Agenda Item 2

UMD Unmanned Aircraft System (UAS) Test Site Briefing

UNIVERSITY SYSTEM of MARYLAND

BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION
INFORMATION OR DISCUSSION

TOPIC: UMD Unmanned Aircraft System (UAS) Test Site Briefing – Matt Scassaro, Director (information item)

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: March 30, 2017

SUMMARY: Unmanned and Autonomous Vehicles are becoming more prevalent with applications in a variety of industries, including hazardous environment navigation for DoD and natural disasters, utility repair work, medical supply delivery farming, and more. UMD is on the forefront of working with these technologies. The UAS Test site offers researchers, students, government, and industry access to extensive resources and pools of expertise in every aspect of UAS research.

ALTERNATIVE(S): This item is for information purposes.

FISCAL IMPACT: This item is for information purposes.

CHANCELLOR'S RECOMMENDATION: This item is for information purposes.

COMMITTEE RECOMMENDATION: DATE:

BOARD ACTION: DATE:

SUBMITTED BY: Tom Sadowski (410) 576-5742 / Suresh Balakrishnan (301) 445-2783

UAS in Maryland

University System of Maryland

March 30th, 2017

University of Maryland 18 56

UAS TEST SITE

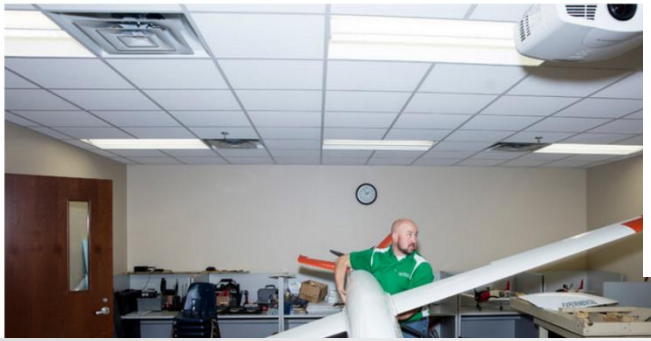
$30 MILLION AIRFIELD FOR DRONE HUB IN NEW YORK

Airstrip and 50-mile flight traffic center to be built in Onondaga County

November 14, 2016

A Silicon Valley for Drones, in North Dakota

By QUENTIN HARDY DEC. 25, 2015



January 6, 2017

LAS VEGAS SUN

THE SUNDAY | NEWS | VEGAS INC | OPINION | SPORTS | POLITICS | ENTERTAINMENT

Sports betting | UNLV sports | Gaming | Education | NHL in Las Vegas | Smith's World | HS Football

0 Comments

Drone-testing range coming to Henderson

It's a competition

Dayton Daily News • NEWS • SPORTS • BUSINESS • COMMUNITY • LIFE • ENTERTAINMENT

AFRL, Ohio to invest $5M in drone technology at Springfield airport

Matt Sanctis - Staff Writer

6:00 a.m. Thursday, Oct. 27, 2016 | Filed in Local

Air Force Research Laboratory headquarters at Wright-Patterson Air Force Base. TY GREENLEES / STAFF

AUGUST 2, 2016 | Albany, NY

Governor Cuomo Announces $5 Million Investment to Grow Unmanned Aerial Systems Industry in Upstate New York

ECONOMIC DEVELOPMENT

HIGH PLAINS/MIDWEST AG JOURNAL

Livestock | Crops | Machinery | Markets | Family | Classifieds | Opinion | Hay | Special Projects | Outdoors | Weather | Blogs

$975,000 grant will help scientists employ UAVs to improve wheat breeding

By Pat Melgares, K-State Research and Extension Dec 30, 2016 0

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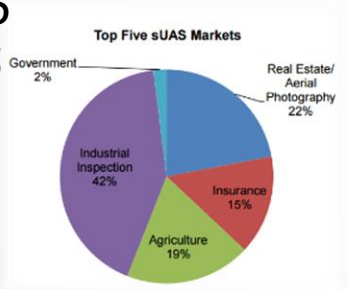
UAS Research in Maryland

