

ENGINEERING EDUCATION RESEARCH AS A VEHICLE FOR TECHNICAL EXCELLENCE

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COLLEGE OF ENGINEERING



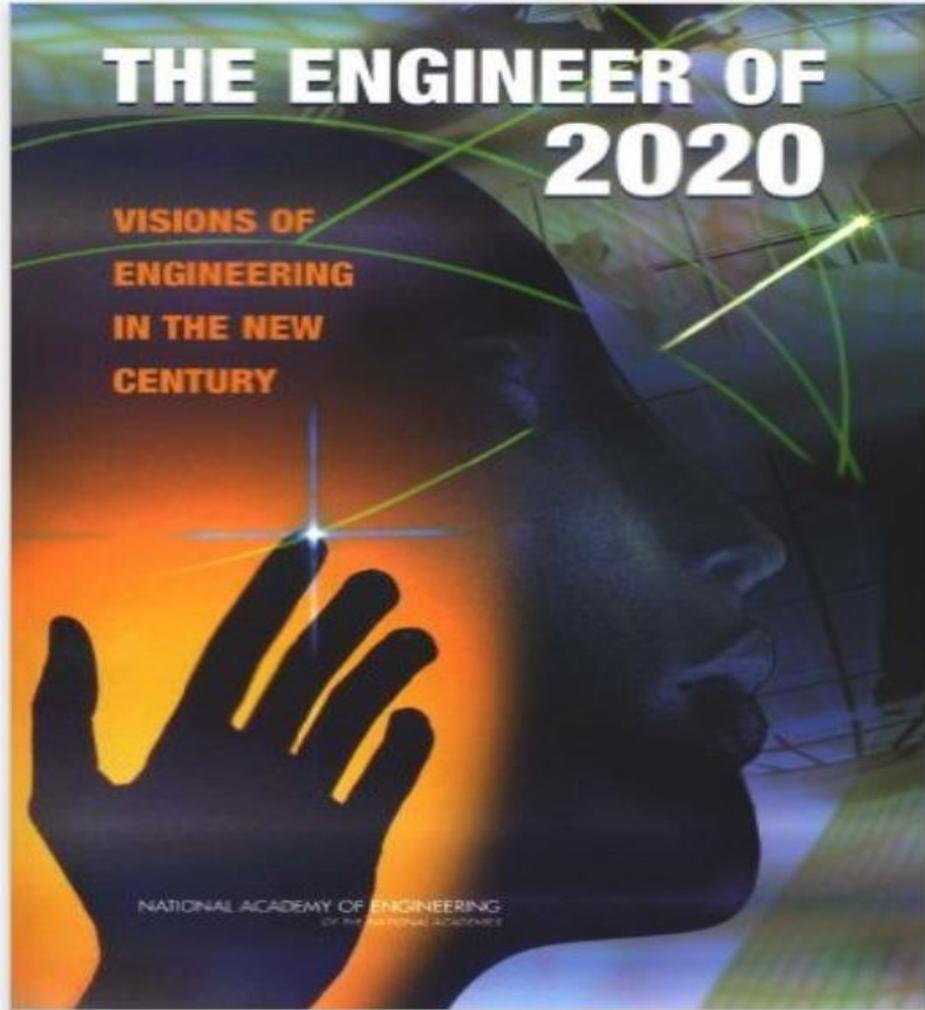
COE SOAR D.C.
JUNE 14 - 15, 2017



***Through a multidisciplinary and multi-institutional approach
the COE SOAR seeks to positively impact the
technical training of ATC professionals.***

***Brief introduction on how the COE SOAR is doing this through Engineering
Education Research***

- An introduction to Engineering Education as a field of research
- Engineering Education Research (EER) in SOAR
- Deliverables that EER can provide

