Emerging Aeronautics and WA Electric Aircraft Working Group

Washington State Transportation Commission

DAVID FLECKENSTEIN, DIRECTOR AVIATION DIVISION
January 15, 2020
Aircraft Innovation

- Exciting time for aviation with new aircraft technologies emerging.
- Unmanned Aircraft Systems (UAS) markets and use cases continue to evolve and mature.
- Electric propulsion in WA provides new opportunities for manufacturing, education, commerce and the environment.
- New technologies, and lessons from UAS development, are setting the stage for new modes of transportation by air.
- Certification, capital investments and infrastructure are key considerations.
Electric Aircraft Working Group

Origin of the EAWG

- WSDOT Aviation was tasked with forming a working group to explore the feasibility of introducing electric and hybrid-electric aircraft in Washington State
  - House Bill 2295
  - Engrossed Substitute Senate Bill 6106

- First report submitted to WA Legislature in May 2019

- The working group met on three occasions to discuss electric aircraft technology for regional transportation
Electric Aircraft Working Group
Original Members

• WSDOT Aviation Division
• Zunum Aero
• Department of Commerce
• The Boeing Company
• Volta Enterprises
• Verdego Aero
• magniX
• Diamondstream Partners
• Stellar Aerospace
• Aerospace Futures Alliance
• Andrew Graham Aircraft Consulting

• Kenmore Air
• Center for Excellence in Aerospace and Advanced Manufacturing
• Federal Aviation Administration
• Seattle Tacoma International Airport
• Wenatchee Pangborn Memorial Airport
• Airline Pilots Association
• Kitsap Aerospace Defense Alliance
• Avista Utilities
• Puget Sound Energy
Electric Aircraft Working Group
New Members

• University of Washington
• Washington State University
• National Renewable Energy Laboratory
• Community Air Mobility Initiative
• National Business Aviation Association
• AeroTEC
• Joby Aviation
• ElectronAir
• Zodiac Aerospace
• Greater Seattle Partners
• Kimley Horn
Aircraft Technology
High Level Findings

• Small electric aircraft are already flying in service as training and recreational aircraft

• Battery technology
  – Very heavy and low energy density
  – Initial aircraft may be hybrid-electric
  – As battery technology improves more fully electric aircraft will emerge
  – Battery technology could be replaced by other sources such as hydrogen fuel cells

• Aircraft will initially be smaller, carrying 9-15 passengers
  – Could be operated as an on demand air services or as a scheduled charter flight
  – Utilizing non-primary airports
Regional Airline Operations

Initial Findings

• Great potential for increased access to air transportation around the state and region
  – The new aircraft will be able to operate out of airports with 3000 feet or more of runway
    ➢ 70 out of 135 total airports in Washington state have at least 3000 feet of runway
    ➢ Currently 60 of those do not have commercial air service
    ➢ Many are located in rural areas
  – Lower operational cost opens up new markets and service locations
Destinations Within 700 NM
Initial Findings Continued

- Infrastructure demands will have to be developed in parallel with technology

- Great potential for future green house gas emission reductions given WA’s use of hydroelectric power to recharge batteries

- Manufacturers are working to ensure that workforce transitions will require minimal retraining

- A positive public perception is required through proof of the following:
  - Safe
  - Expedient and offering potentially lower cost fares
  - Efficient green mode of air transportation
First commercial flight using an all electric airplane took place on December 10, 2019 by Harbour Air powered by a magniX electric motor

magniX plans to begin flight testing on a Cessna 208 Caravan electric conversion in Quarter 1 2020

Eviation, magniX, AeroTEC will be flight testing the Eviation Alice at Grant County International Airport in 2020

EAWG to include more topics about Urban Air Mobility as Phase II of the working group progresses

88% of venture capital dollars are going to four companies
  – Hundreds of companies working in this space

DOE announces $55 million in funding for two programs to support the development of low-cost electric aviation engine technology and powertrain systems
EAWG Phase II

WSDOT Aviation is at the start of a second report

• Deep dive into the following topics
  – Infrastructure
  – Education and Workforce Development
  – Demand for Regional Air Service
  – Timeline for Electric Aircraft Introduction
  – Beta Test for Electric Aircraft Infrastructure at WA Airports

• December 17, 2019 Advertisement Closed
  – Consultant selection ongoing
  – Report due to Legislature November 2020
Questions?

For additional information regarding the Electric Aircraft Working Group, please contact:

David Fleckenstein, Director Aviation Division
(360) 709-8020 or FleckDa@wsdot.wa.gov.