- ***Research*** is a centerpiece of economic development and a catalyst for both innovation and entrepreneurship
  - Ties directly into USM goals statewide to create companies and jobs
- UAS is a new economy on the brink of breakthrough leaps
  - Economic impact of UAS nationally >$82.1B 2015-2025
    - 34,000 manufacturing jobs; total job creation 103,776 by 2025
  - **Maryland** 2015-2025 = $2.017B economic impact, $15.85M in taxes and 2,549 high-paying jobs



- Challenges – regulation and technology
  - **Regulation** – Integration into the manned national airspace system – **SB370,** 1 of 2 pro-UAS bills *in the nation*
  - **Technology** – traffic management, sense and avoid, cybersecurity, applications technology
- **UMD UAS Test Site – nationally recognized UAS research facility**

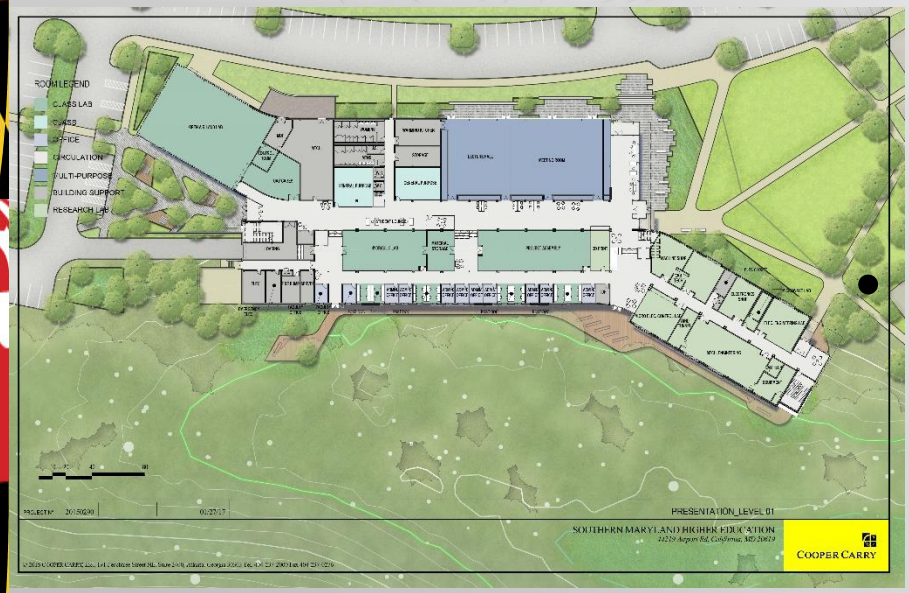
- **Government**
  - **FAA**
  - **NASA**
  - **NOAA**
  - **Navy**
  - **DHS**
  - **Local/state public safety**
- **Industry**
  - **Lockheed-Martin**
  - **Google**
  - **Textron**
  - **Numerous regional companies**
- **Academia**
  - **UMD and other USM institutions**
  - **Johns Hopkins**
  - **GWU**
  - **USNA**

UMD UAS Test Site

- Operational flight research site
  - First research flight 05 December 2014
  - UMD airworthiness process
  - Expanded FAA flight authorizations
  - ~30 research projects executing/in development
  - >45 vehicles
- Collaborative effort
  - UMD/academia/government/industry

UAS TEST SITE

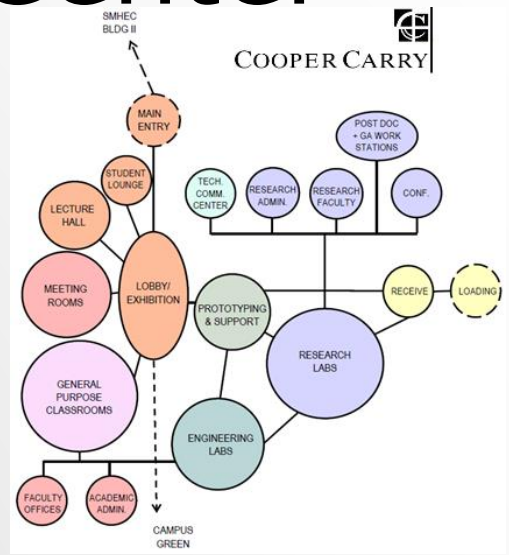
SMHEC campus



- Buildings I and II
  - Continued SMHEC programs
- **Building III**
  - USM built, co-use (SMHEC/UMD)
  - Classroom/lab expansion
  - Autonomous technologies research
- Possibilities
  - Outdoor test track
  - Buildings IV, V

