Center for Emerging Concepts and Innovation

Federal Aviation Administration

Presented to: REDAC

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Facilitating the Safe Introduction of New Technologies

- New technologies enabling innovation
  - Safety enhancing technologies
  - Advanced automation
  - Artificial intelligence
  - Additive manufacturing
  - “Low Boom” aerodynamics
  - Electric / hybrid-electric propulsion
  - Advanced / urban air mobility

Facilitating the Safe Introduction of New Vehicles

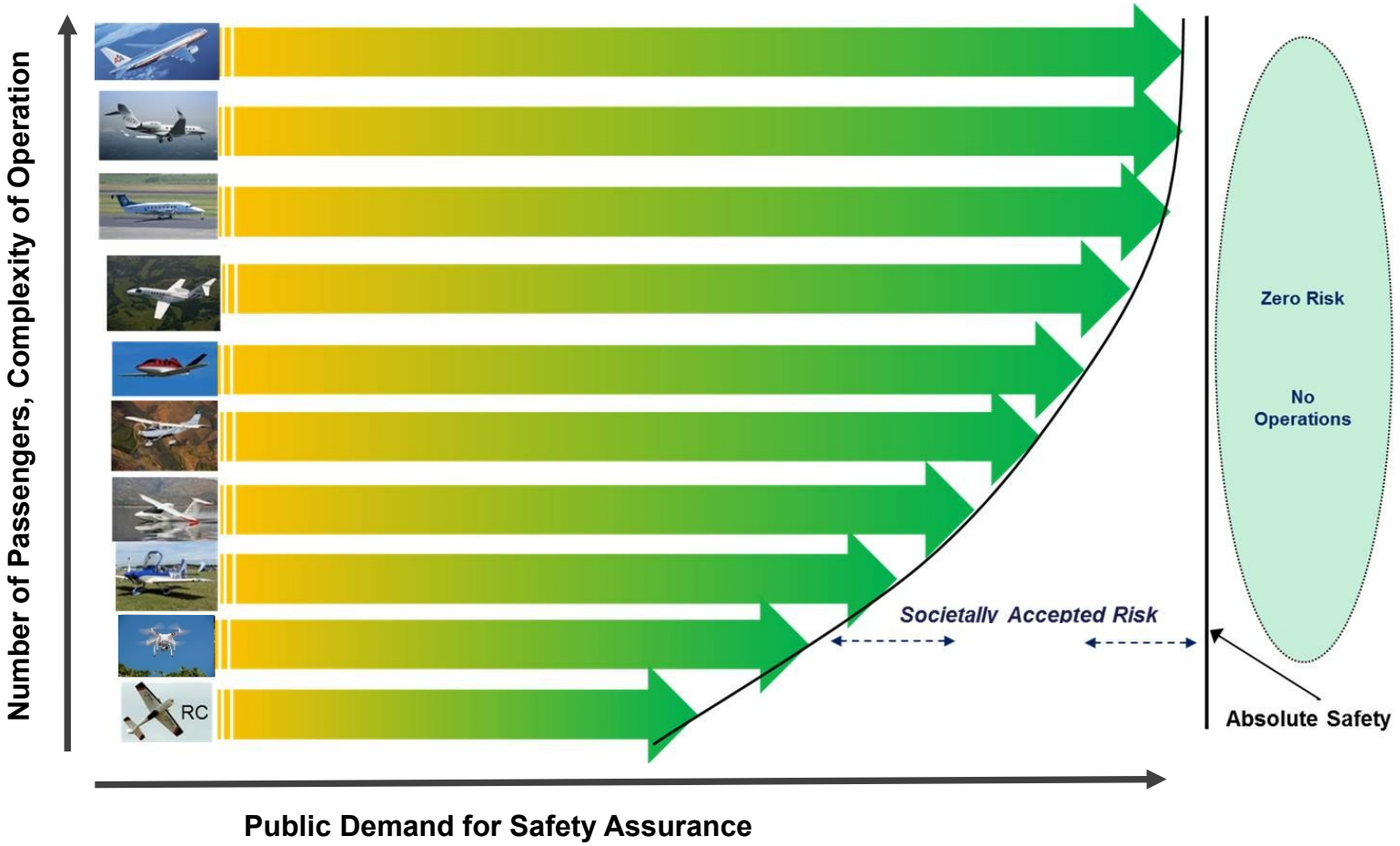




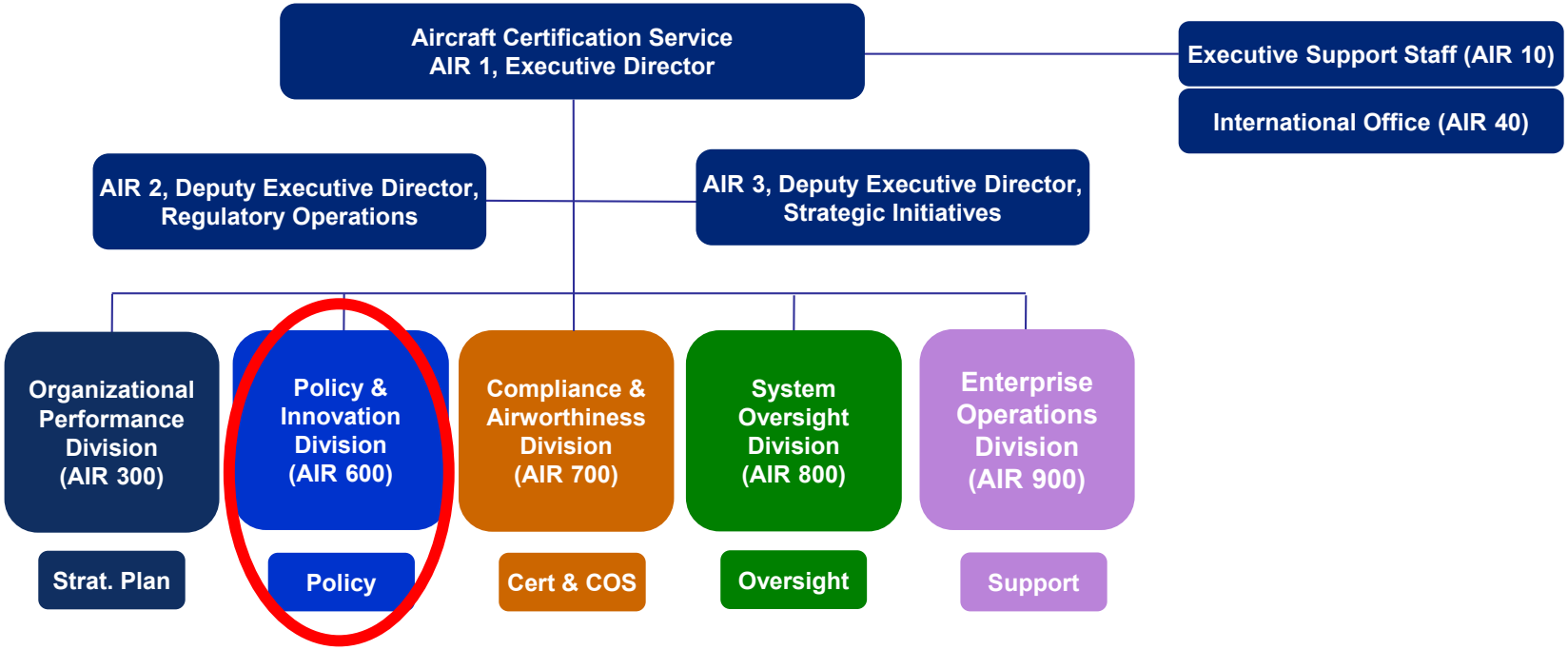




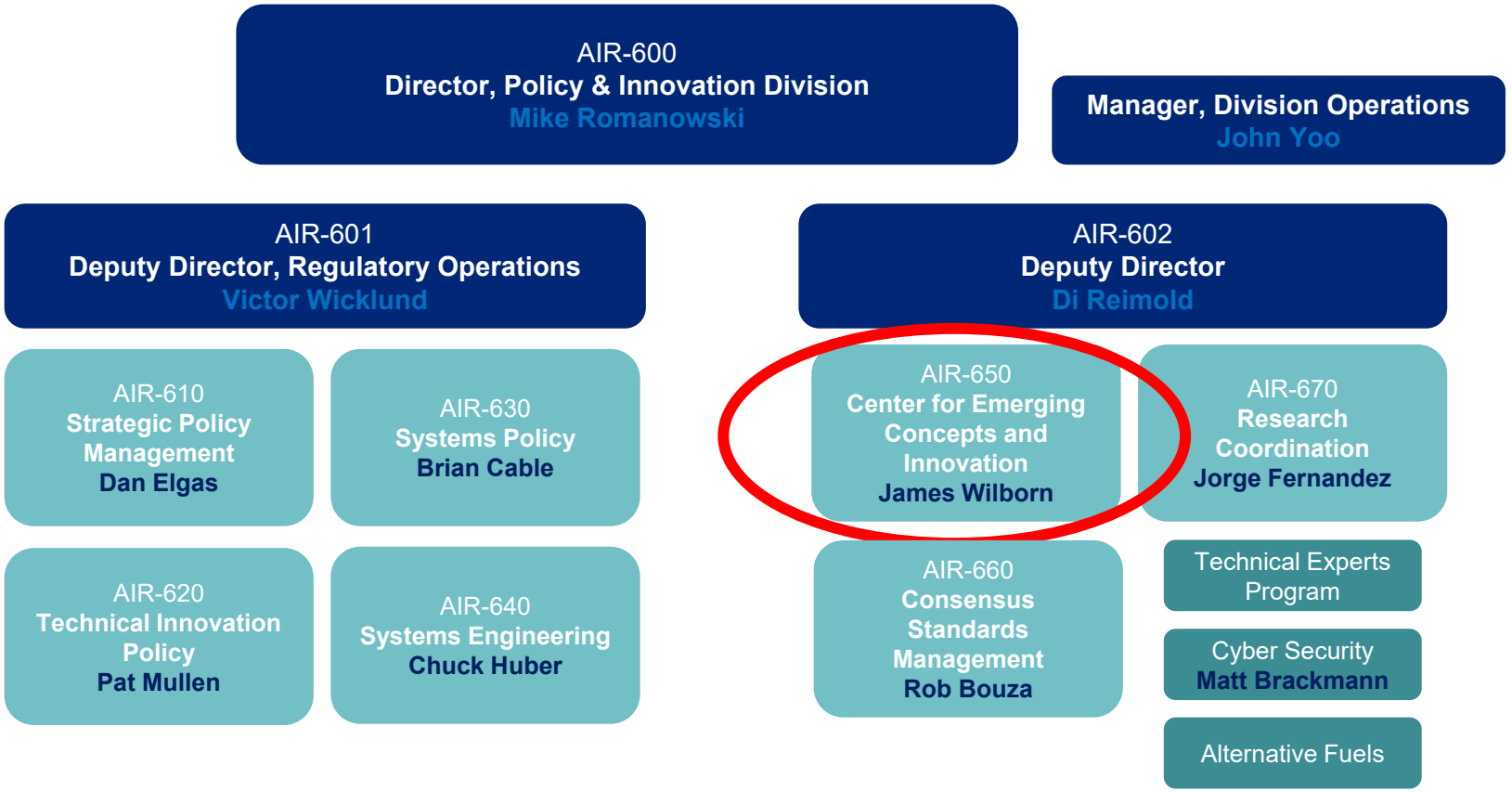
Safety Continuum Provides a Framework for Certification Requirements



Aircraft Certification Service



AIR-600 Policy and Innovation Division



Center for Emerging Concepts and Innovation

- Center facilitates safe introduction of new innovative products through –
  - Early engagement
  - Understanding the cross-cutting issues and developing strategies to address them
