Learning Objectives

1. Discuss the diverse careers that are available in the aviation industry

2. Describe the activities that may be used to engage students of all ages and with varied interests

3. Describe the characteristics of high school and community college aviation programs and their efforts to prepare the next generation of aviation professionals

4. Identify how airports can develop partnerships with high schools and community colleges
American Association of Airport Executives (AAAE)

1.0 Continuing Education Units (CEUs) are available to Accredited Airport Executives (A.A.E.)

Report your CEUs: www.aaae.org/ceu
Jennifer Maples, A.A.E.
City of Phoenix Aviation Department

Q 24 Years at PHX
Q Aviation Superintendent - Facilities
Q ACRP 01-34 Panel Chair; Panelist for 08-02
Q Immediate Past President - Southwest Chapter of AAAE
Q Past President - Arizona Airports Association
Q Accredited Airport Executive since 2007
Q Former Regional Examiner for the AAAE Board of Examiners
Five Ways to Get Involved!

1. Join the ACRP IdeaHub community
2. Volunteer for a project panel
3. Prepare a research proposal
4. Answer an ACRP survey
5. Apply the research results

Visit us online: www.trb.org/ACRP
Today's Speakers

Stephanie Ward, Mead & Hunt, Inc., and Mike McHugh, North Dakota Aeronautics Commission

Presenting

ACRP Report 202: Developing Innovative Strategies for Aviation Education and Participation

Daniel Prather, DPrather Aviation Solutions

Presenting

ACRP Synthesis 103: Promoting Aviation Career Education in High Schools and Community Colleges
Stephanie Ward, AICP

By the Numbers

 35 yrs - Involved in aviation
  ▪ Licensed pilot at 17
 29 yrs - Aviation planner
 21 yrs - Senior Planner & Department Manager w/Mead & Hunt
 20 ACRP Projects
 200+ projects across 22 states

 Passionate about getting the next generation of aviation professionals engaged in our industry
ACRP Report 202 Project Team

Mead & Hunt (Prime)
- Stephanie Ward, AICP
- Courtney Beard
- Sondra Retzlaff

Woolpert, Inc.
- Maria Muia, Ph.D.

Dubuque-Snyder Aviation Consulting
- Paul Snyder
- Leslie Martin

Kim Kenville Consulting
- Kim Kenville, Ph.D., C.M.

Gordon Consulting Group, Inc.
- Dave Gordon
ACRP Report 202 Project Panel

- Jennifer Maples, Chair, City of Phoenix Aviation Dept.
- Lorena de Rodriquez, SSi, Inc.
- Ken Gibson, Project Takeoff
- James Stephens, South Carolina Aeronautics Commission
- Dr. Sherwood Williams, US Air Force Auxiliary (CAP)
- Dr. Donna Wilt, Florida Institute of Technology
- Dr. Michael Hovan, FAA
- Alex Gertsen, NBAA
- Adam Williams, AOPA
- Christine Gerencher, TRB
- Joseph Navarrete, ACRP
Crisis in the Aviation Industry

U.S. Carriers Face Shrinking Pool of Pilots

Senate Aviation Workforce Bill Addresses Technician Shortage

Air Force Doesn’t Have Enough Drone Pilots or Sensor Operators, GAO Says
The Air Force is facing an alarming shortage of pilots and sensor operators needed to fly its remotely piloted aircraft, the Government Accountability Office said in a report released Thursday.