Building III - Autonomous Technology Research Center

- Research into ***all*** domains autonomous technologies
- Attract world-wide talent
  - Partners from academia, industry and government



- Build off of UMD existing capabilities, **partner with Navy**
- Transition from basic to applied research
- Complete 2020

UAS TEST SITE

What is it *really* all about?
Requirements-based UAS R&D

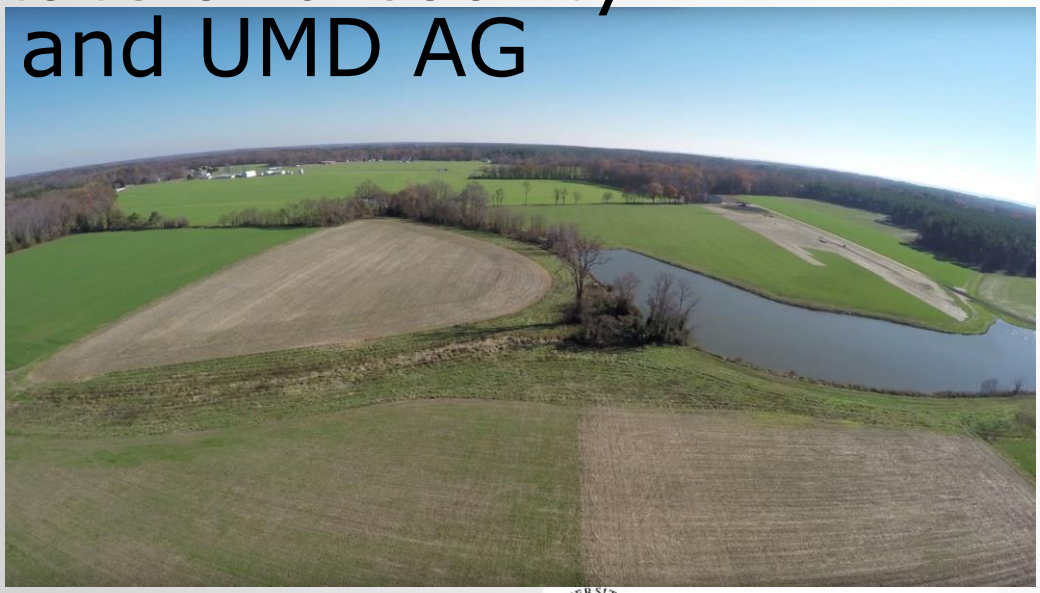
- What Does FAA Need to Support Integration Rulemaking?
- What Does the Industry/Government/ Academia Customer Need?
- What Does the UAS User Community Need to Enable Safe and Cost-Effective Applications?
- **Solve** the challenges
- **Get** and **focus** the resources

Funded projects

- DARPA High-Assurance Cyber Military Systems (HACMS)
- Airport Intrusion Counter-UAS - DHS, CACI
  - *First civil UAS in Class C airspace*, Atlantic City Airport
- Lockheed NEXT – Tiger team of young scientists
- **NOAA GOES-R (plus) – 5 year project; $750K/annual**
- **Navy Tigershark** – Navy and non-Navy
  - Support = $75K/annual; **Flight activity = $1M/annual**
- NSWC Panama City – unmanned surface/subsurface vessels – all domain – resident researchers
- GWU/USNA – at-sea wake measurement
- MD State Police and other public safety
- UMD researchers
  - Agriculture - MNLGA
  - Path planning - NAWCAD
  - Belize – Anthropology – 5 year NSF project

Agriculture / Aquaculture

- Ongoing projects with several customers
- Multi-spectral images/data to impact productivity and environmental aspects
- Partnering with state and county extension offices and UMD AG



