Aviation is Everywhere

Integrating Aviation Content
in Core Curriculum

Second Annual AOPA High School Aviation STEM Symposium
Museum of Flight - Raisbeck Aviation High School

Scott McComb and Marcie Wombold

Aviation is Everywhere

1. About RAHS

2. About us

3. Why we do it

Bring real-world challenges into everyday classrooms

Project-based learning

1: introduction

2: planning, developing, and scheduling

3: managing the project

4: communication and presentation

5: assessment

Two contexts:

Science: Virtual Flight Test

Humanities: How To Make The Public Love Drones

Virtual Flight Test

Opportunities from aviation:

- Economic development
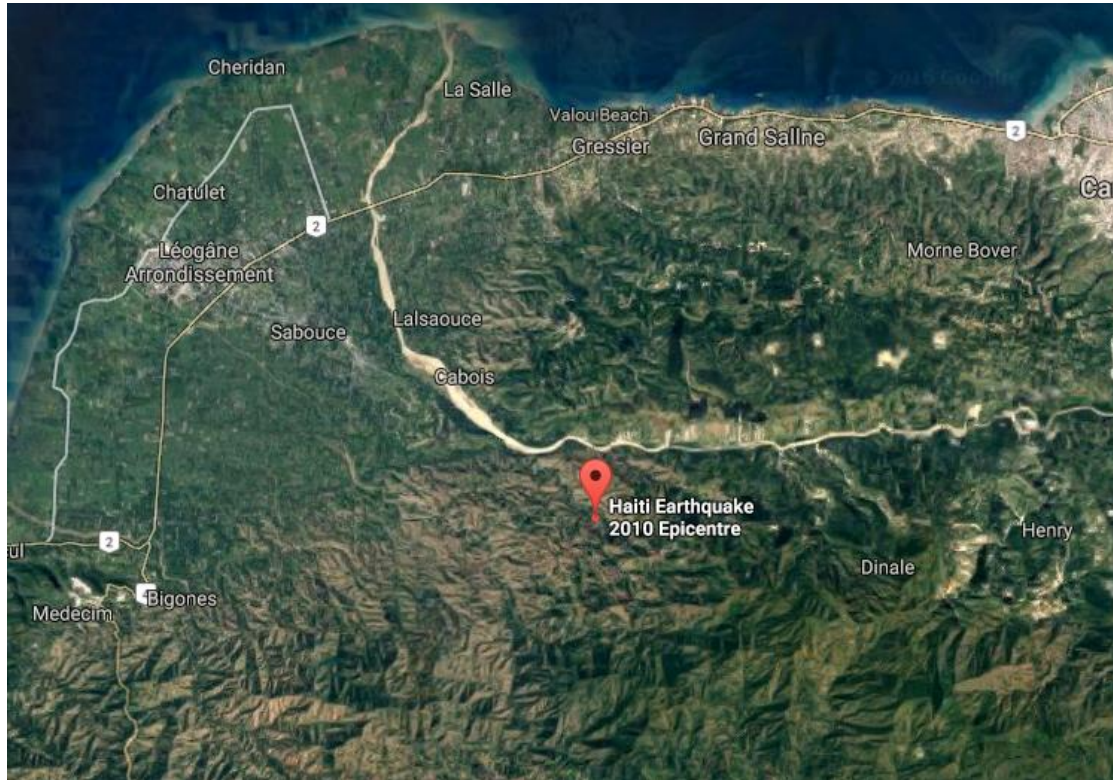- Humanitarian response
- Military intervention

Each is critically limited by the length of the runway.

