Building High School Pipelines

03.21.23

About

In 2020, ATEC incorporated a new 501(c)(3) organization to facilitate educational initiatives in furtherance of workforce development.

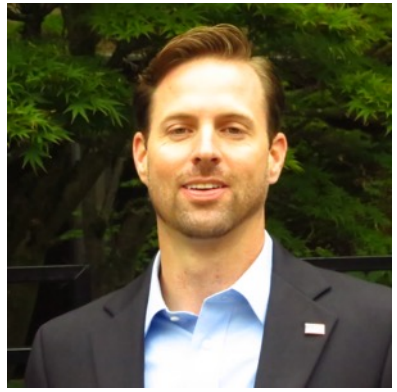
Choose Aerospace is a partnership of aerospace stakeholders, joined together to address one of the biggest threats to continued industry growth: the availability of a diverse, qualified technical workforce.

Leadership

President
Ryan Goertzen, AAR CORP

Vice President
Kevin Dallaire, Piedmont

Secretary/Treasurer
Joel English, AIM



Director
Justin Madden, A4A

Director
Tammera Holmes, AAI

Advisory Director
Sean Torpey, FAA

Executive Director
Crystal Maguire

Scholarship Coordinator
Tarra Ruttman

Sequence of Courses

This modular content facilitates a flexible approach to meet a wide-range of schedule and program needs. For example, the approximately 500 hours of content can be delivered in a full-time, 12-week program for adult learners, or as an elective in the 11th and 12th grade year of high school.

The following courses make up the entire suite of aviation maintenance curriculum. We have provided a suggested order for completion below.

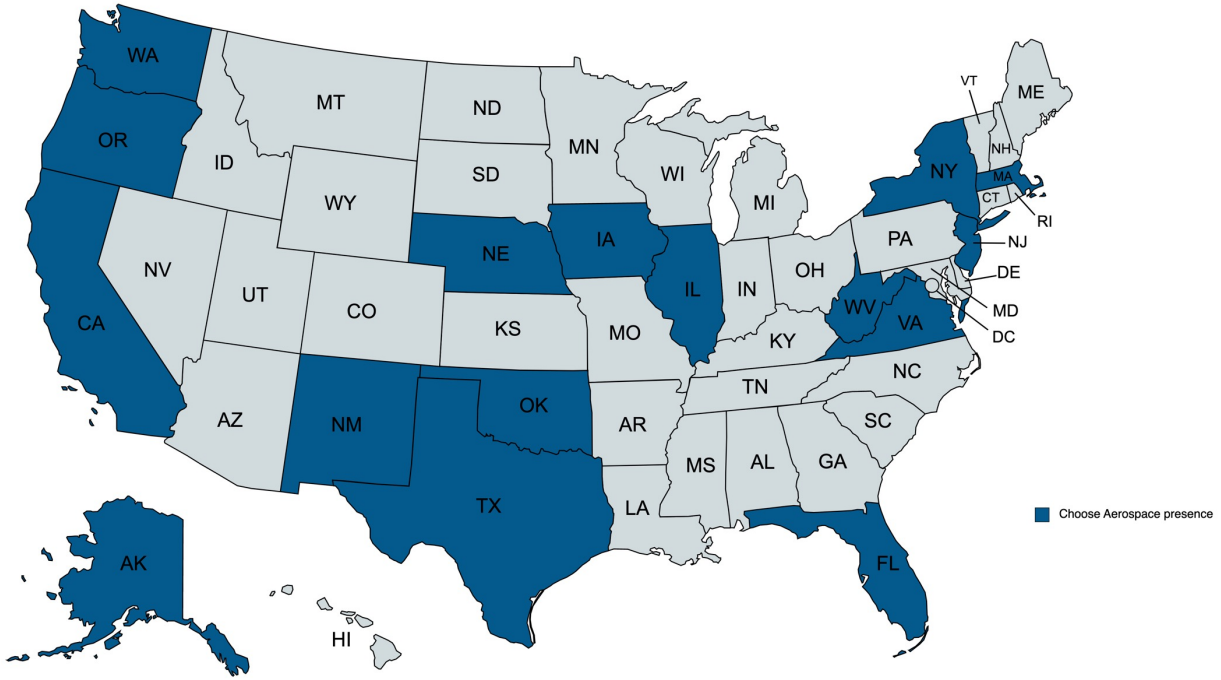
01	FAA-ACS-AM-IF-GOS	Safety, Ground Operation, and Servicing
02	FAA-ACS-AM-IK-HTM	Hand Tools and Measuring Devices
03	FAA-ACS-AM-IC-WAB	Weight and Balance
04	FAA-ACS-AM-IH-MAT	Mathematics
05	FAA-ACS-AM-IJ-PFA	Physics for Aviation
06	FAA-ACS-AM-II-MIR	Maintenance and Inspection Regulations
07	FAA-ACS-AM-IB-ACD	Aircraft Drawing
08	FAA-ACS-AM-IA-FEE	Fundamentals of AC Electricity
09	FAA-ACS-AM-IA-FEE	Fundamentals of DC Electricity
10	FAA-ACS-AM-ID-FLF	Fluid Lines and Fittings
11	FAA-ACS-AM-IE-MHP	Materials, Hardware, and Processes
12	FAA-ACS-AM-IG-CCC	Cleaning and Corrosion Control

Maintenance Curriculum

- Created to make aviation technical content more accessible and build pipelines into part 147 schools.
- Developed by Clemson University Center for Workforce Development and ARCS Aviation in partnership with Choose Aerospace, ATEC, and Advisory Committee.
- Five hundred hours of content covers the general subject areas in the FAA mechanic ACS.
- Includes computer-based curriculum with hands-on labs and activities in accompanying instructor guides.
- Limited equipment, materials, and teacher qualifications necessary. License fees $200 per student, per year.

