NOISE OUTREACH

Project 8

Project manager: Rick G. Riley, Bao Tong FAA
Lead investigator: Kathleen K. Hodgdon Penn State ARL

5th Advisory Committee Meeting
April 2016

ASCENT
AVIATION SUSTAINABILITY CENTER

Linkage to AEE Roadmap

Why is the work being done?

To Provide Noise Mitigation in the form of Outreach and Education

This effort falls under P1: Improved Scientific Knowledge and Integrated Modeling in the NextGen 5 Pillar Environmental Approach.

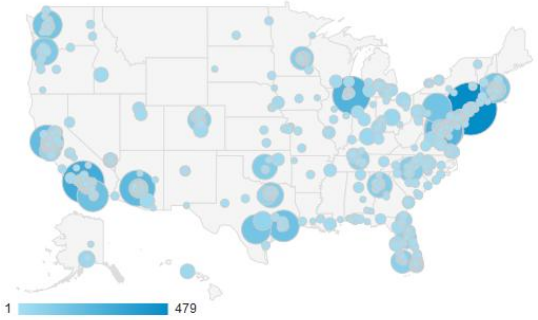
It provides aviation noise information and educational content to help mitigate the fact that noise remains a predominant aviation environmental concern of the public.

Goal of the Project

What is the expected outcome?

NoiseQuest is a resource that can be used to implement global education and outreach on aviation noise topics. It was designed is to enhance knowledge, raise awareness and address aviation noise related issues through information that is presented in a meaningful context and is accessible to the general public.

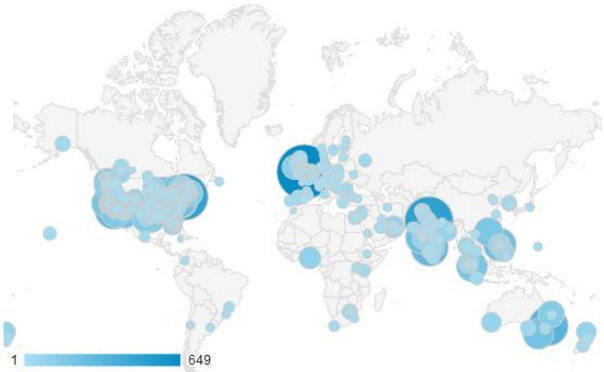
Recent Accomplishments



NQ Usage 2015

15229 NQ Sessions in US

28446 Global Sessions



Top 10 Cities In US	Sessions	Pages/ Session
New York	479 (3.15%)	2.27
Los Angeles	296 (1.94%)	2.62
Washington	270 (1.77%)	3.02
(not set)	269 (1.77%)	1.64
Chicago	256 (1.68%)	2.00
Alexandria	240 (1.58%)	2.10
Phoenix	219 (1.44%)	2.15
San Francisco	198 (1.30%)	1.75
Houston	188 (1.23%)	1.65
San Diego	170 (1.12%)	2.49