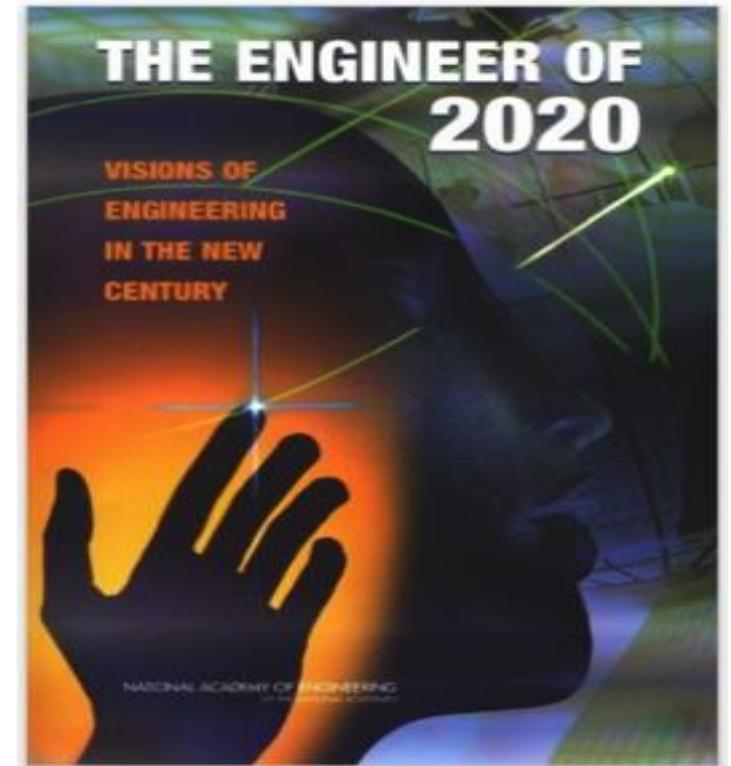


Why is Engineering Education important as a field of research:

- The pace of technological innovation will continue to be rapid
- The world in which technology will be deployed will be intensely globally interconnected
- The population of individuals who are involved with or affected by technology will be increasingly diverse and multidisciplinary
- Social, cultural, political, and economic forces will continue to shape and affect the success of technological innovation
- The presence of technology in our everyday lives will be seamless, transparent, and more significant than ever

To meet these changing needs, engineering educators will need to produce engineering graduates who :

- Are broadly educated
- See themselves as global citizens
- Can lead in business, public service, research, development, and design
- Are ethical and inclusive of all segments of society
- Possess attributes including:
 - Strong analytical skills
 - Creativity / Ingenuity
 - Professionalism
 - Leadership



Engineering Education Research:

- Combinations of Social Science, Educational Research Methods, and Engineering
- Full infrastructure: Ph.d.s, professorships, departments, research centers, journals, etc.
- Developing research informed advances to the development and practice of engineers

The Innovation Cycle of Educational Practice and Research



Adapted from Booth, Colomb, and Williams, 2008

DEVELOPMENT OF A LEARNING TAXONOMY



- Team
 - Rachel Louis Kajfez, PI – OSU Krista Kecskemety and Seth Young, Co-PI – OSU
 - Kadie Hayward Mullins, PI – ERAU Haydee Cuevas and Matthew Verleger, Co-PI – ERAU



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- Goals
 - Develop different learning taxonomies that can be evaluated for their use in organizing training, evaluating training quality, and developing new training opportunities.
 - Provide recommendations for possible implementation strategies of proposed taxonomy.
- Workforce Development
 - This project will provide a learning taxonomy that can ultimately be used to organize training curriculum to ensure that those in the FAA workforce are more properly trained.

PROJECT OVERVIEW: GLOBAL HARMONIZATION AND INTEGRATION

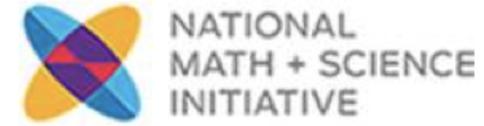


- Team

- **David A. Delaine** PI – OSU **Brian Strzempkowski and Seth Young** – OSU
- **Adam K. Fontecchio**, PI – Drexel **Ellen Bass**, Co-PI – Drexel

A systematic approach to establishing a global network of ATC Educators and partners that can be leveraged to facilitate international cooperation and harmony within the instruction of aviation navigation and safety.