CHOOSE AEROSPACE

Participating Programs

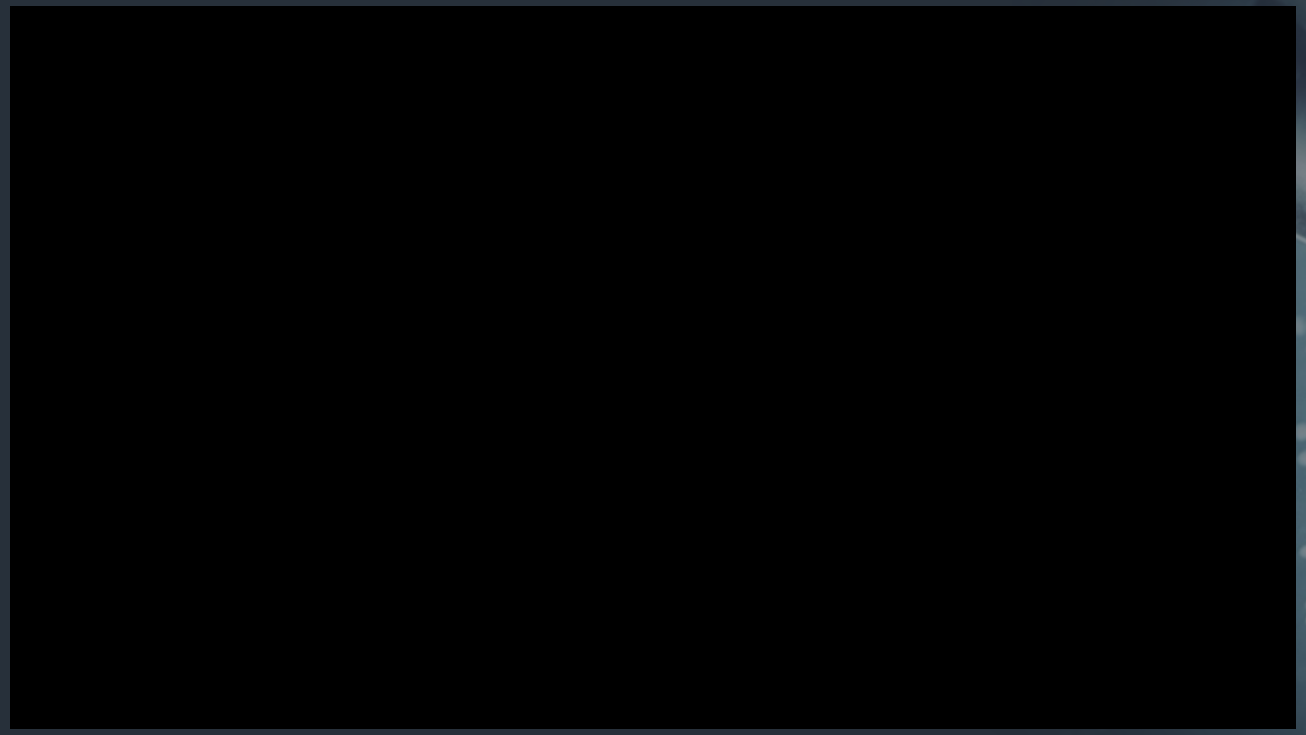


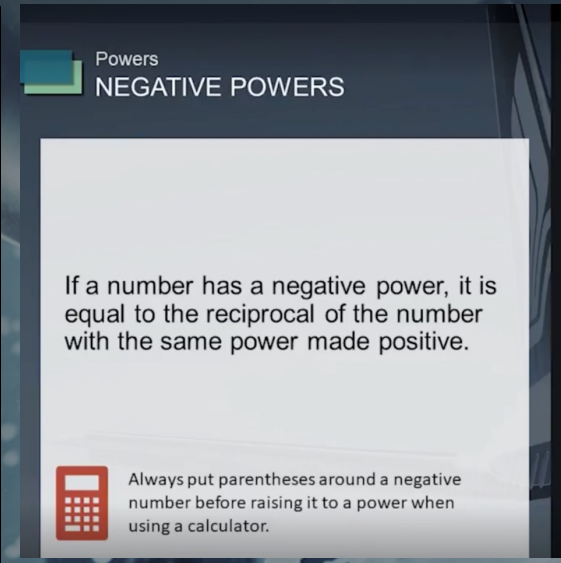
	States	Schools	Students
2021-2022 Pilot Test	8	9	140
2022-2023 Academic Year	6	15	189
2027 Goal	--	--	10,000

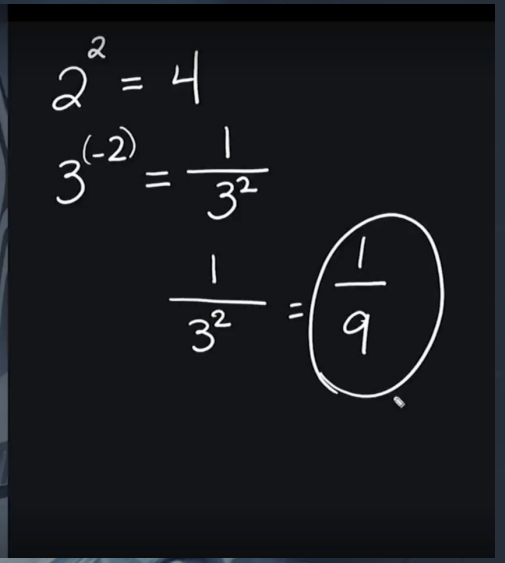
Program Development

- Define multiple pathways to certification
  - Matriculate into A&P schools
  - Go direct to work as a non-certificated technician
  - Feed into apprenticeship program
- Facilitate pathway development
  - Create credential for high school student graduates
  - Expand opportunities to matriculate into A&P school
  - Facilitate industry support
- Remove barriers to adoption
  - Funding
  - Teachers
  - Training