Delta Air Lines Announces Flight Cuts – Cites Shortage of Pilots

Cargo Airlines face pilot shortages
Focus on the 10- through 25-year old age group

Develop and implement strategies for promoting aviation as:

- A career
- For business
- Extracurricular activity
- Sport
- Recreation
Careers in the Aviation Industry

It isn’t just about being a pilot – it’s about ALL the aviation careers and the various employers.
Careers in the Aviation Industry

**Expose students to the diversity that exists in our industry.**

<table>
<thead>
<tr>
<th>Examples of Aviation Career Options by Employer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLIGHT</strong></td>
</tr>
<tr>
<td>Certified Flight Instructor</td>
</tr>
<tr>
<td>Pilot</td>
</tr>
<tr>
<td>Unmanned Aircraft Systems Operators</td>
</tr>
<tr>
<td><strong>CONTROL</strong></td>
</tr>
<tr>
<td>Air Traffic Control Specialist</td>
</tr>
<tr>
<td>Airway Transportation System Specialist</td>
</tr>
<tr>
<td><strong>MANAGE</strong></td>
</tr>
<tr>
<td>Administrative Manager</td>
</tr>
<tr>
<td>Airport Director and Manager</td>
</tr>
<tr>
<td>Airline Station Manager</td>
</tr>
<tr>
<td>Fixed Base Operator Manager</td>
</tr>
<tr>
<td>Logistics Manager</td>
</tr>
<tr>
<td>Operations Research Analyst</td>
</tr>
<tr>
<td>Operations Supervisor</td>
</tr>
<tr>
<td>Program Managers</td>
</tr>
<tr>
<td>Technical Managers</td>
</tr>
<tr>
<td><strong>MAINTAIN</strong></td>
</tr>
<tr>
<td>Aircraft Mechanic</td>
</tr>
<tr>
<td>Aircraft Systems Assembler</td>
</tr>
<tr>
<td>Airport Maintenance</td>
</tr>
<tr>
<td>Avionics Technician</td>
</tr>
<tr>
<td><strong>DESIGN</strong></td>
</tr>
<tr>
<td>Aerospace Engineer</td>
</tr>
<tr>
<td>Civil Engineer</td>
</tr>
<tr>
<td>Electrical Engineer</td>
</tr>
<tr>
<td>Engineering Technician</td>
</tr>
<tr>
<td>Planner</td>
</tr>
<tr>
<td><strong>OPERATE</strong></td>
</tr>
<tr>
<td>Aircraft Fueler</td>
</tr>
<tr>
<td>Aircraft Rescue and Firefighting</td>
</tr>
<tr>
<td>Airport Operations Specialist</td>
</tr>
<tr>
<td>Airline Ground Agent</td>
</tr>
<tr>
<td>Airport Security Screener</td>
</tr>
<tr>
<td>Cargo Agent</td>
</tr>
<tr>
<td>Flight Attendant</td>
</tr>
<tr>
<td>Flight Dispatcher</td>
</tr>
<tr>
<td>Line Person</td>
</tr>
<tr>
<td>Ramp Service</td>
</tr>
</tbody>
</table>

The National Academies of Sciences, Engineering, and Medicine

TRB
Transportation Research Board

ACRP
Airport Cooperative Research Program
How do we get kids exposed to aviation?

- School
- Speakers
- Open houses
- Camps
- Classes
- Workshops
- Tours
- Flights
- Clubs
- Contests
- Internships
- Grants & Scholarships
Challenges and Opportunities

**Challenges Most Prevalent to the Least**

- Funding Sources
- Marketing
- Programming/Curriculum
  - Creation & Development Time
- Competing Interests for Kids
  - Transportation Issues
- Facilities/Space
- Finding Educators
  - Retention of Educators
- Administrative Issues
  - School Boards
  - Principles
  - Membership Costs
- Organizational Issues
  - Structure
  - Goals and Objectives
  - Members/Volunteers

**Opportunities Most Prevalent to the Least**

- Partnerships
  - National - Aviation Trade Groups, Federal Agencies, Department of Education
- Regional
  - Colleges and Universities
- State
  - Aeronautics Offices
  - State Departments of Education
- Local
  - Colleges and Universities
  - K-12 Schools
  - Airports
  - Flying Clubs
  - Kids Clubs
- Corporate/Industry Connections
- Funding Sources - Grants
- Non-Profit Status - 501c3
- Curriculum Standards
  - State Requirements, STEM, Science Standards
- Use Volunteers & Return Guests
Pathway to Establishing an Aviation Career Program