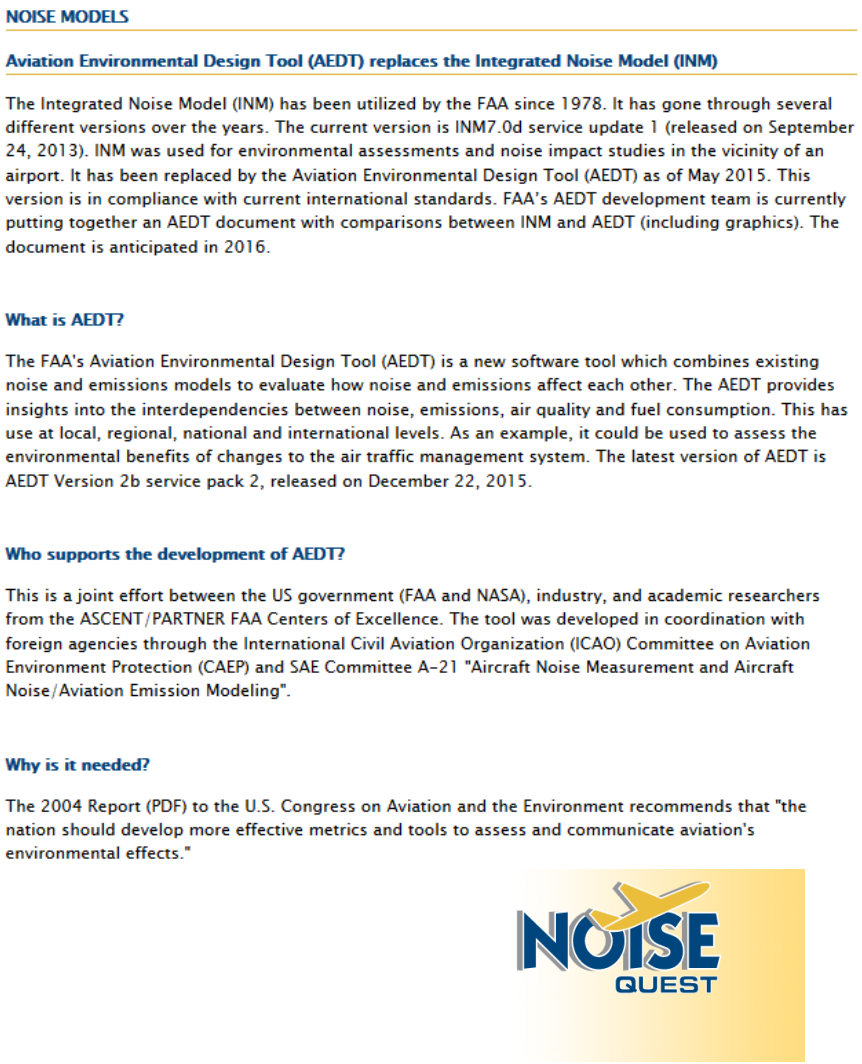
Sessions in 2015 by Country	28,446 % of Total: 100.00% (28,446)
1. United States	15,229 (53.54%)
2. United Kingdom	2,168 (7.62%)
3. India	2,025 (7.12%)
4. Canada	1,294 (4.55%)
5. Australia	934 (3.28%)
6. Philippines	670 (2.36%)
7. Kenya	312 (1.10%)
8. Singapore	291 (1.02%)
9. Malaysia	277 (0.97%)
10. Netherlands	263 (0.92%)

- A global resource for both airports and communities
- Provides information on aviation noise, metrics and models, and resources

Recent Accomplishments

Site Content Revised! New Content Added!

- About Airports
  - Air Traffic Control
- Noise Basics
  - Metrics and Models
    - AEDT
  - FAA CFR
- Sources of Noise
- Noise Effects and Mitigation
  - Mitigation
    - Optimized Profile Descent
  - National Parks
- Community Tools
  - NQ Explorer
- Spotlight on Noise



NOISE MODELS

Aviation Environmental Design Tool (AEDT) replaces the Integrated Noise Model (INM)

The Integrated Noise Model (INM) has been utilized by the FAA since 1978. It has gone through several different versions over the years. The current version is INM7.0d service update 1 (released on September 24, 2013). INM was used for environmental assessments and noise impact studies in the vicinity of an airport. It has been replaced by the Aviation Environmental Design Tool (AEDT) as of May 2015. This version is in compliance with current international standards. FAA's AEDT development team is currently putting together an AEDT document with comparisons between INM and AEDT (including graphics). The document is anticipated in 2016.

What is AEDT?

The FAA's Aviation Environmental Design Tool (AEDT) is a new software tool which combines existing noise and emissions models to evaluate how noise and emissions affect each other. The AEDT provides insights into the interdependencies between noise, emissions, air quality and fuel consumption. This has use at local, regional, national and international levels. As an example, it could be used to assess the environmental benefits of changes to the air traffic management system. The latest version of AEDT is AEDT Version 2b service pack 2, released on December 22, 2015.

Who supports the development of AEDT?