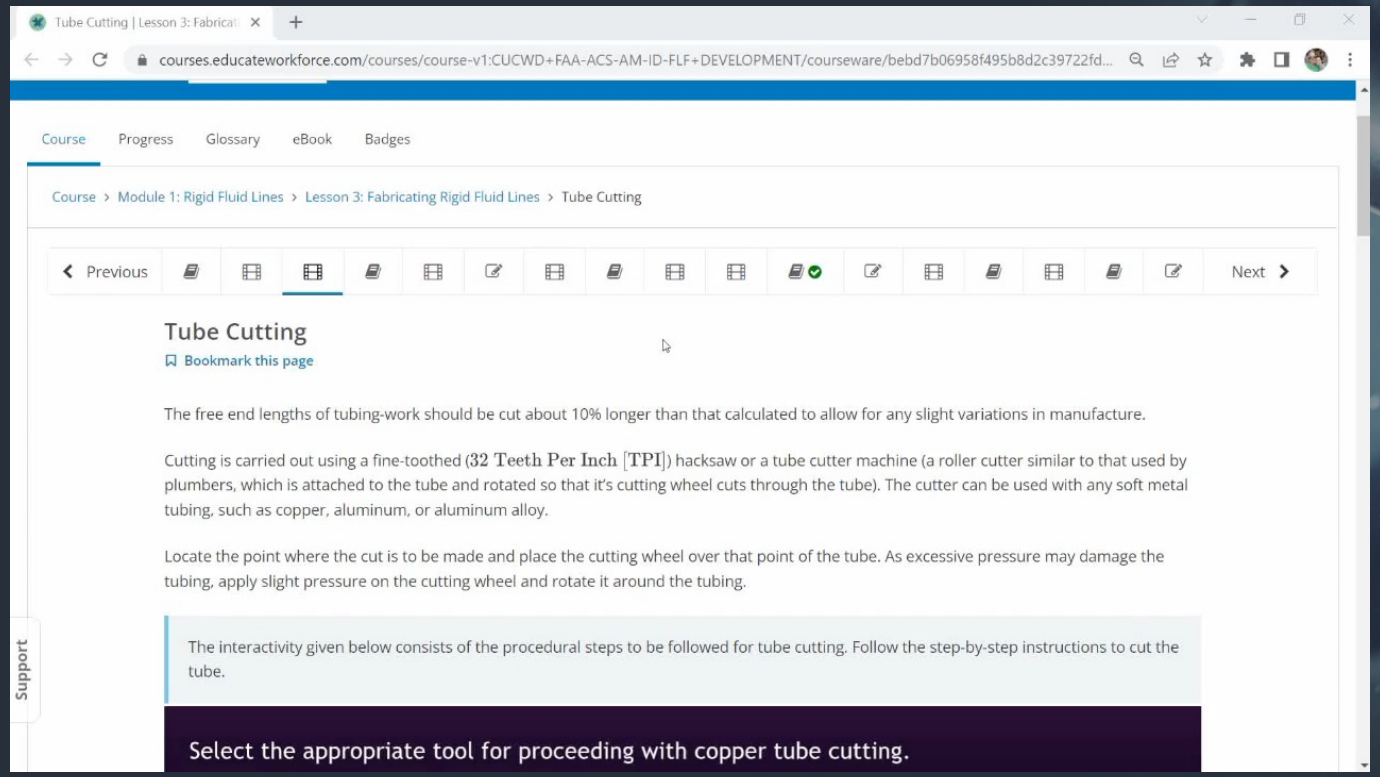
Video Lecture and Annotations

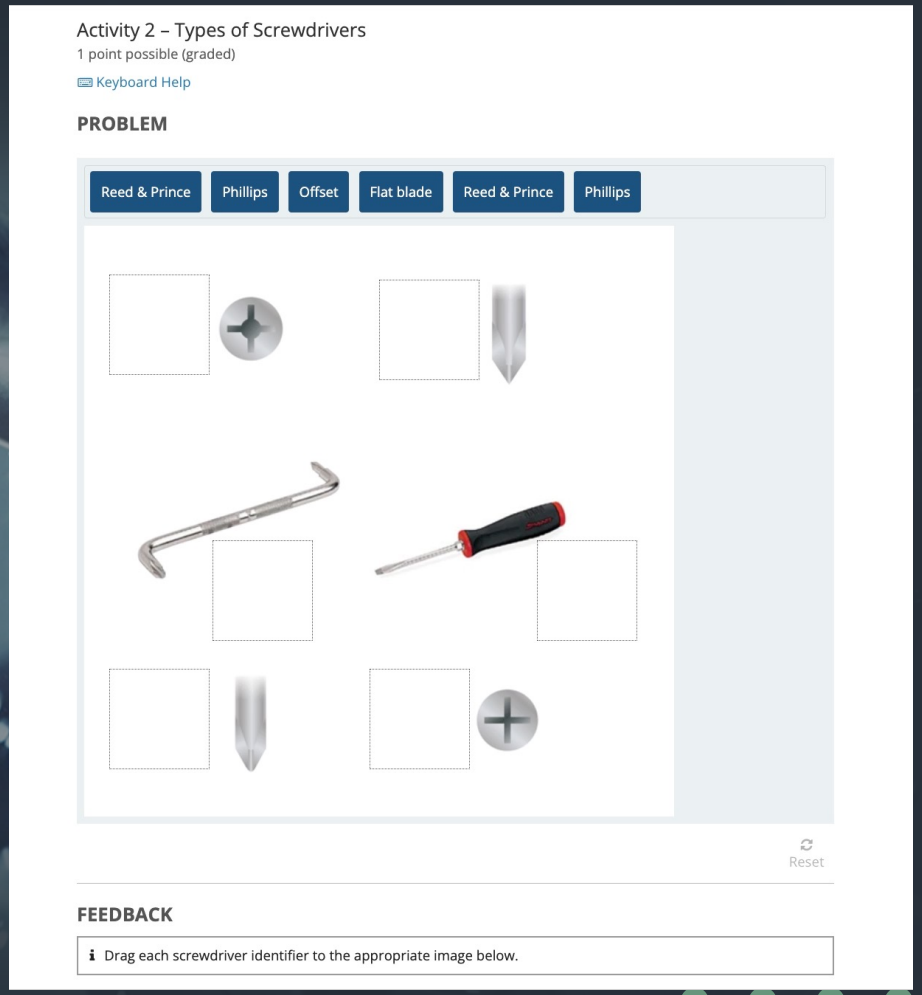






Interactive Lessons and Activities



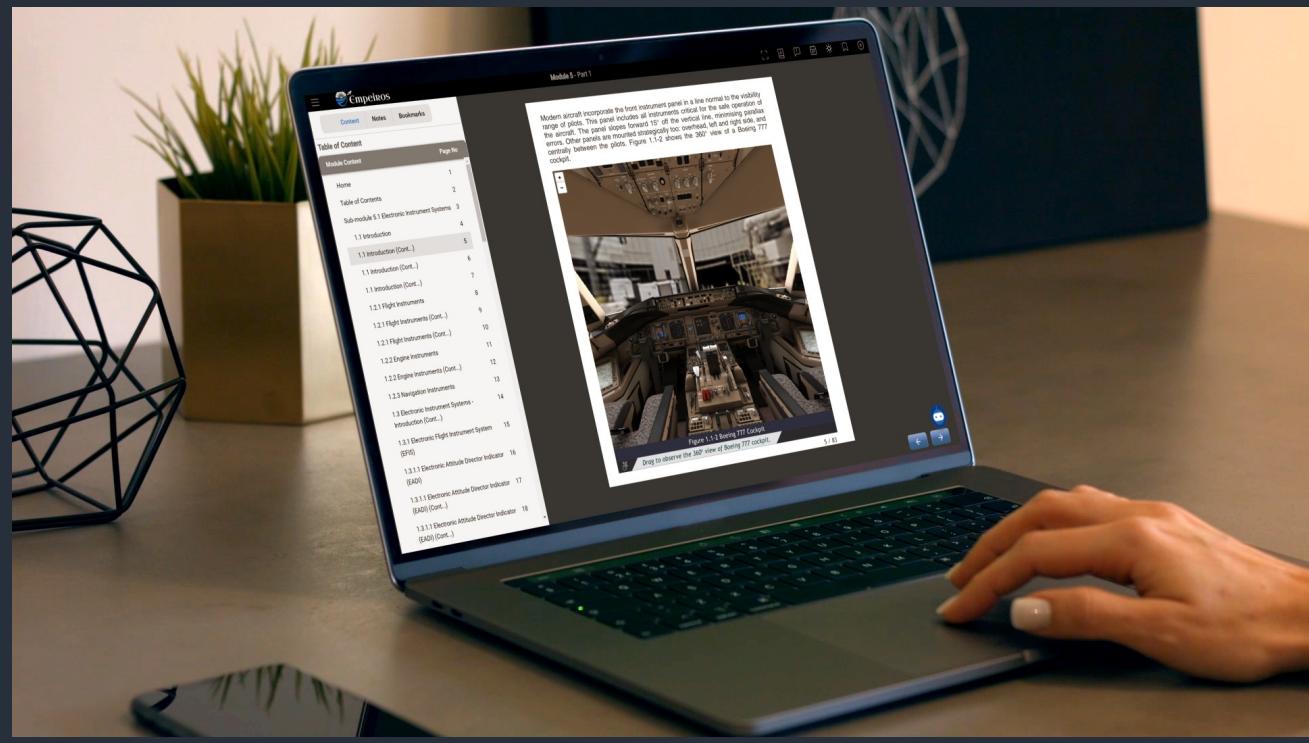


Storyline Interactives

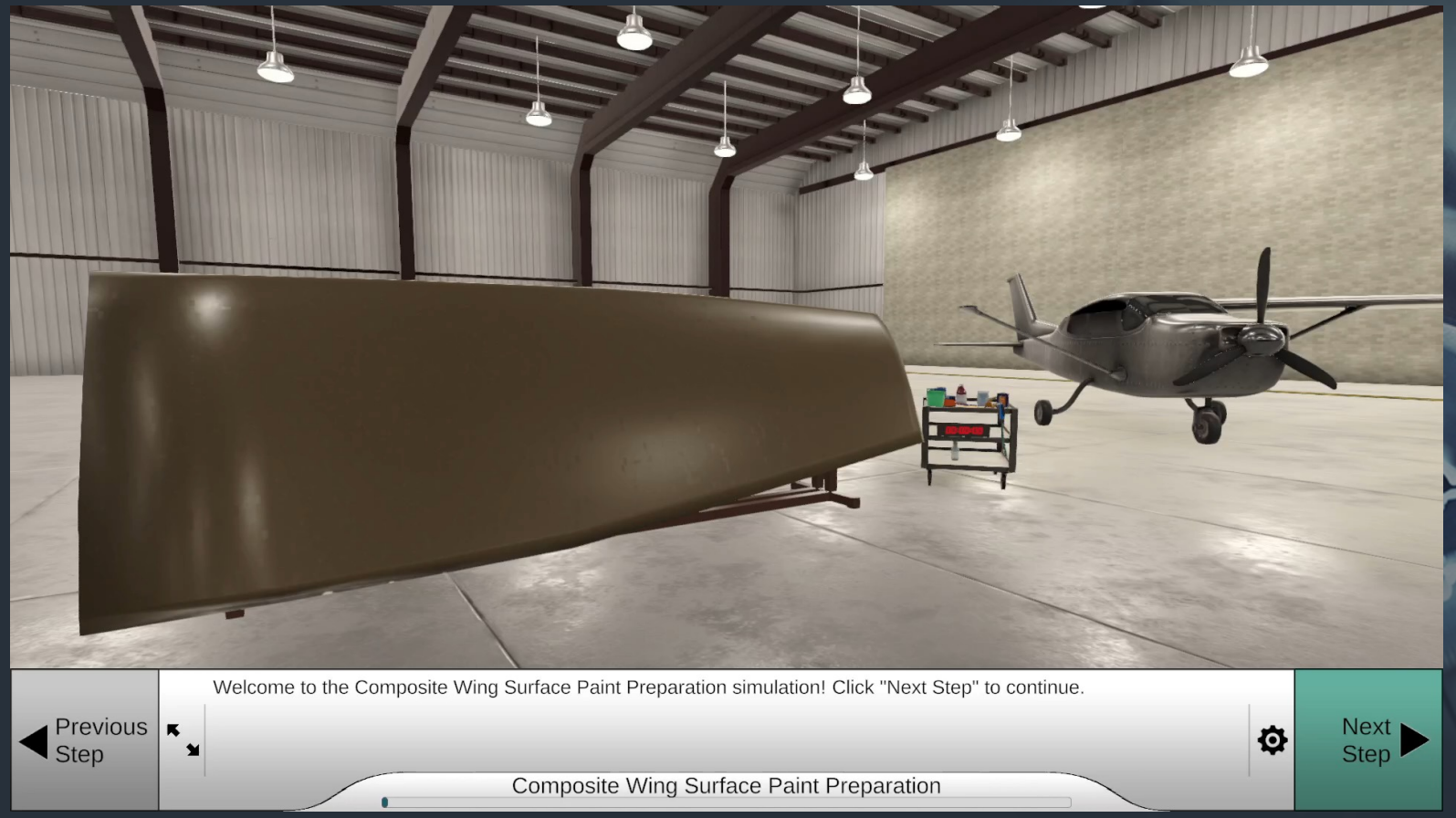
2022 // STEMersion

Virtual Reality Simulations

A sample of simulations

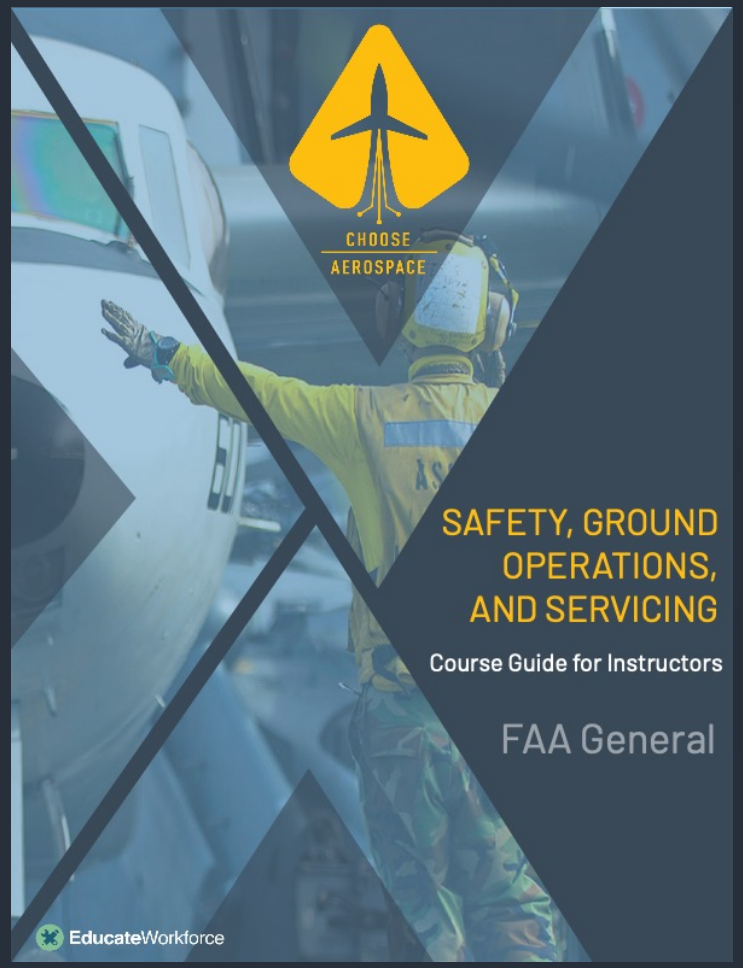


Sample Virtual Reality



Paint Preparation: Composite Wing

Instructor Course Guide



Course Pacing Guide

Interactive PDF: Click on the Lesson Objective buttons and ACS Code buttons for more information.

General Resources (All lessons)
- Choose Aerospace Online Course: Fluid Lines and Fittings
