LINK

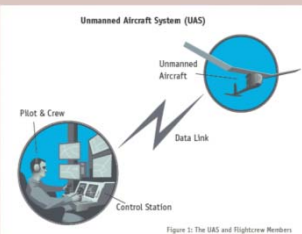


Figure 1- The UAS and Flightcrew Members

WHAT SIZES ARE THEY?



General Groupings	Designation	Name	Vehicle/Type	Capability/Mission	Command Level
Group 5 • < 1,000 lbs • < 15,000 ft		• HAF/USN RQ-66 Global Hawk/BAH-63 Global Hawk	RQ-66	HSA/MSA (ISR)	AFACC/ACC Theater
		• HAF RQ-68 Global Hawk	RQ-68	HSA/MSA	AFACC/ACC Theater
		• HAF RQ-69 Reaper	RQ-69	HSA/MSA	AFACC/ACC Theater
Group 4 • < 1,000 lbs • < 15,000 ft		• HAF MQ-38 Predator	MQ-38	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-39 Shadow	MQ-39	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-40 Global Hawk	MQ-40	HSA/MSA/STARS/FP	AFACC/ACC Theater
Group 3 • < 1,000 lbs • < 15,000 ft		• HAF MQ-9 Reaper	MQ-9	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-15 Predator	MQ-15	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-16 Predator	MQ-16	HSA/MSA/STARS/FP	AFACC/ACC Theater
Group 2 • < 1,000 lbs • < 15,000 ft		• HAF MQ-17 Predator	MQ-17	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-18 Predator	MQ-18	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-19 Predator	MQ-19	HSA/MSA/STARS/FP	AFACC/ACC Theater
Group 1 • < 1,000 lbs • < 15,000 ft		• HAF MQ-20 Predator	MQ-20	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-21 Predator	MQ-21	HSA/MSA/STARS/FP	AFACC/ACC Theater
		• HAF MQ-22 Predator	MQ-22	HSA/MSA/STARS/FP	AFACC/ACC Theater

WHY THE UAS INDUSTRY?



It's an Economic Development Dream:

- Emerging Industry, Evolving Technology
- High Tech, High-Paying Jobs
- Recruitment, Expansion and Startup Opportunities
- Heavy VC and Angel Investment
- Very Limited Competition

ENDLESS APPLICATIONS




Climate Research	Industrial Logistics	Disaster Response
Firefighting	Pollution Monitoring	Search & Rescue
Flood Monitoring	Storm Research	Volcanic Research
Crop Survey	HAZMAT Detection	Pipeline Monitoring
Mining	Asset Monitoring	Filmmaking
Aerial Photography	Event Security	Aerial News Coverage
Real-estate	Port Security	Wildlife Monitoring
Communications	Construction	Forensic Photography
Border Security	Cargo	Power line Surveying
Infrastructure Monitoring	Broadcasting	Damage Assessment


POTENTIAL ECONOMIC IMPACT


- **UAS - fastest growing segment of aerospace industry**
- **AUVSI 2013 Economic Report Forecast:**
 - **\$13.6B** first (3) years of U.S. airspace integration
 - **\$82.1B** between 2015 and 2025
- **OR Economic Impact Projected**
 - >120 Oregon companies currently
 - Consider Hood River (Insitu, Cloud Cap, etc.)
 - **1,400 new jobs** projected
 - **\$120m** payroll
 - **\$225m** impact total

(Source: OSU Economic Assessment for FAA Proposal)



- Only 3 Approved UAS Ranges in OR
- Widely Diverse Terrain
- Low population/Low Air Traffic






THE NEWEST NATURAL RESOURCE - ABSOLUTELY NOTHING!

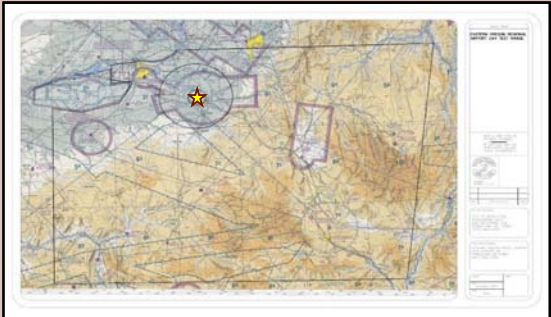




Pendleton UAS Range

(14,000 Sq/Miles)





When Do You Need a Range?



