



# What's Led us to The Topic?

- Emergence of eVTOL aircraft and UAM industry
- Key components to deploy and integrate
  - Vehicles
  - Air Traffic Management
  - Infrastructure
- Void in standards, policy and system oversight
- Aviation Research Division
  - Airport Technology R&D Branch (ATRD)
    - **Safety R&D Section**



# Vertiport Design for eVTOL

## Purpose:

Study and develop recommendations for vertiport design standards for vertical take-off and landing (VTOL) aircraft. These aircraft include, but are not limited to, standard category aircraft (<7000lbs and <9 passengers), optionally piloted aircraft and unmanned aircraft.

- Intense technology and existing concepts research
- Industry Advisory Board (IAB)
- Develop ~6 concepts and conduct operational simulations
- Eventual operationally test with UAM systems
- Final product are recommendations on AC standards (future)

- Vehicle size
- Landing area design and geometry needed for aircraft
- Approach/departure paths
- Expected aircraft loading on landing area
- Aircraft parking requirements
- Power plant specifications
- Battery type, size and charging specifications (electric only)
- Expected noise production

# Mission and Strategic Goals

## Mission

Support and research for the FAA design standards for vertiports and the emerging urban air mobility industry.

## Strategic Goals



### Safety

Focus design standards on passenger, operator, and operational safety in and around vertiports.



### Collaboration

Develop and coordinate with an Industry Advisory Board to ensure all stakeholders' perspectives are incorporated.



### Resiliency

Ensure design standards can evolve with the industry and incorporate any future design demands.



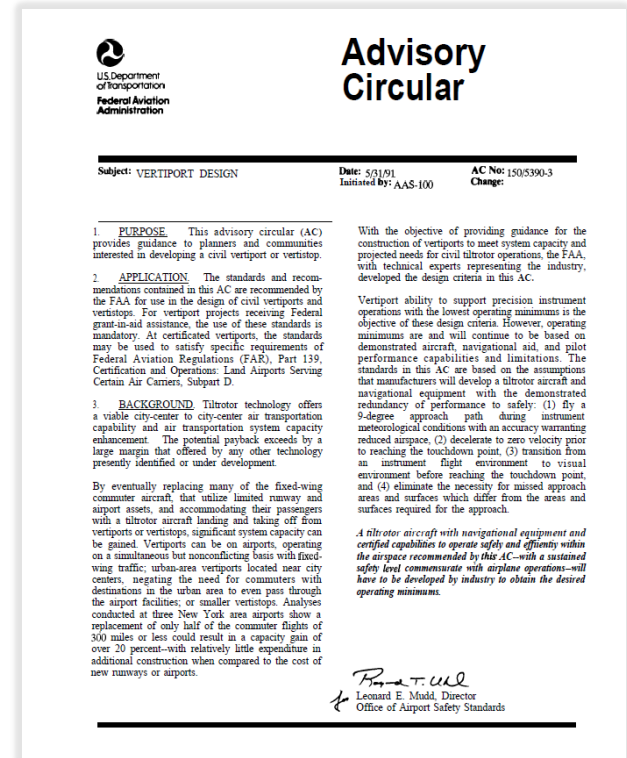
### Implementation

Generate standards that can easily be integrated with existing infrastructure and tangential Advisory Circulars.

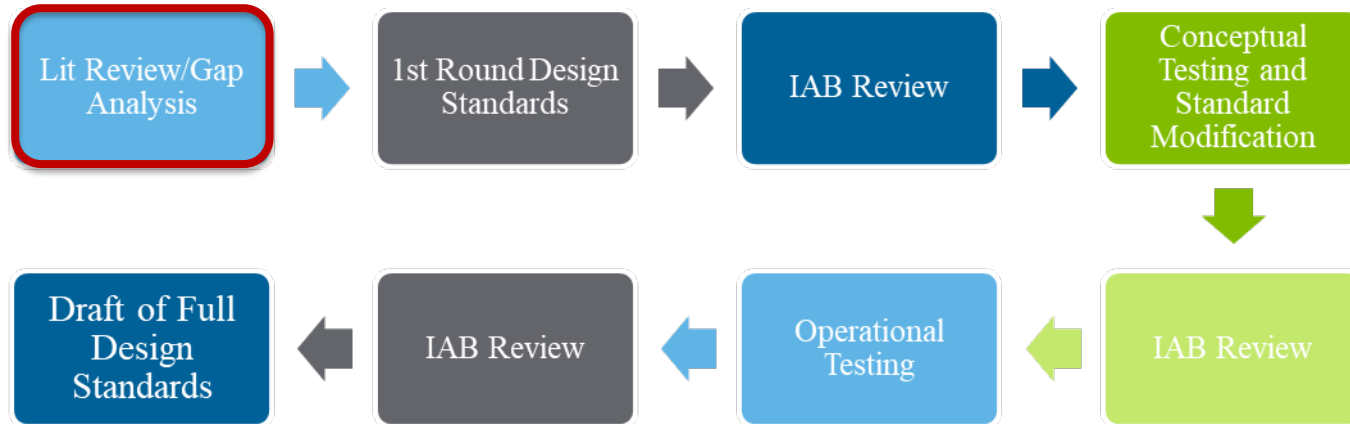


# Starting from Scratch...Not exactly

- Advent of VTOLs in 1970's with tiltrotor and tiltwing aircraft
- Response to hype, FAA published AC 150/5390-3: Vertiport Design
  - Airside, Airspace, Marking, Lighting, Landside Facilities, etc.
- Employed a one-size-fits-all approach
  - Regardless of size, location, operation type, aircraft performance
- AC CANCELLED in 1991 – Limited interest in technology
- VTOL vehicles are:
  - NOT Helicopters,
  - NOT Airplanes...