  - Outreach and education/partnerships
  - Research and development
- Pre-application engagement with applicants to develop clear path to compliance
  - Participation across AIR & FAA

A Framework to Enable Innovation

- Advancing ***performance based regulations*** to enable our approach to new technologies
- Tailoring ***certification requirements*** to specific applications
- Leveraging technical experts to identify and raise awareness of ***emerging technologies and trends***
- Collaborating on **cross-*discipline approaches*** to for introducing new technology into the airspace
- Building ***partnerships*** with NASA, industry, researchers, and other certification authorities on a common approach
- Defining ***areas of research***

Building the Framework
Performance Based Regulations

- Setting high-level requirements without prescribing any specific means to achieve them
  - Part 23 at Amendment 23-64
  - Part 25 Transport Airplane Certification Modernization
- Leveraging the work of industry standards committees (ASTM, SAE, RTCA, etc.) to develop more robust means of compliance

Certification Requirements Tailored for Specific Applications

Reflecting safety continuum risks and expectations for innovative vehicle concepts

Fixed wing

(Parts 23, 25)

Engines & Propellers

(Parts 33, 35)

Rotary wing

(Parts 27, 29)

Special Conditions

Certification Basis (21.17) and Means of Compliance

Building a Framework
Embracing New Technology

- Leveraging the technical expertise of our Senior Technical Experts Program (STEP)
  - Chief Scientific and Technical Advisors (CSTAs) and Senior Technical Specialists (STS)
  - Facilitate the development of strategies and research in their areas of expertise
- Example Areas of Focus
  - Advanced avionics / artificial intelligence
  - Advanced materials
  - Autonomous flight
  - Complex flight control laws
  - Crash dynamics
  - Electromagnetic compatibility
  - Engine system dynamics and safety
  - Flight deck technology integration
  - Flight Simulation
  - High speed flight
  - Human factors
  - Icing
  - Wake Turbulence