Pitch

Virtual Flight Test

Hook

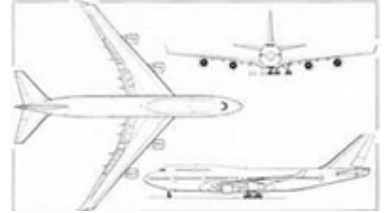# Virtual Flight Test

Hook

Virtual Flight Test

Hook

Virtual Flight Test
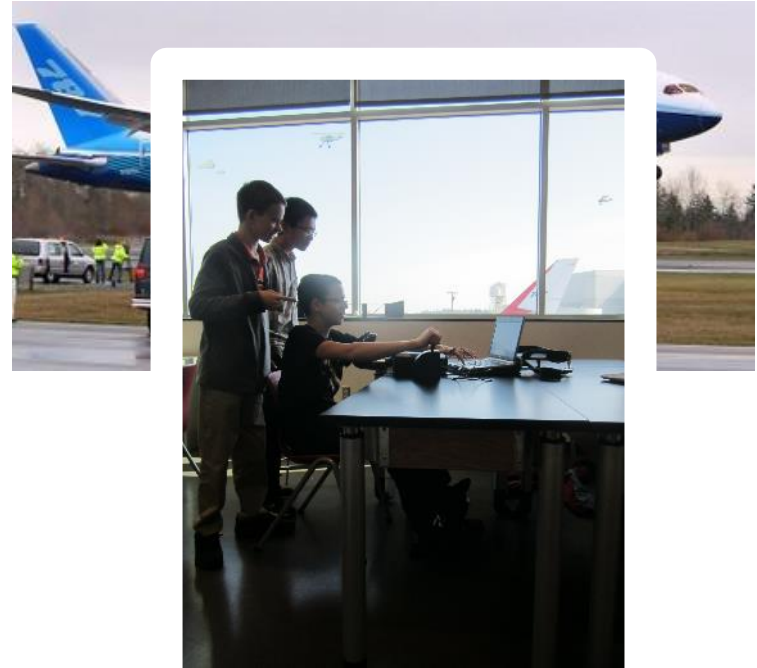
To answer these questions,

students will need to:

- Create and fly flight test plans
- Modify planes
- Make recommendations to pilots, flight test engineers, and planners.

Task

Virtual Flight Test

Planning

1. Brainstorming project ideas

2. Select most promising possibility

3. Envision goal

4. Establish process

5. Build a scaffold

Virtual Flight Test

Managing the project

Ensure satisfactory progress towards goals

- "Typical" teacher tools for helping students acquire new skills and knowledge

- Project manager tools

Naming conventions for student data logs

Student data logs, color-coded by pilot

Tracking team progress

Virtual Flight Test

Presentation

Preparing students

Preparing outside experts

Wednesday, 1 Jun
Session 1: 0900 - 1040

judge	judge	location	room	interview 1 0905 - 0930	interview 2 0935 - 1000	interview 3 1005 - 1030		Flight Test Group	
								01.1	Harhi, Nurzhanov, Taylor, Kryman

Presented by _____ Period _____ Date _____

Presented to _____ Occupation _____

Organization _____

PHYSICAL SCIENCE & PHYSICS OF FLIGHT
FLIGHT TEST PROJECT RUBRIC

Category	Exemplary	Thorough & Complete	Developing	Novice	Missing	Comments
Test planning: identifies variables, outlines testing procedure, etc.	④	③	②	①	⓪	
Test Results: reflects the data; identifies anomalous data	④	③	②	①	⓪	
Analysis: provides physics-based explanation for results	④	③	②	①	⓪	
Distance calculations: explains how distance calculations were computed	④	③	②	①	⓪	
Overall presentation quality	④	③	②	①	⓪	
Overall test report quality	④	③	②	①	⓪	

Other comments _____
_____
_____
_____

Virtual Flight Test

Assessment

Knowledge
- **Laws of motion**
- **Kinematics**
- **Vectors**

Skills
- **Data management**
- **Consistency**
- **Modeling**

Foundations for success
- **Teamwork**
- **Time management**
- **Communication**

Virtual Flight Test

Next steps

Extensions

Revision to challenge

Connection to flight training, internships

How To Make The Public Love Drones

Pitch

FAA UAS Operational Test Sites (August 2014)

North Dakota Department of Commerce

Currently Operational

Griffiss International Airport (NY)

State of Nevada

Virginia Polytechnic Institute & State University

University of Alaska

Texas A&M University Corpus Christi

FEBRUARY 11, 2013

Petition Mania! / Israel's Oprah / Test Anxiety Solved

TIME

RISE OF THE

DRONES

They are America's global fighting machines.
What happens when they're unleashed at home?
BY LEV GROSSMAN

www.time.com

How To Make The Public Love Drones

Hook

A real problem

For a real audience

How To Make The Public Love Drones

Planning

1) **Research Methods**

2) **Economic Sectors**

3) **Marketing Basics**

4) **Industry Terminology**

Project Description

Working in small teams of 3-4, students will research, create and present to the Federal Aviation Administration a plan to promote Unmanned Aerial Systems integration to the public at large.