Examples of events, activities, and organizations that can/could be included in the pathway process:

**Awareness**
- Career Days at Schools
- STEM-Mobile
- Field Trips to Airports
- Museum Visits
- Young Eagle Flights

**Understanding**
- Civil Air Patrol
- Boy Scouts
- Explorer Unit
- Girl Scouts

**Education**
- High School Programs
- Technical High Schools
- Colleges & Universities
- STEM & Aviation Colleges
- Flight Schools

**Experience**
- Airlines
- Airports
- FBOs
- Corporate Flight Departments
- Consultants
- Federal/State Agencies
- Manufacturers
Pathway to Establishing an Aviation Career Program

1. Spark the Interest
   - Elementary School Activities
     - Camps & Activities through Museums, Organizations, and Groups

2. Continue the Interest
   - Middle School Activities
     - Camps & Activities through Museums, Organizations, and Groups

3. Pathway for a Career
   - High School Activities
     - School Curriculum
     - Aviation Focused High Schools
     - Scholarships
     - Camps & Activities through Museums, Organizations, and Groups

4. Find a Program
   - Post Secondary Educational & Training Programs
     - Training & Certification
     - Degree Programs
     - Internships
     - Volunteer Opportunities

5. Employed as an Aviation Professional
   - Flight
   - Control
   - Manage
   - Maintain
   - Design
   - Operate

6. Give Back to Aviation Organizations
   - Join Aviation Industry Groups and Clubs and Give Back to Local Aviation Educational Organizations to Educate the Next Generation
   - Contribute to Scholarships
   - Volunteer
Organizations Involved in Aviation

→ Example of 32 National Agencies involved in aviation education in some form
  ▪ Federal
    ○ (i.e. FAA, NASA)
  ▪ National Industry and Trade Organizations
    ○ (i.e. AAAE, AOPA, NAAA)
  ▪ National Youth Organizations
    ○ (i.e. 4-H, Project Lead the Way)
→ Countless State and Local Agencies
  ▪ Too many to catalog

→ Make the connections
Report 202 Provides Examples

100 Aviation Education Events cataloged in single page PDFs (Landing Pages)
Searchable PDF Feature
  ➤ Presorted Tables
  ➤ Bookmarked PDF
  ➤ Ctrl + F for Key Words
Considerations When Planning/Developing

Examples:
- Age
- Activities
- Duration
- Cost
- Staffing
- Venue
- Funding sources
- Equipment
- Insurance
- Food
- Marketing
- Restrooms
- Parking

Activity: Class/Workshop
Target Group: High
Title: Apple Valley High School Aviation Courses
Duration: >3 days
Emphasis: Science, Technology, Engineering, Math
Staff: FT
Venue: Classroom
Provider: School
Specialized Equipment: UAS
Cost/Person: Free
Funding Source: Grant
Participants: Medium
Established: 2017
Region: GL
Website: [https://stemavhs.com/](https://stemavhs.com/) [https://stemavhs.com/workshops-and-camps/](https://stemavhs.com/workshops-and-camps/)

Description of Activity:
The Apple Valley School District in Minnesota received a Department of Labor Grant, E3 STEM. With this grant, Christopher Lee has been creating a drone course. Throughout this course students will construct small and larger drones. Once built the students will have the opportunity to fly and then modify them. They will be exposed to the manufacturing, electronics and coding side of the drone industry in addition to just simply flying them.
Key Takeaways

→ Spark the interest
→ Showcase ALL the career opportunities
→ Do something – start small – scale to fit resources
→ Look for connectivity
→ Learn from others
Thank you!