This is a joint effort between the US government (FAA and NASA), industry, and academic researchers from the ASCENT/PARTNER FAA Centers of Excellence. The tool was developed in coordination with foreign agencies through the International Civil Aviation Organization (ICAO) Committee on Aviation Environment Protection (CAEP) and SAE Committee A-21 "Aircraft Noise Measurement and Aircraft Noise/Aviation Emission Modeling".

Why is it needed?

The 2004 Report (PDF) to the U.S. Congress on Aviation and the Environment recommends that "the nation should develop more effective metrics and tools to assess and communicate aviation's environmental effects."

NOISE QUEST

Next Steps

- Expand content areas
  - Performance Based Navigation
  - Historical Noise Contours
  - Supersonic Low Boom
  - AEDT Graphics
  - NQ Explorer Noise Contours
- Enhance site features
  - Upgrade version of ArcGIS Server NQ Explorer
  - Address changes to the Google Application Program Interface
  - Evaluate options to improve site navigation for mobile phone usage

Contributors

Thanks to NoiseQuest Site Review Contributors!!

FAA AEE Noise Outreach Managers: Becky Cointin, Rick G. Riley, Bao Tong
FAA AEE: Christopher J. Sequeira, Katherine Andrus, Stephen J. Merlin

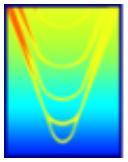
Outreach University Team Members
Penn State Applied Research Laboratory: Team Lead Kathleen K. Hodgdon
Penn State Institute for Energy and the Environment: Maurie Caitlin Kelly
Penn State Earth & Environment Institute: Bernd Haupt

Outreach Advisory Committee Members
Gulfstream Aerospace Corporation: Robbie Cowart
Port of Portland Sr. Noise Analyst: Jason Schwartz
Volpe Transportation Systems Center: Eric Boeker, Juliet Page

Plan for next set of slides
Add WSPRRR team and Final presentation date here with NASA sponsors

ADD Subtle approach concept slide

Waveforms Sonic boom Perception and Response Risk Reduction (WSPRRR) Conceptual Plan for Community Field Test



Applied Physical Sciences

PennState Applied Research Laboratory

Volpe

Gulfstream
A GENERAL DYNAMICS COMPANY

wyle laboratories

Gaugler Associates

EAGLE AERONAUTICS, INC.
Engineering the Future

WSPRRR Conceptual Outreach Approach presented to NASA review team on 3/23/16

Competition Sensitive

The WSPRRR plans to initiate a more subtle Outreach approach prior to the first community test, with a media based outreach effort after each Regional field test has been completed. This approach advocates maintaining a low profile initially to avoid large media coverage and the introduction of bias.

The test objective is to gather data to support regulatory review, and the proposed design considers the potential impact of media coverage on our data gathering process and how our findings are viewed. Positive media coverage could bias respondents, and could also be misconstrued as an attempt by our team to bias research participants to respond more positively. Negative media coverage could bias our respondents, and could result in potential community based objections that could delay the flight test. As such, we are delaying full media coverage until after the test. The information provided initially will consist of research test based content.

WSPRRR Outreach Conceptual Overview

Multi-Community Outreach Approach

- Utilize Outreach team with diverse agency membership
- Implement an in depth educational outreach plan executed across multiple communities
  - » Provide access to information and interactive learning experiences
  - » Foster public acceptance through education and understanding
- Develop informational content designed to enhance knowledge, raise awareness
- Use FAA sponsored NoiseQuest for web based content on Outreach
- Develop STEM materials available as downloadable content from NoiseQuest
- Provide information on supersonic low boom related research
  - » Provide readily accessible information in PLAIN language approach
  - » Target 8th to 10th grade reading level
  - » Share advanced technology and underlying concepts
  - » Acknowledge challenges
  - » Inspire students and travelers to imagine the future
- Implement multi-method delivery approach
  - » Web enabled: Use FAA NoiseQuest for web based outreach (www.noisequest.psu.edu)
  - » Direct communication: Develop Presentations/posters
  - » Interactive training: Use simulator for auditory familiarization/hands on education
    - Low boom is on order of distant thunder or two car door slams
    - Encourage participants to hear range of booms in simulator