- eBook: FAA-H-8083-3A General Handbook (Chapter 1)
- Audiobook: FAA-H-8083-3A Ch. 1
- Airman Certification Standards

MODULE 1: SHOP AND FLIGHT LINE SAFETY

Days	Lesson	Lesson Objectives (Click the buttons below to view the full list of objectives.)	ACS Codes (Click the buttons to view the full list.)	Materials/Resources
DAYS 1-4 *(3 hrs,)*		Lesson 1 Objectives	AM.I.F.K12 AM.I.F.K13 AM.I.F.K14 AM.I.F.K15 AM.I.F.K16 AM.I.F.S1	Les … paper, poster • … Safety: https://youtu.be/b-6BwAisUe8 ○ FOD Walk: https://youtu.be/TY0UDy9to8A ○ Hazard Diamond Song: https://youtu.be/GEVIkekbpt8
DAY 5 *(45 min)*	Lesson 2 Fire Protection	Lesson 2 Objectives	AM.I.F.K6 AM.I.F.S10	Lesson 2 • Video Lecture: Lesson 2-Fire Protection • Flash Photography Image • Teacher Handout: ○ Checkpoint Activity • Student Handouts: ○ Guided Notes ○ Checkpoint Activity • **Video Resource:** ○ Magnesium Reaction: https://youtu.be/KY9ri-UOoLo
DAY 6 *(45 min)*	Lesson 3: Select Aircraft Operation	Lesson 3 Objectives	AM.I.F.S12	Lesson 3 • Video Lecture: Lesson 3-Select Aircraft Operation • Teacher Handout: ○ Aviation Terms Activity • Student Handouts: ○ Guided Notes ○ Aviation Terms Activity ○ Safety Skit Activity ○ Module 1 Quiz Study Guide • Video Resources: ○ Aircraft Engine Fire https://youtu.be/OdDMa8mME_c ○ Engine Fire Protection https://youtu.be/-nY0IYaWL-I

TOTAL MODULE 1 TIME: 6 Days | 6 hrs.