If you want to fly complex missions:


- Higher
- Faster
- Larger than 55-lbs.
- Night Ops
- BVLOS (Beyond Visual Line of Sight)
- Simultaneous Ops
- Type Certification




Quadcopter w/gimbal camera

Critical Components:

Range Manager- Darryl Abling




US Air Force
Rockwell International
Northrop Grumman (29 years-Retired)


Major Projects:

- B-1B Bomber – Flight Test
- B-2 Bomber - Avionics Test Engineer
- MQ-8A/B/C Fire Scout Flight Test Manager
- X-47B System Test Manager


Over 15 years in UAS Flight Test
Private Pilot




B-2




MQ-8C




X-47B



RV-6A



B-1B



Rutan Varieze

Pendleton UAS Range (PUR)



UAS Research Plan that has been developed to achieve integration of UAS into the National Airspace System (NAS):

1. Operations over People
2. Expanded Operations (includes EVLOS and BVLOS)
3. Non-Segregated Operations
4. Small Cargo/Passenger

Challenges to accomplish these integration milestones:

1. Population & Critical Infrastructure Overflight
2. Air Traffic Congestion
3. Airspace Class
4. Airworthiness
5. Speed/Weight
6. Line of Sight
7. Altitude



Multi-spectral sensor

Pendleton UAS Range (PUR)



Mission Statement:

Support **research and development efforts** to facilitate **integration of UAS into the National Airspace System (NAS)** by operating the premier UAS test range on the West Coast, providing our clientele the safest, most user-friendly and most diverse flight test environments available.

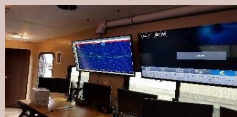


AGBot

CRITICAL COMPONENTS



MOBILE MISSION CONTROL



MOBILE TRACKING RADAR

Mission Control & Innovation Center





HQ: 12,000 sf Office & Warehouse



VR Lab



Fixed Mission Control/Training Center




3D Printing





Connectivity --

- 10 GB per Second-Looped Service
- Uninterruptible Power Supply

Pendleton UAS Range - Operations Areas, on Airport







Operations Areas, Off-Airport





Google Earth



Arcturus T-20

- Multiple operations areas to support a variety of user needs
 - Terrain, elevation, etc.
- Land use agreements
- Insurance
- Landowner compensated

PRIORITY #1: SAFETY OF FLIGHT



- On Site Range Manager & Safety Officer
- Full Range Operations Manual
- Special FAA Permissions (COA's) to operate
- All Missions Vetted with Univ. of Alaska Fairbanks
- Independent Flight Safety Review Board (ISRB)
- All Parties Must Be Fully Insured
- Airport Ops Require Airfield Training
 - Operators in Constant Contact with ATC Tower

HOW A RANGE MAKES MONEY?



INFRASTRUCTURE & SUPPORT SERVICES

- Rent UAS Test Pads
- Rent Remote Launch & Recovery Sites
- UAS Experienced Staff Time
- Safety Support Services
- Mobile Command Center
- Fixed Command Center
- Misc. Support Equipment
- Lease Space: Office, Hangars, and Workshop
- Innovation Center

ASSETS/FEATURES

- High # of VFR Days
- Big, Under-utilized Airport
- Very Little Air Traffic
- Very Little Ground Cover
- Low Population
- Skilled, Available Workforce
- Big Range with Biological, Climatic, Geographic Diversity
- Accessible & Convenient
- UAS Friendly Community

Who's Using The Range?



- Project Vahaha (California & Virginia)
- Digital Harvest (VA/Oregon)
- Yamaha Motor Corporation (California/Japan)
- Pacific Northwest National Laboratories (Washington)
- NASC (Pennsylvania)
- PAE ISR (Virginia)
- Arcturus UAV (California)
- Trillium (Oregon)
- Umatilla Co Sheriff's Office
- Numerous companies under NDA



Bumblebee

Expanding Opportunities



NAVMAR Applied Sciences Corporation (NASC)



ArcticShark



TEROS

NASC Manufactures a variety of unmanned aircraft. Recently, NASC relocated their flight testing of ARCTICSHARK to Pendleton. ARCTICSHARK is a fixed-wing, 650 lb UAS designed for atmospheric research in Alaska. The aircraft carries a variety of sensors and can stay aloft for 8 hours.

The Jetson's—Coming Soon!



- **Project Vahana: The Future of Urban Mobility**
 - A³ by Airbus / Modern Technology Solutions, Inc. (MTSI)
 - Autonomous, Electric VTOL air-taxi
 - Animation: <https://vimeo.com/218066461>

ECONOMIC IMPACT: JOBS, DEVELOPMENT & COMMERCE



DIRECT

- Labor
- Range Use Fees
- Leases-
 - Office
 - Workshop
 - Hangars
- Mobile Mission Control
- Fixed Mission Control
- Support Equipment
- Chase Planes/Pilots
- Radar Truck

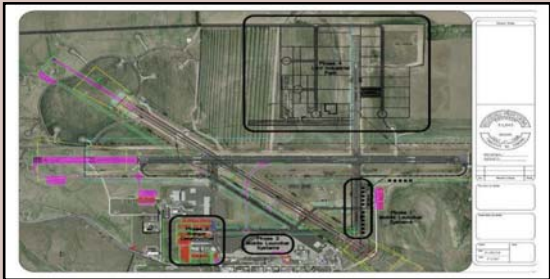
2017 Estimated Revenue: \$200k

INDIRECT

- Man Hours: 10,846 hrs (2017)
- Lodging
- Restaurants/Catering
- Rental Cars
- Air Service
- Fuelers
- Hardware
- Shipping
- Shopping

2017 Estimated Impact: Over \$1million

Pendleton UAS range – Future Vision



Questions?