Prior site development of NoiseQuest supported by FAA PARTNER/ASCENT COE

WSPRRR Community Outreach Approach

Outreach Approach for each Community

Conduct community based Outreach
Implement Outreach in LBFD test communities
National Outreach campaign is beyond the scope of this effort

Community Based Outreach Plan

- Form Outreach team with diverse agency membership such as;
  - » WSPRR: Kathy Hodgdon, Juliet Page, Bob Hunte, Matt Collmar, Kevin Bradley
  - » NASA/DOT representatives from Supersonics, Outreach and public affairs offices (TBD)
  - » FAA: Rick Riley, Sandy Liu, Becky Cointin (FAA Outreach and Supersonics teams)
- Implement Outreach approach for test community based efforts
  - » Utilize similar methods/materials
  - » As possible present specific content for individual communities
- Identify additional community specific outreach opportunities
- Prepare materials for open public discussion of purpose of low boom field test
- Identify News Media outlets (if any):Printed, TV, Radio, Web-based, newsletters
  - » Media release may be delayed until after the test and treated as Outreach

WSPRRR Pre-Test Community Engagement

Pre-Field Test Community Engagement Approach: Field test based information

- For each field test community assess community infrastructure
- Identify and work with leaders in local government, community organizations
- Identify research test based message content, determine potential information release options

- Require English speaking participants (Multi-lingual option requires increased scope and funds)
- Notify emergency responders (in case off design booms prompt concern from residents)

State Representatives	Prominent Community Representatives	Others Possible Outreach
State Governor – Executive Branch	Community elected or appointed leader for Local Government (Commissioner, County, City)	Colleges and Universities including community colleges,
State Department of the Environment (or equivalent) with environmental protection oversight	Health Department Representative	Local Media outlets including News Stations, Radio, State, Regional and town newspapers and online publications
State Department of Education overseeing public schools.	First Responders / Safety Headquarters Community Liaison	School system board of education public liaison and Science Department Chair
State Department of Health (or equivalent) overseeing and regulating health-related issues	Police Headquarters/ Commissioner Community Liaison or Public Safety Officer for relevant Bureaus	Local Museums or Science Centers Outreach / Education Office or Department
State Legislative Branch – Senators and Delegates for the Prominent Communities		Airports, Heliports and Hobbyist Flight fields (radio controlled aircraft)
		Libraries and Community Centers and Meeting Locations

New noise source: Orientation

What does a low boom sound like?

Respondent Orientation Strategies

- Provide context in survey consent and instructions
- Low boom is on order of distant thunder or two car door slams (in succession)
- Include written *description* in survey instructions and informed consent
- Information provided to *all* respondents

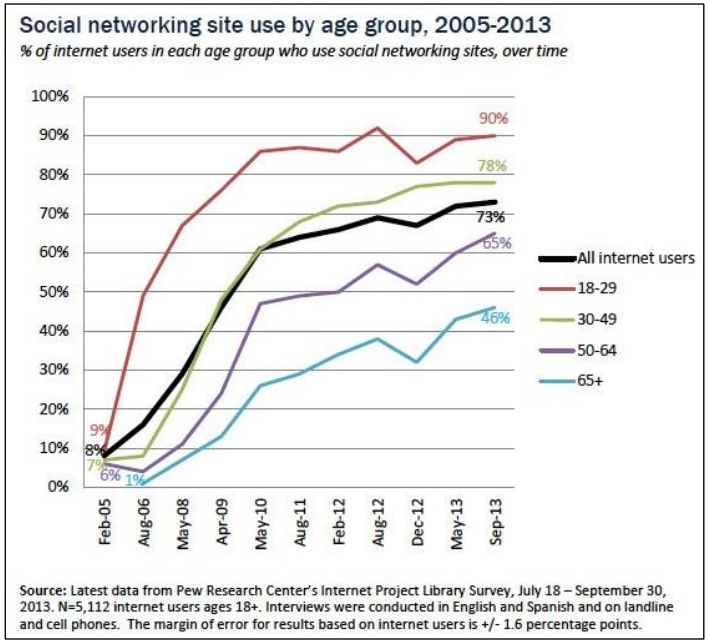
- Conduct Low profile Simulator Days
- Use simulator to *familiarize respondents on sound character* of low booms
- Low boom is on order of distant thunder or two car door slams
- Encourage participants to hear full range of booms in simulator
- Keep *record of which respondents* heard the range of booms in the simulator