1. Identify safety precautions and policies for shop safety: electrical, gases, hazardous materials, and machine tools.
2. Demonstrate proper procedures for shop safety in each of the four areas.
3. Explain the importance of tool and hardware accountability and organization.
4. Explain safety measures and protections on the flight line for hearing, foreign object damage, aircraft propellers, and fire safety.

AM.I.F.K12 Tool and hardware use and accountability
AM.I.F.K13 Material handling
AM.I.F.K14 Parts protection
AM.I.F.K15 Hazardous materials, Safety Data Sheets (SDS), and PPE
AM.I.F.K16 Foreign object damage effects
AM.I.F.S1 Perform a foreign object damage control procedure.
AM.I.F.S1 Perform a foreign object damage control procedure.

MODULE 01

Shop Line Safety and Fire Procedures

This next module will review shop safety and policies in the following areas: 1) Shop safety when dealing with electricity, gases, hazardous materials, and machine tools. 2) Flight Line Safety such as hearing protection, foreign object damage (FOD), safety around aircraft, and fire safety. 3) Fire Protection including classification of fires, types and operation of fire extinguishers, identification, inspection, and use of fire extinguishers.

The information in this module is for the purpose of introduction and a general guide. It is important to review the safety precautions and policies of all manuals for specific equipment used.

Module Goal

Upon completion of this module, course participants will understand and apply proper precautions or actions for shop, flight line, and fire safety. It is important for participants to know that safety is everyone's responsibility. For each area, participants will be able to describe the basic guidelines for safety and recognize common safety symbols. When provided with a safety situation, participants will be able to identify precautions and/or procedures to prevent an accident or take action if an accident happens

Objectives and Standards

Module 1 Objectives

After completing this module, learners will be able to:

- Identify precautions and procedures essential for shop safety.
- Describe safety precautions necessary while working in the flight line.
- Differentiate the types of fires and fire extinguishers, and describe which type of extinguisher is used on which class of fire.

ACS Codes

The following Airman Certification Standards (ACS) are covered within each lesson.

(1.1) AM.I.F.K12 - K16
(1.1) AM.I.F.S1
(1.2) AM.I.F.K6
(1.2) AM.I.F.S10
(1.3) AM.I.F.S12

Orienting Questions

As you complete the sections within this module, you should be able to answer the following questions:

- What are basic precautions for shop safety in the areas of: electricity, compressed gases, hazardous materials, and machine tools?
- What types of protections should be taken while working in the flight line?
- What are the different classes of fire?
- What are the different types of fire extinguishers and which are more appropriate for the each class of fire?

Student Handout

Lesson 1 - Servicing an Aircraft
3.1 Guided Notes

Name: _____

Date: _____

As you watch the Lesson 1 Servicing an Aircraft video lecture, fill in the organizer with important information.

Servicing Overview:

- _____ aircraft systems is an important _____ function. This is only a general guide for servicing aircrafts.
- Check the _____ to determine the proper servicing procedures.
- If any aircraft fluids are spilled on clothing or skin, _____ as soon as possible due to _____.
- If you are servicing tires or struts, _____.

Aircraft Fluids:

Oil

- Oil is checked using a _____ or _____.
  - Reciprocating engines: check _____.
  - Turbine engines: checked _____.
- Use caution if _____.
- Never _____ oil tank.
- Always use the correct type of _____ for the _____ being serviced.

Hydraulic

- Bleed pressurized reservoirs _____ to service.
- Take extra effort not to _____ the system during service.
- When changing _____filters, make sure _____.
- After servicing, _____.

Electric Ground Power Units:

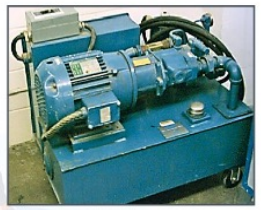
- Electric ground power can be _____.
- Each vary in _____
- When in use, _____.
- NEVER _____ while the cables are attached to an aircraft.

Student Handout

Lesson 1 - Servicing an Aircraft
3.1 Guided Notes

Hydraulic Ground Power Units:

- Used to _____ aircraft hydraulic systems and _____
- Use caution when _____. Leaks greater than _____ can cut like a sharp knife.
- ALWAYS _____.
- When not in use, _____.



Ground Support Air Units:

- Ground support air units are used to provide: _____.
  - Typically used to _____ or like an APU _____ on the ground.

Oxygen Servicing:

- Servicing should be accomplished in _____.
- Servicing area must be _____.
- All maintenance actions should _____.

Oxygen Types:

- Two types of oxygen for use on aircraft: _____ and _____ _____ people are required to _____; one manages the _____ and the other _____in the aircraft.
- _____ during this process in case of emergency.
- Only oxygen labeled _____ should be used in aircraft systems.
  - Contains _____
  - Gaseous oxygen, while nonflammable, _____.
  - Always use _____ when servicing oxygen systems.

Student Handout

Lesson 3 - Select Aircraft Operations

1.3 Safety Skit Activity

Name: _____

Date: _____

This module has included many concepts of shop and aircraft safety. In small groups of 2-4 students, you will choose a safety concept from this module and create a short 3-5 minute skit to perform to the class today. Be sure everyone in the group plays a role.

Example: A group demonstrates how to choose and use a fire extinguisher properly.