Public Safety

- Working with EMS on a variety of applications
- Limited only by imagination
- Great public outreach
- On team with MEMA and MSP to rewrite ESF-9 state SAR manual
  - Include air ops and UAS

Maryland Independent

Established 1872 Friday, January 15, 2016 ■ 75¢ Charles County, Maryland

Animal shelter future in the air after meeting

Officials agree to fix HVAC unit

By MICHAEL SYKES II
msykes@somdnews.com

After a historic meeting on Tuesday in Prince Frederick in which the county commissioners from Charles, Calvert and St. Mary's Counties met to discuss the future of the Tri-County Animal Shelter, things are still in flux.

The commissioners did make progress by deciding to come back with a solution for fixing the shelter's ailing HVAC system within a month and they have also committed to determining what each jurisdiction wants its future with the shelter to be by the end of April.

Still, not everyone was satisfied.

Michelle Quigley, a local veterinarian in Charles County who attended the meeting, said the commissioners did not make any significant progress in fixing the larger issues at the current shelter and making it into the best facility it can be at the moment.

According to a shelter evaluation by Humane Society Management

See SHELTER Page A4

Charles County EMS performs first drone test on Cobb Island

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NASA UTM

- UAS Traffic Management System
  - Part of six test site national campaign
  - First flights 19 April 2016
    - 22 aircraft up nation-wide
    - Additional projects flown at same time
      - Network control of UAS

  - Future tasks to be flown
    - BLOS
    - Network control
    - Cybersecurity

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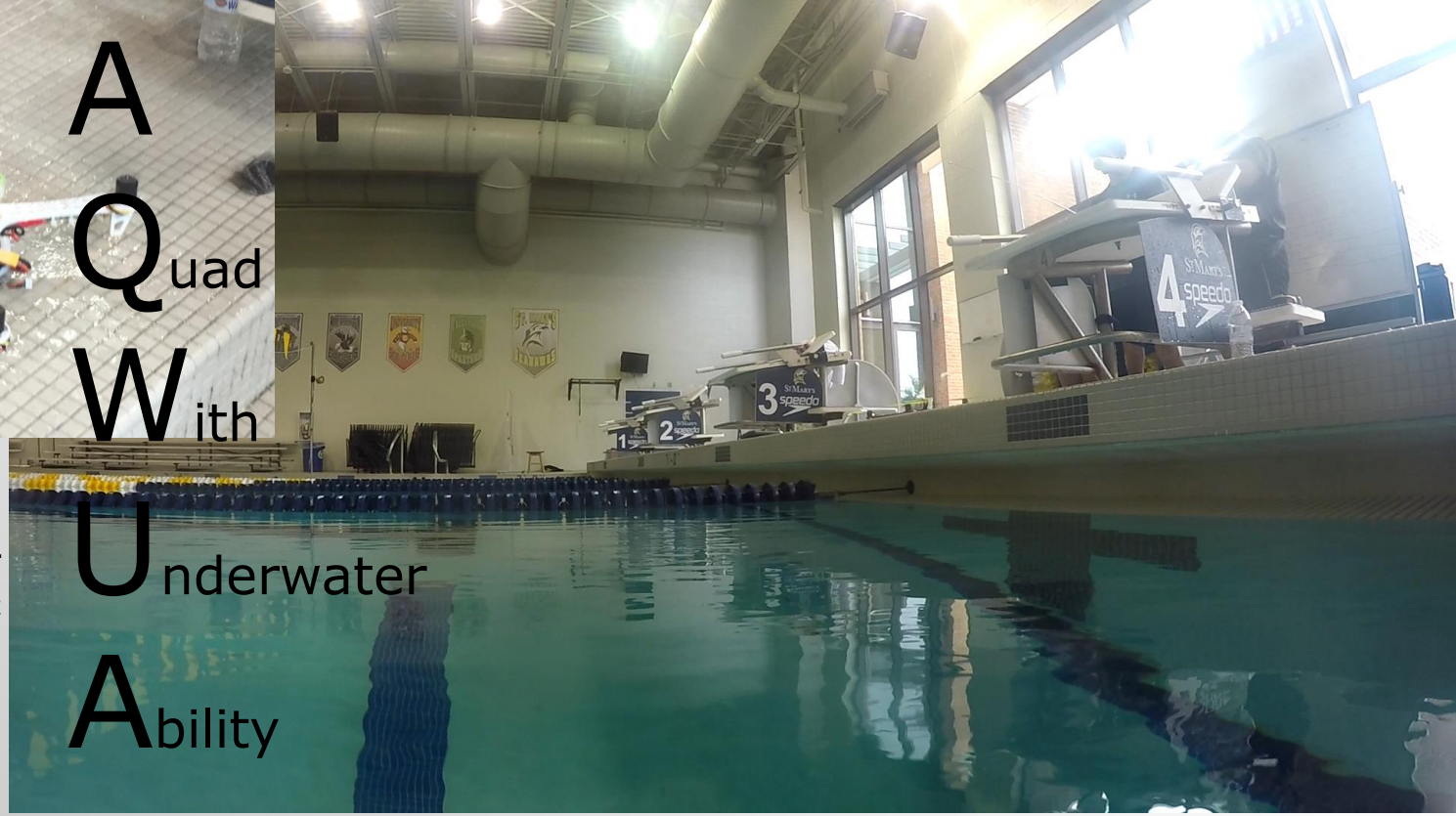
Belize Anthropology Project