- Implement Social Media Monitoring Strategies for general community response
- General observation of on-line posts and community dynamics regarding noise
- Use Social media monitoring to observe community dynamics during test
- Intended for public domain information only and *not viewed as response data*

Leverage FAA ASCENT PSU Social Media Effort

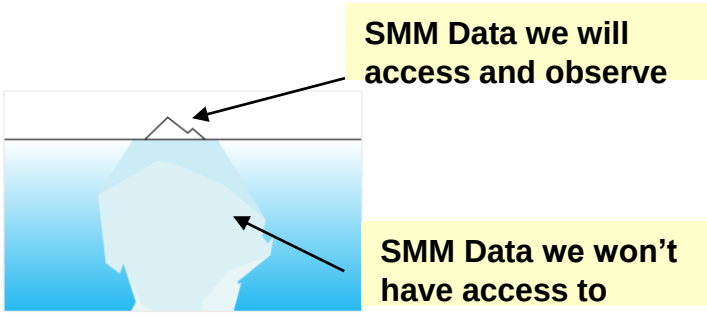
New Noise Source: Social Media Monitoring

Contingency Plan to identify and address viral negative social media



SMM is a soft sensor to observe community dynamics
Population-centric media: Facebook, Twitter, Instagram
Geographic based topic specific search of social media
Search dependent on users with location feature on

Used to identify viral negative media in community
Press releases will be ready to address negative media



Notional data access diagram

Trend Observation Only: Social media sites have population sampling biases

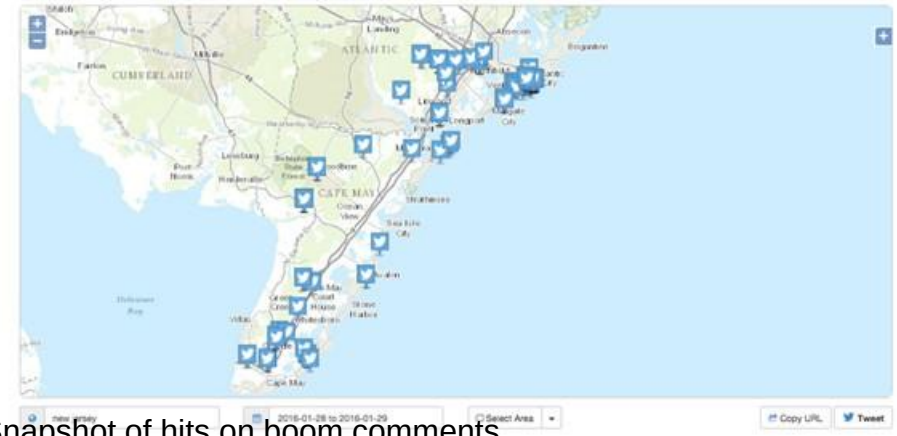
- •Example: Instagram: Typically adults between the ages of 18 and 29 (age specific participation)
- •Some "people" are: professional writers, PR for corporations, or can be bought

•Social media sites use proprietary algorithms to create or filter their data streams

- •Twitter data sources are filtered by Twitter affording about 7% of the data

SMM Concept Development supported by FAA ASCENT COE

Contingency Plans: Social Media Monitoring



Snapshot of hits on boom comments

Using freeware (limited) version of Echosec (https://www.echosec.net/)

SMM of sonic boom event in New Jersey 1/28/16 Snapshot on SMM for F-35 sonic boom “mistaken for earthquake” What did social media show?