Step One: *Research and identify/select the economic sector you believe will see the largest positive impact from the UAS integration. i.e. Agriculture, Conservation, Disaster Response, etc.*

  A. Explain and Defend your decision
    Why do you believe this sector will impress the public at large?
      - How are you defining "public at large"
  B. Explain and Defend your decision making model
    Did you use a matrix to compare the different sectors? or expert opinions? Or your gut?
    Why was that the best decision making model?
  C. Explain and defend the change you believe the sector will see.
    Showing your research will be important here!
    Was it data or anecdotal evidence that you found most impressive?

Step Two: *Research and identify/select the social, political and/or economic factor you believe is limiting total buy-in for UAS integration.*
        i.e. Privacy concerns, Military Applications, Fear of collision, Job loss, etc.

  A. Explain and Defend your decision
    Why do you believe this issues is of greatest concern to the public at large?
  B. Explain and Defend your decision making model
    Did you use a matrix to compare the different sectors? or expert opinions? Or your gut?
      A survey?
    Why was that the best decision making model?

Step Three: *Create a plan - and products - for the FAA to promote the positive impact of UAS Integration to the public at large.*

  A. Determine which media will have the largest impact on the public at large.
    i.e. Print ads, Television ads, Social networking, YouTube, etc.
    Why is this media the best method for the FAA to use?
      - How do you measure impact?
  B. Create promotional message language/slogan/catch phrase for the FAA to use to promote the UAS integration to the public at large.
    How does this message address the concerns of the public at large?
    How does this message inspire the public to consider UAS in a new, positive way?
  C. Design and construct a professional mock-up/sample of your message as it would appear in the medium you are promoting.

How To Make The Public Love Drones

Managing the project

1) Research Methods

How do we get good data?

How do we understand the data?

How do we share that information?

Percent of Americans Who Used a Source for Their News

The Percent Source of News Split by Topic

Americans' Go-To Reporting Sources Depend on the News Topic

Topic	% 24-Hour TV News	% Local TV News Station	% Unspecified TV Station	% Newspapers	% Specialty
Foreign or international issues	31	3	14	13	0
National government and politics	28	7	18	14	0
Social issues	24	10	11	10	0
Business and the economy	21	10	10	15	9
Crime and public safety	12	40	13	17	0
Traffic and weather	1	32	9	3	27
Health and medicine	9	12	12	8	2
Environment and natural disasters	18	12	23	10	3
Your local town or city	1	30	9	37	0
Art and culture	2	6	6	28	7
Schools and education	7	20	11	21	0
Sports	3	18	13	10	38
Entertainment and celebrities	2	8	10	4	22
Science and technology	9	5	6	9	10
Lifestyle topics	3	2	7	13	14

How To Make The Public Love Drones

Managing the project

1) **Research Methods**

2) **Economy Sectors**

What are economic sectors?

How do we identify economic indicators and trends?

How do we measure impact?

How To Make The Public Love Drones

Managing the project

1) **Research Methods**

2) **Economic Sectors**

3) **Marketing Basics**

How does "marketing" work?

How are marketing decisions made?

How do we influence behavior?

How To Make The Public Love Drones

Managing the project

1) **Research Methods**

2) **Economy Sectors**

3) **Marketing Basics**

4) **Industry Terminology**

QUADCOPTER V/S DRONE

How To Make The Public Love Drones

Managing the project

- Teams were tasked with recommendation a course of action to the FAA

  - 6 small teams

- Take what they had learned and apply it to the problem

  - Develop a possible solution

How To Make The Public Love Drones

Why We Chose Privacy

What is Your Primary Concern for Drone Use In Today's World?
Source: Student Survey