Questions?
Contact me at stephanie.ward@meadhunt.com
ACRP Report 202 – Developing Innovative Strategies for Aviation Education and Participation

Reach for the Sky—Attracting New Aviation Career Professionals

Mike McHugh
ND Aeronautics Commission
Mike McHugh

Aviation Education Coordinator – ND Aeronautics Commission

17 years involved in aviation Education
  12 Yrs High School CTE
  5 Yrs – ND Aeronautics

Commercial Pilot

BBA Aviation Management

M. ED – Instructional Design and Technology

2015 A. Scott Crossfield National Aerospace Educator of the Year
ACRP Report 202 Key Takeaways

Q Set the Hook

Q Knowledge is easily accessible, experiences and relationships are not

Q Find your assets

Q No “one-size-fits-all” approach

“Encouraging students to experience and explore diverse opportunities within the aviation industry to drive their interests is key.”
Where to start

Q Where to start:

β Consider the local assets:
   β PEOPLE
   β Museum, Hangar, School, etc.

Q Logistics:

β Time

β Number of students
   ○ Others in the community?

β Venue
Considerations

Q. Consider the local assets:
- Airports
- Airlines
- UAS
- FBO
- Corporate Flight Departments
- Air-Med
- Engineering Consultants
- State and Federal agencies
- Manufacturing
- Maintenance/restoration
- ATC
- Support businesses
Types of activities

- Tours
- Guest Speakers
- Flights
- Job Shadows
- Other hands-on activities
- Contests

Consider school curriculum and standards
## Landing Pages Sorted by Activity (Pages 80–86)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Target Age Group</th>
<th>Title</th>
<th>Duration</th>
<th>Emphasis</th>
<th>Staff</th>
<th>Venue</th>
<th>Provider</th>
<th>Specialized Equipment</th>
<th>Cost/Person</th>
<th>Funding Source</th>
<th>Participants</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp</td>
<td>H</td>
<td>Academy of Model Aeronautics - Camp AMA</td>
<td>&gt;3 days, 1-3 days</td>
<td>STEM</td>
<td>FT</td>
<td>Museum</td>
<td>Museum</td>
<td>UAS</td>
<td>$$$</td>
<td>Tuition</td>
<td>S/M/L</td>
<td>GL</td>
</tr>
<tr>
<td>Camp</td>
<td>E/M/H</td>
<td>Air Zoo Camps</td>
<td>3-8 hours, 1-3 days</td>
<td>STEM</td>
<td>FT</td>
<td>Museum</td>
<td>Museum</td>
<td>$$$/$$$</td>
<td>Admission</td>
<td>S/M</td>
<td>GL</td>
<td></td>
</tr>
<tr>
<td>Camp</td>
<td>H</td>
<td>Auburn University Aviation Camp</td>
<td>&gt;3 days</td>
<td>STEM</td>
<td>V</td>
<td>Classroom/ Airport</td>
<td>University</td>
<td>Aircraft</td>
<td>$$$</td>
<td>Admission</td>
<td>M</td>
<td>SO</td>
</tr>
<tr>
<td>Camp</td>
<td>H</td>
<td>Aviation Museum of Kentucky Summer Camp</td>
<td>1-3 days</td>
<td>STEM</td>
<td>V</td>
<td>Museum</td>
<td>Museum</td>
<td>$$$</td>
<td>Admission</td>
<td>SO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camp</td>
<td>E/M</td>
<td>Bismarck Public School Career Academy Drone Summer Camp</td>
<td>1-3 days</td>
<td>STEM</td>
<td>FT</td>
<td>Classroom, Hangar</td>
<td>School</td>
<td>Computers, UAS</td>
<td>$</td>
<td>Grant</td>
<td>M</td>
<td>GL</td>
</tr>
<tr>
<td>Camp</td>
<td>M/H</td>
<td>Challenger Center Fischertechnik</td>
<td>3-8 hours</td>
<td>STEM</td>
<td>FT</td>
<td>Classroom, Laboratory</td>
<td>School</td>
<td>$$$</td>
<td>Admission</td>
<td>SO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Most Important!

- Set the Hook
- Be Enthusiastic!
- Develop relationships
- Create a Pathway
Thank you!