Sample post

- Pre-Test: Assess local noise attitudes via social media monitoring. Is there a noise issue?
- Test Period: Assess community response and dynamics
  - If issues observed, address concerns with a proactive press release
  - Affords prompt action to contain any potential viral negative media
- Post-Test: Monitor area for community comments during period with press releases
  - Issue post-test news release to address concerns observed on social media
  - Use observations to enhance communications and outreach in future tests

- Monitor areas under carpet where we may not have noise monitors or formal respondents
- Provide insight into a reaction to a boom impact that we didn’t anticipate

SMM Concept Development supported by FAA ASCENT COE

Content Development Approach

Plain Language

The Plain Writing Act of 2010 (the Act) (Public Law 111-274), calls for writing that is clear, concise, and well-organized. See: http://www.plainlanguage.gov/

Plain language presents complex concepts in simple terms

- Use highlighted words
- Bulleted lists
- Meaningful subheadings
- The inverted pyramid style
  - » begin with a question
  - » give the conclusion
  - » follow with the details in bullets and lists

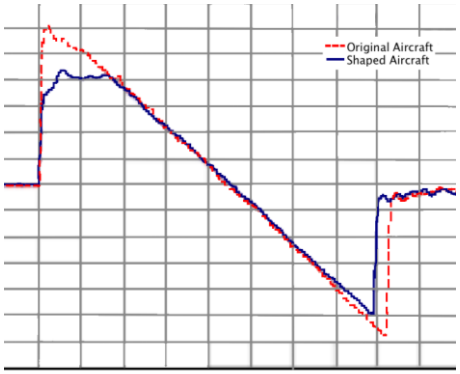
The Readability Statistics feature available in the MS Word spell check option can be used to evaluate the reading level of each topic area

Content Development Approach

Content Development Approach:
Content will be presented in a variety of formats in easy to read language

- Written content would be associated with informative images
- Content would be initially written using technical language to ensure accuracy, and then edited to simplify the reading level.
- A reading level of 8th to 10th grade will be targeted to match the national reading level
- Some content may not lend itself readily to a 10th grade reading level. Accuracy would be maintained, and the content would be simplified as much as possible.
- Relevant video links would be identified to provide multi-media learning opportunities

Ongoing LBFD vehicle research

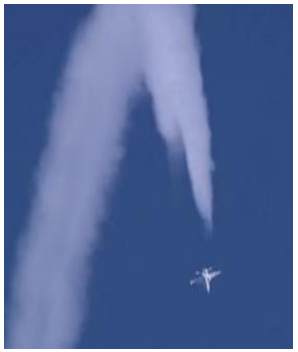


SSBD low boom prior research

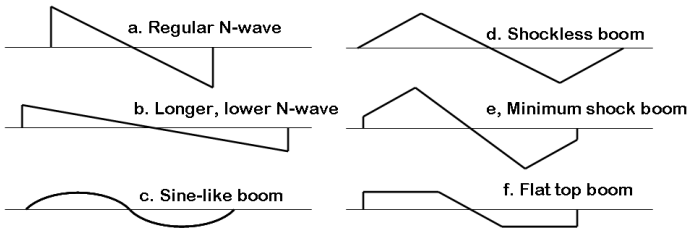
Potential Content Ideas

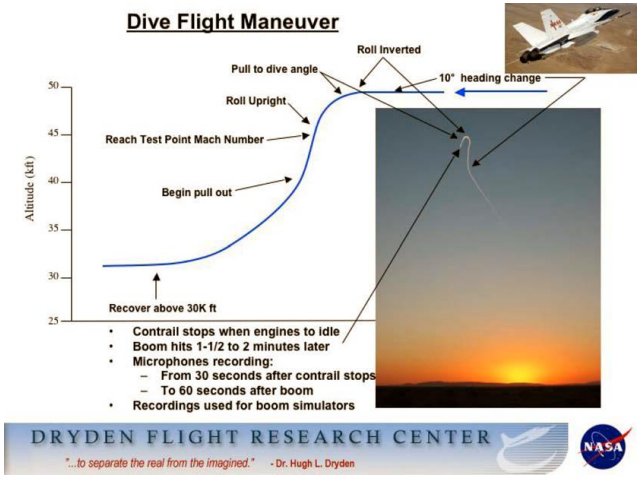
To prompt interest, content can begin with a Question:

Why should we have supersonic flight?
What is a sonic boom?
What is a low boom?
How does the noise travel?
What testing has been done?
How is a low boom supersonic flight vehicle different from a regular aircraft?