Safety Skit Rubric

CRITERIA	Weight	Exceptional 4	Admirable 3	Acceptable 2	Attempted 1
Understanding of Topic	40%	☐ Information is accurate ☐ Clear understanding of topic	☐ Information is mostly accurate ☐ Good understanding of topic	☐ Information is somewhat accurate ☐ Fair understanding of topic	☐ Information is inaccurate ☐ Presentation is off topic
Cooperation	30%	☐ All members contribute ☐ Individually contributes and accepts ideas of others	☐ Some members contribute ☐ Individually contributes and accepts most ideas	☐ Few members contribute ☐ Unwilling to contribute or accept ideas from others	☐ One or two members completed all the work ☐ Does not work well with group members
Presentation	30%	☐ Shows confidence ☐ Informative ☐ Entertaining, engages audience ☐ Speaks loudly and clearly ☐ Appropriate use of body language ☐ Presentation time is appropriate	☐ Shows some confidence ☐ Presents some information ☐ Engages audience ☐ Can be heard ☐ Some use of body language ☐ Presentation time meets minimum	☐ Unsure of responsibility ☐ Somewhat informative ☐ Engages audience intermittently ☐ Not very clear or loud ☐ Some movement ☐ Presentation time is under requirement	☐ Little to no confidence ☐ Not enough information ☐ Not engaging ☐ Does not speak loudly or clearly ☐ Little to no body language ☐ Presentation time is too short
Total					

Student Handout

Module 1 -Shop Line Safety and Fire Procedures

Module Quiz Study Guide

Name: _____

Date: _____

To prepare for Module 1 Quiz, review each of the following using your guided notes and the ebook. Be sure to add any missing information into your guided notes.

Specific topics to review in ebook Chapter 1:

- ☐ Page 2 Electrical Safety
- ☐ Page 2 Safety Around Compressed Gases
- ☐ Page 3 Safety Around Hazardous Materials
- ☐ Page 3 Safety Around Machine Tools
- ☐ Page 4 Hearing Protection
- ☐ Page 5 Foreign Object Damage (FOD)
- ☐ Page 5 Safety Around Airplanes
- ☐ Page 5 Fire Safety
- ☐ Page 6 Classification of Fires
- ☐ Page 6 Types and Operation of Shop and Flight Line Fire Extinguishers
- ☐ Page 8 Inspection of Fire Extinguishers
- ☐ Page 8 Identifying Fire Extinguishers
- ☐ Page 9 Using Fire Extinguishers

Review at the beginning of Module 1 in EducateWorkforce:

- ☐ Introduction
- ☐ Objectives
- ☐ Orienting Questions – be sure you can answer these!!

Review at the end of Module 1 in EducateWorkforce:

- ☐ Key Concepts
- ☐ Key Terms

Review for EACH lesson in Module 1 in EducateWorkforce:

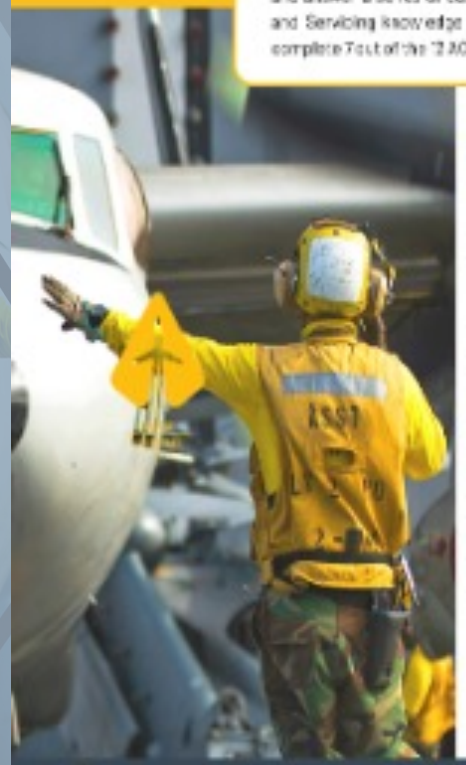
- ☐ Objectives
- ☐ Summary and Key Terms

Review Notes and any activities from Module 1

PRACTICAL PROJECT | Safety, Ground Ops, & Servicing Skill Stations

Project Overview

In this project, students will work in small group stations, complete a FOD Walk, and answer a series of questions to demonstrate Safety, Ground Operations, and Servicing knowledge and skills. Through this, students will be able to complete 7 out of the 12 ACS skill requirements.



Project Duration:
Two 45-minute class periods

Pre-Requisites

FAA-ACS-AMI-F-3DS- Safety, Ground Operations, and Servicing Course

Learning Outcomes:

The students will be able to demonstrate the successful completion of several skills through application and critical thinking in areas of shop, aircraft and fire safety, ground operations, and the servicing of aircraft, including FOD control, use of hand signals, identification and application of aviation fuels, starting/shutting down a reciprocating aircraft, extinguishing an engine induction fire, and securing an aircraft.

This hands-on project was designed as a culminating project to be completed at the end of the Safety, Ground Operations, and Servicing course.

Note to Instructor: This project can be adapted to meet the needs of the learners. Please read through entire project before beginning the project to ensure you have the required supplies and materials.

Supplies/Materials:

- 2 copies of FAA-H-8083-30A handbook
- Nylon rope - 6' per group member (length as needed to tie two objects together)
- Five mason jars with lids
- Water
- Red, Green, Blue, Purple, and Yellow food coloring
- FOD Walk Location map
- Trash bags (1 per every 2 students)
- Yellow/Orange vest (optional)
- Prize (Optional)

Attachments

- Station 1 Instruction Sheet - Airman's Hand Signals
- Station 2 Instruction Sheet - Aircraft Knots
- Station 3 Instruction Sheet - Reciprocating Engine Start-Up/Shut Down
- Station 3 Cessna 172 Start Up/Shut Down Checklist
- Station 4 Instruction Sheet - Aircraft Induction System Fire
- Station 4 Timeline Cards
- Station 5 Instruction Sheet - Aircraft Fuel Grades
- Station 5 Fuel Grades Color Cards
- Station 5 Fuel Grades Matching Cards
- Station 5 Instruction Sheet - Approved Fuels
- Station 5 Aircraft Image Cards
- Station 5 Approved Fuel Types Matching Cards

Equipment

- Computer with Microsoft Flight Simulator installed (preferably 1 per every 2 students)

ACS Codes

The following Aircraft Certification Standards will be covered in this project.