Government Transparency: 16.0
Privacy Concern: 17.0
Fourth Admendment: 9.0
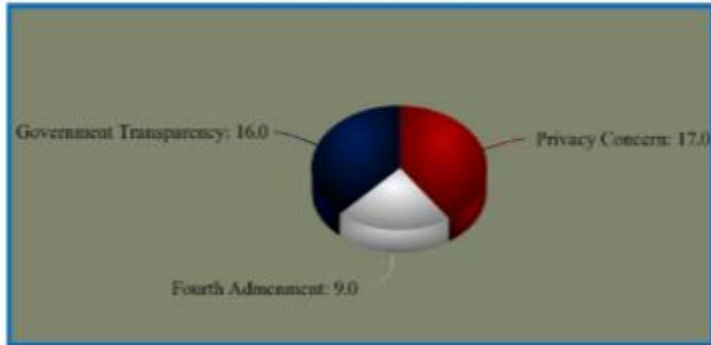
■ Privacy Concern ■ Fourth Admenment ■ Government Transparency
meta-chart.com

What is Your Primary Concern for Drone Use In Today's World?
Source: Public Survey

Fourth Admendment: 14.0
Privacy Concern: 24.0
Government Transparency: 14.0
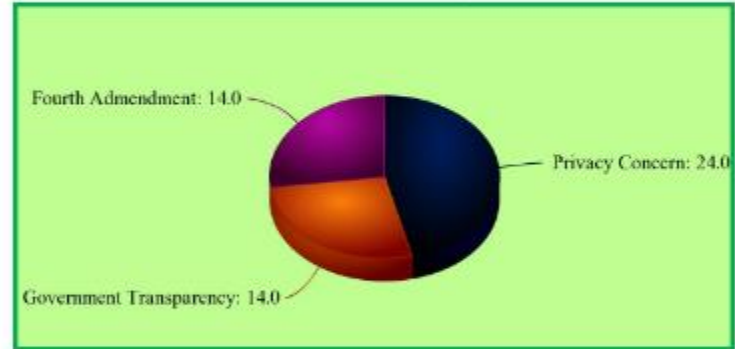
■ Privacy Concern ■ Government Transparency ■ Fourth Admendment
meta-chart.com

How To Make The Public Love Drones

Reasons Why the Public Resists Unmanned Aerial Systems

Fears	Mostly Uninformed
• Preconceived Ideas • Privacy • Safety	• Not their biggest concern • Not aware of UAS potential • Opportunity to educate

How To Make The Public Love Drones

Impact of Drones on the Film Industry

- Film industry is worth $31 billion
- Cost of UAS: $6,000 to $28,000 flat rate
  - Plane/helicopter: $5,000 to $10,000 hourly
- 6 film companies have permission for UAS use
  - (Aerial Mob, Astraeus Aerial, HeliVideo Productions, Pictorvision, Snaproll Media and Vortex Aerial)
- More money going into our economy instead of other countries

How To Make The Public Love Drones

THE FUTURE OF FARMING

Farmers no longer need to buy gas to work their fields

How To Make The Public Love Drones

SHE DOESN'T HAVE TO BE HERE

RAHS WORKING IN PART WITH THE FAA TO PROMOTE SAFE AND RESPONSIBLE DRONE USE.

How To Make The Public Love Drones

Feedback from the people who had presented information to them!

Presentation

SLIDE 6 IS A PROBLEM

Tuesday Presentation
- Make the data slides clearer
  - Where did that data come from
    - If survey: how many people
  - What exactly are they showing/ what is the point of showing them
- Chang main title to objective of presentation
- Talk about the survey earlier
- Consider addressing
  - The pro of environmental improvement
  - Safety concerns
  - Political issues
- Everyone looks at it from the own point of view
  - The POV of the FAA is that they want to know the advertising they're paying for is going to be palatable for the public and make audience think they are doing their job to ensure their safety

How To Make The Public Love Drones

Teams gave formal presentations to the FAA at their office

6 Teams. 1 Winning Proposal.

Assessment

Take-away

Project-based learning transforms teachers into project managers, and invigorates students learning.

Aviation is a rich field for finding authentic problems in every discipline.

If you're a teacher, reach out; if you're not, get involved.

Consider....

Who are some logical partners in your community?

What might be an interesting problem relevant to your students and your community?