- Sean Downey, Anthropology/GIS project looking at foliage, "swidden" and effects on culture
- Flying in Belize over 5 year period, *sensitive project*
- Just mapped 10,000 acres of rainforest

UAS TEST SITE

AQUA

Quad With Underwater Ability

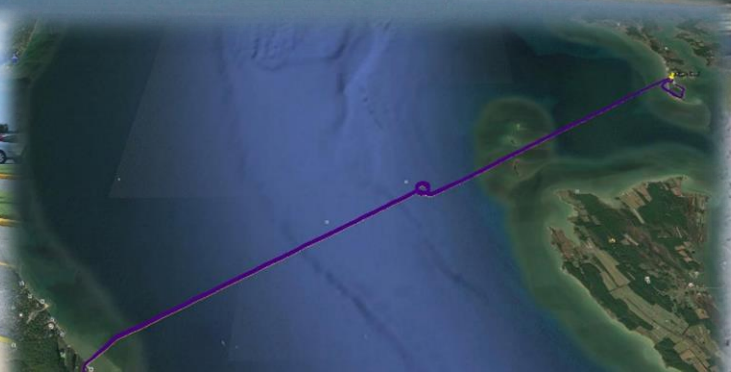


- Weight(including battery):1226.7g
- Diagonal Size: 50 cm
- Max Flight Time: Approx. 15 minutes
- Radio Frequency: 72MHz
- Full Manual Control—No self-level
- Motors: 1400KV
- Propellers: 8 inch diameter
- Dimensions(cm): 36x36x13
- Battery: 5100mAH, 11.1 V Lithium Polymer

- Brian Kelley (h/w, Aero) and Ryan Wong (s/w, EE) under Imraan Faruque
- Design, build and fly/swim a UAS/UUV
- Continuing work

Lifeline across the Bay

- 1st flight of civil/ commercial UAS across the Chesapeake
- 1st Cargo/Medical package delivery in Maryland
- Autonomous flight with human-on-the-loop handoff
- Worked with Calvert/ Dorchester Counties, UMD Shore Regional Medical Center



Big activities / targets

- Navy
  - Non-program of record Group 1-3
  - Software & algorithms
  - NAWCAD BAA - PIA
- NOAA
  - GOES-R
  - Environmental sensing
- Disaster response / Cargo
  - FEMA/MEMA
  - Medical community
- Technologies
  - BVLOS/BLOS
  - SAA
  - Counter-UAS
  - Payloads/sensors of all types
  - Collaborative control
  - Cargo
- Working with non-air domains

Some of our research partners in government, academia, & industry

takeaways

- Requirement-based R&D
- Strengthening relationships
- Exercising leadership roles

FEARLESS FLIGHT

UAS TEST SITE