- 1) Identifying key stakeholders and educators within ATC and Aviation Safety
- 2) Determine parallel/complementary practices
- 3) Recommending pathways for international collaborations
- 4) Identifying global educational best-practice between world leaders in the field to provide positive outcomes and increased alignment within global aviation and associated technical training and development



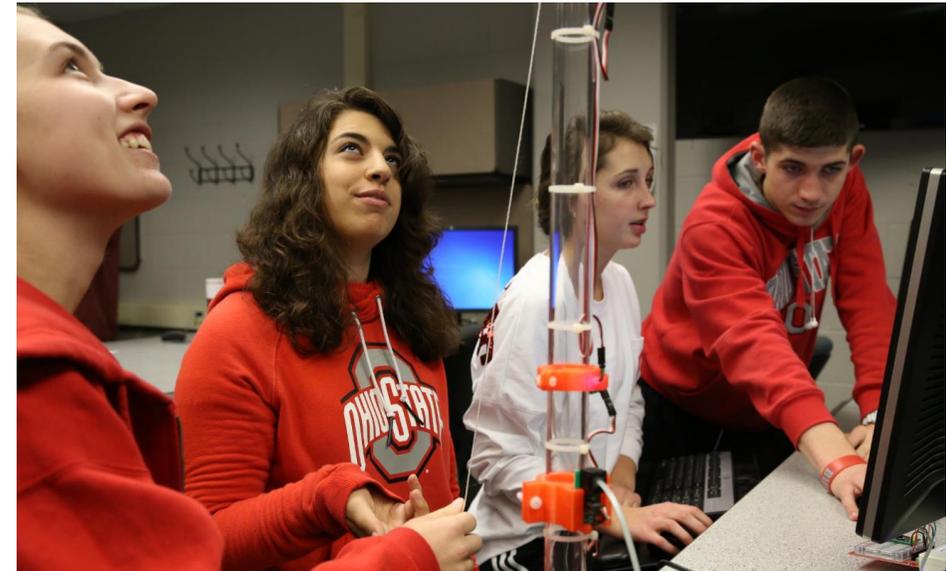
Center for the Advancement of STEM Teaching and Learning Excellence (CASTLE)

Goal: Affect large-scale institutional change in STEM teaching and learning across the educational spectrum through fundamental research



The OSU Department of Engineering Education

- **First-Year Engineering Program (2300 students)**
 - Robot Lab
 - Advanced Energy Vehicle
 - Student Instructional Leadership Team (SILT)
- **Multidisciplinary Capstone**
 - Business, industrial design, humanities, and MBA
 - End-of-year design showcase
- **Graduate Education**
 - Ph.D. program
 - Cutting edge Engineering Education research
- **Engineering Technical Communication**
 - Technical workshops
 - Creative Writing & Arts Contest



CONCLUSION



- Engineering Education is just one example of the wide fields of research and capabilities of the various partners within the SOAR COE.
- Through continued research, interdisciplinarity, and collaboration we seek to deliver important knowledge that can lead to positive outcomes for the FAA.



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THANK YOU!!!

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RESEARCH STRUCTURE



- Constant comparative method
- Qualitative analysis of selected documents and stakeholder interviews from a wide range of global stakeholders



BECOME AN AIR TRAFFIC CONTROLLER

Gain your AVI50115 Diploma of Aviation (Air Traffic Control).
Airservices is a Registered Training Organisation (RTO) 5168.

AIR TRAFFIC CONTROL

Airservices provides air traffic services to over four million flights carrying more than eighty million passengers per year.

Air traffic controllers manage the safe and efficient flow of aircraft across Australian airspace, covering approximately 11 percent of the world's airspace.

In addition to the daily management of air traffic, Airservices qualified controllers provide pilots with information and assistance in the event of an in-flight emergency.

Airservices provides three broad categories of air traffic control: area, approach and aerodrome control.

commence their training with Airservices in either Brisbane or Melbourne. On successful completion of this training program you will have demonstrated the skills and knowledge necessary to be eligible to receive the AVI50115 Diploma of Aviation (Air Traffic Control), which will progress you to on-the-job workplace training at one of Airservices many locations. It is in the workplace that you will undertake further training and assessment to achieve your air traffic control licence.

The AVI50115 Diploma of Aviation (Air Traffic Control) training program is designed to provide you with the necessary knowledge and skills to progress you into final field training.

WHO SHOULD APPLY?

EER DELIVERABLES



- Critical and self reflective analysis of educational practice
- Research informed improvements

INSIGHT INTO INTERVIEWS



- “Globalization has an impact on everything in the aviation industry, because the longest flight is 17+ hours and goes through multiple countries and airspace. The technology used for this has increased the need for harmonization.”
- “Every member state in Europe does training different, with each country using a different platform because they need to train on the equipment they will be using in the field. However the actual curriculum is standardized across the countries.”