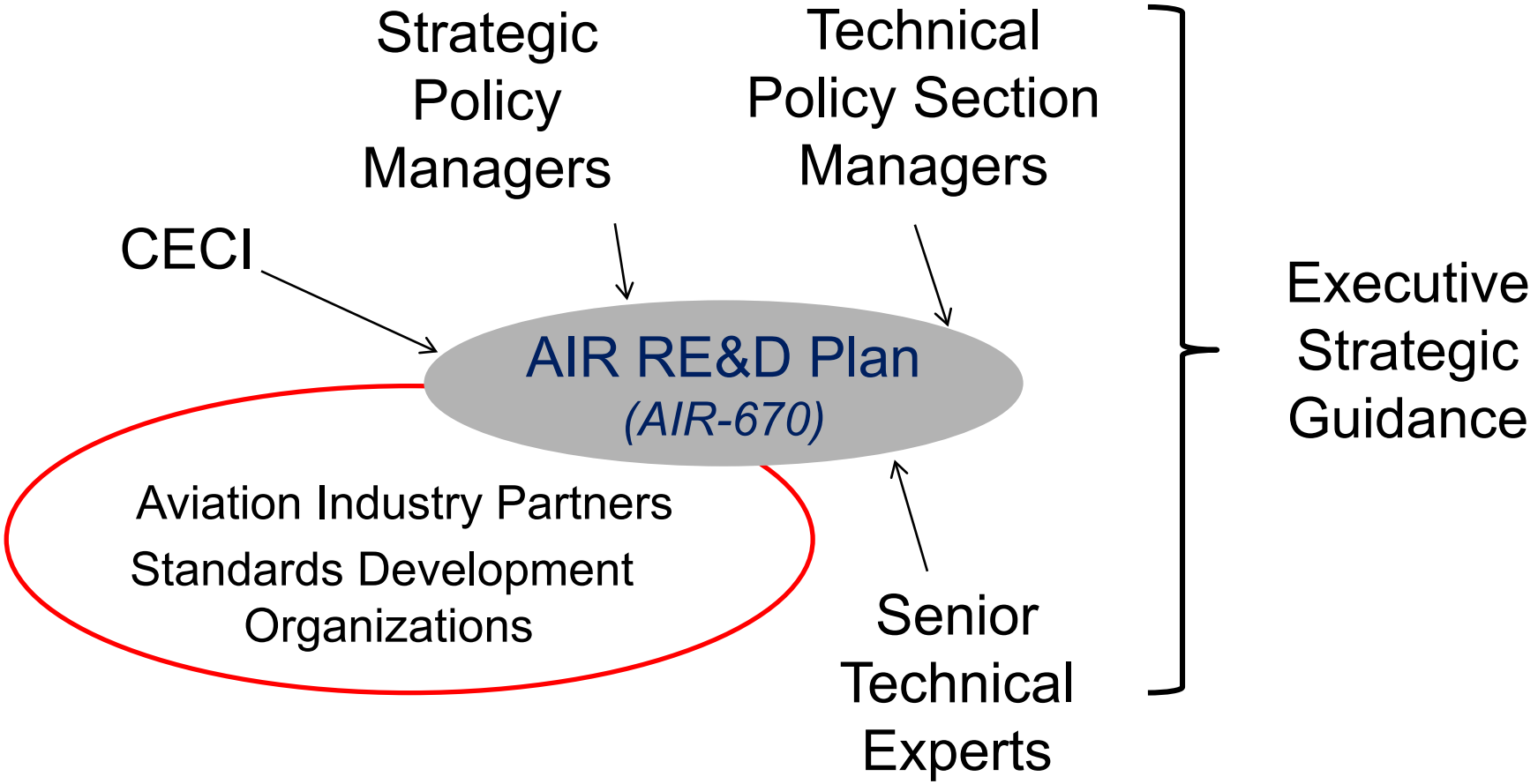
Building the Framework
Cross-Discipline Coordination

- CECI coordinates with other FAA offices that are likely to see impacts from innovative projects
- Early engagement ensures that issues are recognized and addressed long before a product is approved
- Examples
  - Reduced pilot qualifications for highly autonomous vehicles
  - Compatibility of high speed and conventional subsonic vehicles in commercial airspace
  - Infrastructure to support alternative energy sources for propulsion (electric, hydrogen fuel cells, alternative fuels, etc.)
  - Airspace design and control for urban air mobility
- Monthly roundtable meetings facilitated by CECI with focal points from across FAA lines of business

Building the Framework
Partnerships

- NASA's Urban Air Mobility Grand Challenge
- Supersonic Flight Test Demonstrator
- UAS Integration Pilot Projects
- Outreach to the aviation community
- Coordination with Foreign Authorities

Building the Framework
Research and Development



Thank You!