TVF Working Group-2 2017 Summary
Commercial Intra-City
Anubhav Datta
Alfred Gessow Rotorcraft Center
ROLE

• Engage aerospace & aviation community to identify key barriers
  - technological
  - operational
  - business
  - regulatory

• Quantify barriers into specific actionable problems

• Recommend activities to overcome them ... a roadmap
TASKS
July-Dec 2017

- Create elementary baseline/reference mission

- Recruit subject matter experts in enabling/driving technologies
  - Yr 2017 work began with electric power

- Document State of Art

- Survey R&D horizon for (credible & conservative) future outlook
COMMERCIAL INTRA-CITY
ON-DEMAND ELECTRIC-VTOL
STATUS OF TECHNOLOGY

Anubhav Datta
Associate Professor
University of Maryland at College Park

AN AHS/NARI TRANSFORMATIVE VERTICAL FLIGHT
WORKING GROUP-2 REPORT

January 15, 2018
ANUBHAV DATTA, University of Maryland, Chair / WG Lead

MIKE HIRSCHBERG, American Helicopter Society (AHS) Int.
JOSEF KALLO, German Aerospace Center (DLR)
SEAN ELBERS, Lockheed Martin
SEAN WAKAYAMA, The Boeing Company
JUAN ALONSO, Stanford University
EMILIO BOTERO, Stanford University
CANDICE CARTER, Kansas State University
BRENT MILLS, U. S. Army Research Laboratory
WANYING, University of Maryland
ERIC TIJERINO, Self
DETLEV KONIGORSKI, Airbus, Commercial Airplanes
NIJO ABRAHAM, NASA Langley
ERIC BARTSCH, Chanute Consulting
CHRISTOPHER CADOU, University of Maryland
CARL RUSSELL, NASA Ames
FRANCISCO MARTINS, Embraer
VALENTINI LUIZ, Embraer
MATTHIAS STRACK, German Aerospace Center (DLR)
Addresses 12 Critical Enablers

Contents

TVF.WG2. Current E-VTOL Concepts ................................................................. 8
TVF.WG2. Commercial Intra-City Mission ......................................................... 20
TVF.WG2. Technology ...................................................................................... 22
  Subtopic: VTOL Performance Metrics ............................................................ 22
  Subtopic: High Performance Batteries ............................................................ 25
  Subtopic: PEM Fuel cell Stack ....................................................................... 28
  Subtopic: Hydrogen Storage ......................................................................... 32
  Subtopic: Electric Motors .............................................................................. 34
  Subtopic: Hybrid-electric ............................................................................... 36
  Subtopic: SOFC (Engine-integrated SOFC) ..................................................... 39
  Subtopic: E-VTOL Multi-Fidelity Modeling and Simulation ............................ 42
  Subtopic: Integrated Flight and Propulsion Controls (IFPC) ......................... 45
TVF.WG2. Certification and Regulations .......................................................... 47
  Subtopic: Cyber-security ............................................................................... 47
  Subtopic: Pilot Certification ......................................................................... 56
Does not include yet …

- Safety
- Cost
- Noise
- Air space integration