

Emerging Aeronautics and WA Electric Aircraft Working Group

Washington State Transportation Commission

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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 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

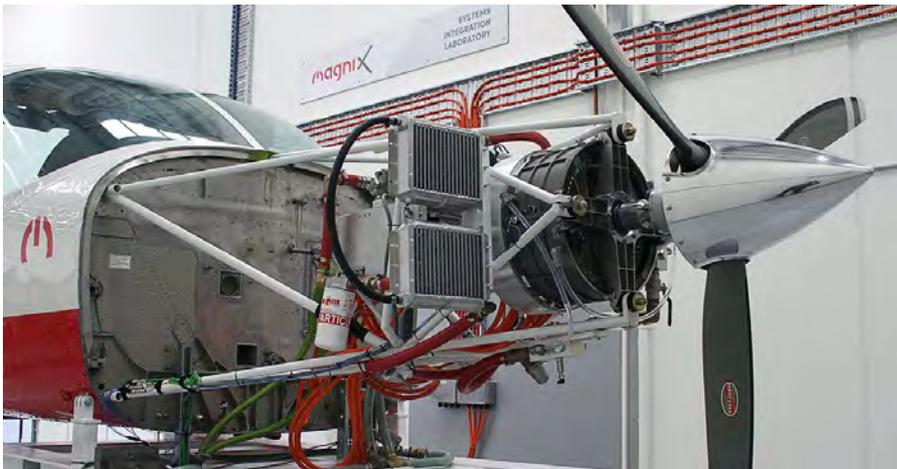
High Level Findings

- 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

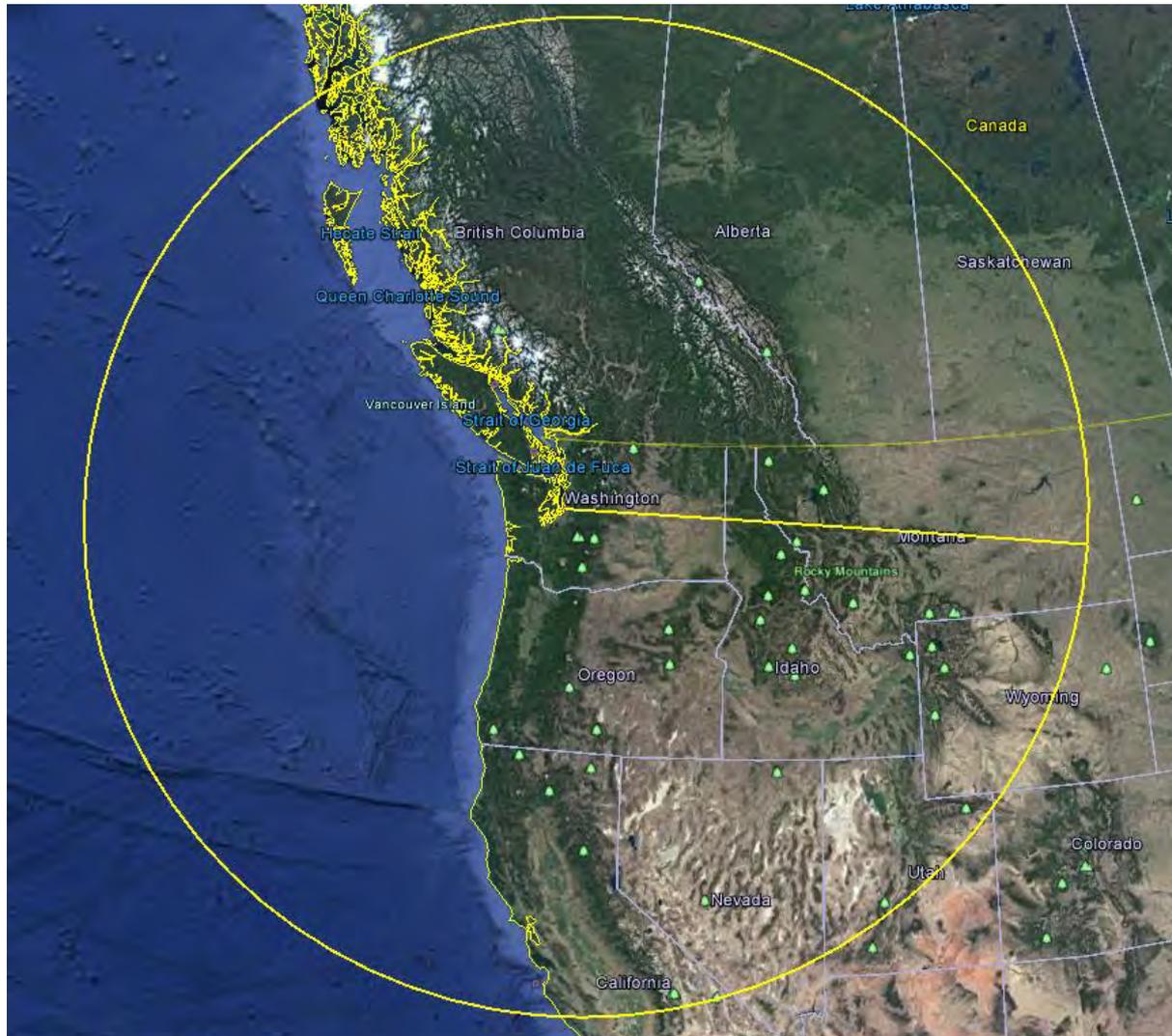
Regional Airline Operations

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

EAWG December Update



- 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?

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