Mike McHugh
Contact:
mchugh@nd.gov
701-328-9653
ACRP Synthesis 103: Promoting Aviation Career Education in High Schools and Community Colleges

C. Daniel Prather, Ph.D., D.B.A., A.A.E., CAM
DPrather Aviation Solutions, LLC
C. Daniel Prather, Ph.D., D.B.A., A.A.E., CAM
Principal Investigator

- President, DPrather Aviation Solutions, LLC
- Professor of Aviation Science – California Baptist University
- Former Assistant Director of Operations – Tampa International Airport
- Instrument-rated private pilot
- Remote Pilot
- Accredited Airport Executive
- Certified Aviation Manager
ACRP Synthesis 103 Oversight Panel

Jeffrey D. Borowiec, Texas A&M Transportation Institute, College Station, TX
Traci Clark, Allegheny County Airport Authority, West Mifflin, PA
Sam Fischer, Florida State College at Jacksonville, Jacksonville, FL
Cindy Hasselbring, Aircraft Owners and Pilots Association, Frederick, MD
Mandy Haverdink, Allegheny County Airport Authority – Pittsburgh International Airport, Pittsburgh, PA
William Reinhardt, FAA Liaison
Qinya Pang, Airport Industry Liaison
ACRP Synthesis 103: Promoting Aviation Career Education in High Schools and Community Colleges

- Recognizes industry labor forecasts.
- Reviews STEM, STEAM, AVSED, and CTE.
- Reviews state of industry efforts to engage students and increase enrollments.
- Reviews efforts of high schools and community colleges to develop aviation pathways.
- Presents numerous case examples of successful partnerships between industry and education.
- Published 2019.
Introduction to Research Problem

- Lack of qualified talent, as evidenced by current and predicted labor shortages in aviation
- Diverse career paths in aviation
- Role of high schools and community colleges in preparing next generation of workers
- Need for airport industry to partner with educational institutions to influence the pipeline
Approach to Address the Problem

- Extensive review of available literature.
- Survey sent to 106 high schools and 105 community colleges with aviation programs.
  - HS: 81% response (59 responses)
  - CC: 84% response (61 responses)
- Phone interviews with select high schools, community colleges, and airports for development of case examples.
## Research Results

<table>
<thead>
<tr>
<th>Most Common Pathways</th>
<th>HS</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-wing flight</td>
<td>39%</td>
<td>61%</td>
</tr>
<tr>
<td>Unmanned systems (UAS)</td>
<td>29%</td>
<td>31%</td>
</tr>
<tr>
<td>Aircraft maintenance</td>
<td>14%</td>
<td>62%</td>
</tr>
</tbody>
</table>

- UAS is the most popular *future* program being considered by both HS (32%) and CC (23%).
- HS mostly rely on the AOPA STEM curriculum while CC mostly develop curriculum in-house.
Research Results

- 75% of HS and 54% of CC have at least one airport partnership in place.
- 54% of HS and 68% of CC believe that the majority of students are very aware of aviation career paths.
- Challenges in developing and maintaining an aviation program:
  - HS- Lack of financial resources, finding qualified teachers, and keeping students motivated
  - CC- Regulatory and VA compliance, funding, shortage of instructors, and educating college leadership to the unique challenges of aviation
Case Examples
Davis Aerospace and Maritime High School, Cleveland, OH

DAVIS STUDENTS AND FAMILIES:
We hope you are safe and healthy during the Coronavirus shutdown. [Click here for information] about our Distance Learning plan and other ways we can support you during the school closure period.

Welcome to Davis Aerospace & Maritime High School, located near the shores of Lake Erie in Cleveland, Ohio!
Denbigh High School Aviation Academy, Newport News, VA

What is the Aviation Academy magnet program?

Denbigh High School’s Aviation Academy is a nationally recognized STEM site with a focus on piloting, aircraft maintenance, engineering, and aviation security/safety. Our mission is to provide a quality education that will maximize the potential of every student by providing them with the knowledge, skills, experiences and values needed in the 21st Century workplace.