Content would cover a range of topics:
Basic concepts of N-waves and sonic booms
Historical perspective of low boom research
Shaped sonic boom demonstrators (SSBD)
Past findings such as WSPR pilot project





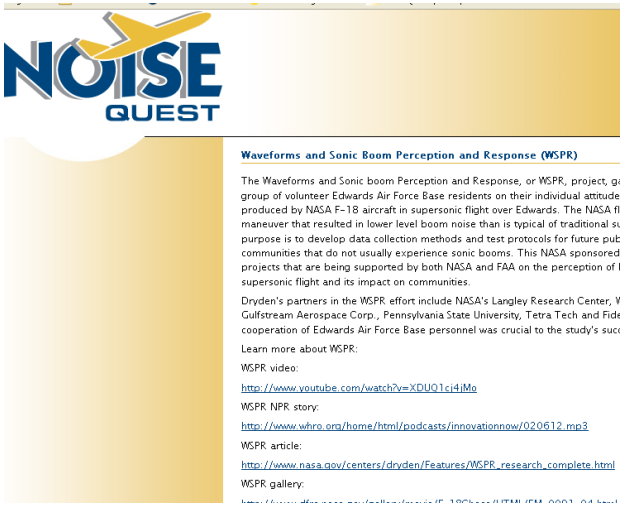
Outreach Vision

Imagine the future
Inspire future generations of students and travelers
Share advanced technology and underlying concepts
Acknowledge challenges

Multiple modes of presentation and interactions
STEM educational outreach efforts

- Web-based education
- Public meetings
- Media based
  - » Traditional/Social Media
- Written publications
- Flyers/Handouts/Pamphlets/Newsletters

Utilize existing FAA and NASA web based Outreach resources



References

Fienberg, Howard, 2015. "New U.S. Restrictions on Telephone Research Prompt Risk Management Debate: Do the New TCPA Rules Mean You Should Junk Your Autodialer?" Marketingresearch.org. 3 Aug. From: http://www.marketingresearch.org/article/new-us-restrictions-telephone-research-prompt-risk-management-debate-do-new-tcpa-rules-mean accessed 06 Mar 2016.

Messer, Benjamin L. & Don A. Dillman. 2011. “Surveying the general public over the Internet using addressed-based sampling and mail contact procedures.” Public Opinion Quarterly, 75(3):429-57.

"Social Networking Fact Sheet." Pew Research Center Internet Science Tech RSS. N.p., 27 Dec. 2013. Web. 11 Mar. 2016. <http://www.pewinternet.org/fact-sheets/social-networking-fact-sheet/>.

TCPA Omnibus Declaratory Ruling and Order." Federal Communications Commission. FCC-15-72, 10 Jul. 2015. n.d. Web. https://www.fcc.gov/document/tcpa-omnibus-declaratory-ruling-and-order.

“Using Social Media For Large Behavioral Studies Is Fast and Cheap, But Fraught With Biases and Distortion” Carnegie Mellon New, Byron Spice , 12/1/14. http://www.cmu.edu/news/stories/archives/2014/december/december1_socialmediadatabiased.html

WSPRRR Leveraging Team Resources

PSU FAA ASCENT

The PSU FAA ASCENT Supersonics and Outreach team are supported through the ASCENT COE working with FAA AEE Noise Division Manager Becky Cointin, and program managers Sandy Liu and Rick Riley.

Leveraged support from PSU FAA ASCENT and PSU SFS funded by NSF and DHS

Mitch Gold is a PSU student on the FAA ASCENT Supersonics Social Medial Monitoring team. He is supported through the Federal Cyber Corps Scholarship for Service (SFS) program, which is offered and funded through the National Science Foundation (NSF) and the Department of Homeland Security (DHS). The PSU SFS program is administered through the College of Information Science and Technology and the Applied Research Lab.

PSU Survey Research Center (SRC)

The PSU SRC WSPRRR members include Diana Crom, Brian Sonak and Tina Hoy.