# Research Approach Overview



- Guiding posts to complete the research
  - eVTOL/UAM documentation and data (made available)
  - Stakeholder and industry SME engagement
  - Current airport and heliport criteria and research
- Estimated 36-months

# Literature Review/Gap Analysis

- Research team reviewed over 110 documents
  - ~70 determined applicable
- Important sources referenced:
  - Government materials
  - Existing research
  - Technical papers
  - International agencies
- Gap Analysis – post completion of lit review
  - Next step after lit review
  - Living document
  - Incorporating new information
  - Identifying further research needs

US Government	FAA – NASA – USDOT – USDoD
International	ICAO – EASA
Manufacturers/Operators	BETA – Uber – Lilliam – EmbraerX – Airservices Australia
University/Academia	MIT – Embry Riddle – St. Anthony Falls Lab – Georgia Institute of Technology – MITRE
Industry Organizations	American Society for Testing and Materials (ASTM) National Fire Protection Association (NFPA) National Air Transportation Association (NATA) McKinsey & Co. Deloitte Insights
Additional Technical Papers	Various authors – Consultants - Corporations
Accidents	NTSB – Investigator Interviews

# Heliport Geospatial Data Standards

- Provide minimum survey specifications to obtain IFPs
- Extension of FAA AC 150/5300-18B: *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*
  - Airports GIS (AGIS) data standards and specifications
  - FAA's Airport Data and Information Portal (ADIP)
  - Authoritative source for airport/airspace geospatial data
- Standardized, verifiable, and reliable safety critical airport data
  - Heliport segment in AGIS database
  - New data schema incorporating heliport features
- Delivered as an Engineering Brief (EB)

ADIP Portal Home Facility Dashboard Help Thomas Mackie

### Airport Data and Information Portal - Home

**COVID-19 NOTICE:** Please click here to see the latest ADIP updates related to COVID-19

Search 5010 Facilities by Name or Loc Id...  
★ You currently have no favorite facilities. To add a facility, perform an search and select the star next to the facility name.  
Go To Advanced Facility Search

**Runway Safety Area (RSA)**  
My RSA Inventory  
User Guide  
Training Guide  
AC 150/5300-13

**My Account (Thomas Mackie)**  
Update My Account Information  
Change My Password

**AGIS Survey Projects**  
My Survey Projects  
Test a Survey File  
Survey Reports  
User Guides & Templates

**Search Wind Data**  
Download Wind Speed Data  
Wind Analysis/Generate Windrose  
User Guide

**Modification of Standard (MOS)**  
My MOS

**Additional Data**  
View/Download Completed Surveys  
Download IFPA/OAS Obstacle Data

**Help & Training**  
My Helpdesk Issues  
Create New Issue  
Online Help

**System Information**  
Version 6.6.0 - Deployed 01/22/2021  
Release History  
Submit Feedback



# Heliport Geospatial Data Standards

	Precision approach to IFR heliport	Precision Approach to IFR heliport	Non precision Approach to IFR Heliport	Approach to Point in Space Proceed Visually	Approach to Point in Space proceed VFR
Visibility Minimums	1/4 statue mile	1/2 Statue Mile <sup>1</sup>	HAL=250-600: ½ SM HAL=601-800: ¾ SM HAL>800: 1 SM	¾ SM Day <sup>6</sup>	¾ SM day, 1 SM night <sup>7</sup>
Height above heliport	200' AGL	200' AGL	250' AGL	≥250	≥250
Heliport Type	IFR	IFR	IFR	VFR	VFR
OCS	34:1 Clear <sup>2</sup>	34:1 Clear <sup>2</sup>	Standard Nonprecision ROC	8:1	8:1
Heliport Size <sup>5</sup>	Depends on design helicopter	Depends on design helicopter	Depends on design helicopter	Depends on design helicopter	Depends on design helicopter
Heliport Markings	IAW 150-5390-2	IAW 150-5390-2	IAW 150-5390-2	IAW 150-5390-2	IAW 150-5390-2
Heliport Lights <sup>3</sup>	Required	Required	Required	Required	Required
Survey Required	Yes	Yes	Yes	Yes	No
Approach Lights(HALS)	Yes	No	No	No	No
HPZ helicopter protection	Yes	Yes	Yes	Yes	Yes
Final Approach Reference Area	Yes	Yes <sup>4</sup>	No	No	No

- Delivery of survey data to FAA will be required
  - Standardized format
  - Meeting accuracy specifications
  - Supplemental reporting
- Establishing authoritative source of safety critical data – multiple applications
- Foundational to eVTOL and UAM safety and operations
  - Future geospatial data requirements
  - Establishing airspace protection for heliports
- Fully integrated airspace of the future

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