The Newport News School Division does not discriminate on the basis of race, color, national origin, sex, creed, marital status, age or disability in its programs, activities or employment practices as required by the Title VI, Title VII, Title IX, Section 504 and ADA regulations.

as of October 2019
Raisbeck Aviation High School, Tukwila, WA
Ross Shaw Sterling Aviation High School, Houston ISD, TX

STUDENTS RECEIVE PRIVATE PILOT’S LICENSE
Tampa Bay Regional Aeronautics Academy, Tampa, FL
East Valley Institute of Technology, Mesa, AZ
North Texas Aviation Education Initiative, North Texas
Clark County Department of Aviation Airport Internship, Las Vegas, NV
In-house aviation champion stimulates aviation programs.

Airports pursuing partnerships with high schools and community colleges will produce benefits for the industry. Partnerships may include tours, internships, guest speakers, curriculum development support, etc.

The airport can potentially influence city/county councils/commissions and community development boards, to stimulate interest and support for local high school and community college aviation programs.

Aviation student enrollment can be increased by airports engaging local K-12 students through airshows, airport tours, and school visits to stimulate student interest in aviation academic programs and careers.
Action Steps

- Reach out to local high schools and community colleges to begin a discussion about aviation labor challenges and career paths.
- Develop a multi-faceted outreach program (internships, tours, in-class presentations, airshows, etc.)
- Be a champion for the next generation!
FOR ADDITIONAL INFORMATION

C. Daniel Prather, Ph.D., D.B.A., A.A.E., CAM
Daniel@dprather.com
http://www.trb.org/Main/Blurbs/179963.aspx
Today’s Panelists
#TRBWebinar

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Mike McHugh, North Dakota Aeronautics Commission

Stephanie Ward, Mead & Hunt

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ACRP is an Industry-Driven Program

Q Managed by TRB and sponsored by the Federal Aviation Administration (FAA).

Q Seeks out the latest issues facing the airport industry.

Q Conducts research to find solutions.

Q Publishes and disseminates research results through free publications and webinars.
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Other Ways to Participate

Become an Ambassador. Ambassadors represent ACRP at events and conferences across the country!

Sponsor or become an ACRP Champion. The champion program is designed to help early- to mid-career, young professionals grow and excel within the airport industry.

Visit ACRP’s Impacts on Practice webpage to submit leads on how ACRP’s research is being applied at any airport.

Visit us online:
www.trb.org/ACRP
Other ACRP Research on Today's Topic

Report 22: Helping Airport and Air Carrier Employees Cope with Traumatic Events

Report 75: Airport Leadership Development Program

Report 186: Guidebook on Building Airport Workforce Capacity

Synthesis 40: Issues with Airport Organization and Reorganization

Synthesis 49: Helping New Maintenance Hires Adapt to the Airport Operating Environment

Web-only Document 28: Identifying and Evaluating Airport Workforce Requirements (Phase I and Phase II)

Visit us online:
www.trb.org/ACRP
Today’s Panelists
#TRBWebinar

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Mike McHugh, North Dakota Aeronautics Commission

Stephanie Ward, Mead & Hunt

Dan Prather, DPrather Aviation Solutions
Get Involved with TRB

#TRBwebinar

Be a Friend of a Committee [bit.ly/TRBcommittees]
  – Networking opportunities
  – May provide a path to Standing Committee membership

Join a Standing Committee [bit.ly/TRBstandingcommittee]


Update your information [www.mytrb.org]

Getting involved is free!
TRB turns 100 on November 11, 2020

Help TRB:
- Promote the value of transportation research;
- Recognize, honor, and celebrate the TRB community; and
- Highlight 100 years of accomplishments.

Learn more at
www.TRB.org/Centennial
#TRB100

MOVING IDEAS: ADVANCECING SOCIETY—100 YEARS OF TRANSPORTATION RESEARCH

The National Academies of
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