- AMI.I.F.S1 Perform a foreign object damage control procedure.
- AMI.I.F.S4 Use appropriate hand signals for the movement of aircraft.
- AMI.I.F.S6 Identify different grades of aviation fuel.
- AMI.I.F.S7 Select an approved fuel for an aircraft.
- AMI.I.F.S8 Follow a checklist to start up or shut down an aircraft reciprocating or turbine engine.
- AMI.I.F.S10 Identify procedures for extinguishing fires in an engine induction system.
- AMI.I.F.S11 Secure an aircraft.

References

- eBook FAA-H-8083-30A- Pages 1-5
- FAA Advisory Circular 150/5210-24
- FAA Aeronautical Information Manual

Table of Contents | Getting Started | Course Introduction | Module 1 | Module 2 | Module 3

EducateWorkfor

Program Development

- Identifying high school programs in the regional area to build pipelines into new program
- Goal is to spread awareness and increase enrollment
- Focused on improving student outcomes
- Challenges to adoption

Program Development

- Offered independent of the high school
- “Hyflex” model brings student to campus monthly
- Two-year program gives the student 12 credits (2 semesters) for prior learning toward the AMT associate degree program
- Upon acceptance to the AMT program, the student takes the general knowledge exam
- Challenges to adoption

AVIATION MAINTENANCE TECHNOLOGY
at Cape Cod Community College

Begin your path to a degree in Aviation Maintenance Technology while you are still in high school!

Introducing the Aviation Maintenance Technology (AMT) "Choose Aerospace" Pathways Program

Program Cost with Scholarship: Two-year/module program, $250 per year/module. Scholarships are need-based. If a student is not in need of a scholarship, the program cost is $1,275 per year/module.

Year One/Module One Program Start Dates: Fall 2023
Year Two/Module Two Program Start Dates: Fall 2024

What is the AMT Pathways Program?

Cape Cod Community College is home to the region's premiere education and training program for Aviation Maintenance Technology (AMT). With three hangars filled with real aircraft located at Plymouth Municipal Airport, our program has been building aviation careers for students since 2017, sending dozens of graduates into rewarding, powerful careers.

With a need at both the local and national level for AMT professionals on the rise, we're taking our program online so that we can partner with area high schools to create a seamless Pathways program, allowing your students to start training while still in high school.

4C's has partnered with the Aviation Technical Education Council (ATEC) to build a two-year program designed for high school students which mirrors the current 4C's current AMT program. Students in this Program take their courses online, remotely, and through our state-of-the-art "hyflex" model, which allows them freedom to learn under the watchful eye of an FAA Certified Instructor, including weekly check-ins, reviews and learning opportunities with an additional on-campus lab component scheduled monthly.

Students that complete the program while still in high school, will be on pace to:

- Become an AMT Professional with employment opportunities ranging from $70 - $90,000 annually.
- Apply for 12 credits for prior learning upon successful completion of the AMT Pathways program and acceptance into the associate in applied science Aviation Maintenance Technology Degree Program at Cape Cod Community College.
- Upon acceptance into the AMT Degree Program, students will be eligible to take the Federal
- Aviation Administration (FAA) General Certification Written Exam, placing them on the road to a full A&P Certification, allowing for a 2-semester leg up on the certification training and process.
- Interview for employment at local aviation companies for part-time internship positions upon successful completion of the General Written Certification Exam.

APPLY NOW!

AVIATION MAINTENANCE TECHNOLOGY
at Cape Cod Community College

How Does it Work?

This online-based AMT curriculum is the first of its kind, developed by the aviation community and offering soon-to-be maintenance professionals a direct path to a rewarding career. It aligns with the emerging FAA Mechanic Airman Certification Standards (ACS) to cover the knowledge and skills needed for the FAA Mechanic General Written Certification.

Through a nationally recognized e-learning platform, students receive their education and training in multiple ways. This includes traditional methods like classrooms and in-person ltraining on real aircraft at the 4Cs AMT hangars at Plymouth Municipal Airport, and online methods such as video lecture, e-books, and virtual/augmented reality simulations.

Want to Learn More?
www.capecod.edu/amtpathways

Orientation Sessions are available and we'll come to you!

Information sessions are hosted here at the Plymouth Facility or we will gladly come to your school to host a session for students interested in this program along with their parents and/or counselors.

AVIATION MAINTENANCE TECHNOLOGY
at Cape Cod Community College

Contact
Michael Sasso, Director of the Aviation Maintenance Technician Program at 4Cs msasso@capecod.edu

The Aviation Maintenance Technology Career Advancement Project at Cape Cod Community College is 100% funded by two federal grant awards: a $463,304 grant awarded by the Federal Aviation Administration (# G-22-WD-AM-002) and a $1,950,000 grant awarded by the Department of Education (# P116Z220044). The program is 0% funded by non-governmental sources.

Crystal Maguire
Executive Director
crystal.maguire@atec-amt.org

Ryan Goertzen
President
Ryan.goertzen@aarcorp.com

Karen Johnson
Subject Matter Expert
Karen.johnson@siu.edu

Tarra Ruttman
Program Manager
Tarra.ruttman@chooseaerospace.org

Michael Sasso
Cape Cod Community College
msasso@capecod.edu

James Smith
Marshall University
jsmith@marshall.edu

CHOOSE
AEROSPACE

Questions?

www.atec-amt.org

www.chooseaerospace.org