

Navigating the Valley of Death: Lessons for Defense Acquisition from Transitioning Electric Vertical Takeoff and Landing Technologies in the United States Air Force Jim Mignano and Lauren A. Mayer May 8, 2025

This briefing transmits results of RAND research published in Goldfeld et al., *Amping Airpower—Electric Vertical Takeoff and Landing for the U.S. Air Force: Military Utility, Market Dynamics, and Warfighter Adoption*, RAND Corporation, 2024, and Mayer et al., *Department of Defense Considerations for Leveraging Commercially Developed Emerging Technologies: Preliminary Insights from Advanced Air Mobility*, RAND Corporation, 2023.

# How can defense organizations bridge the valley of death without initial capability sponsorship?

DoD increasingly seeks to adopt emerging commercial technologies for operational uses

Emerging commercial technologies often lack alignment with an existing capability gap

Without a clear capability gap, options to transition commercial technologies are relatively limited and uncharted



NOTE: A *capability gap* is "the inability to meet or exceed a capability requirement, resulting in an associated operational risk until closed or mitigated. The gap may be the result of no fielded capability, lack of proficiency or sufficiency in a fielded capability solution, or the need to replace a fielded capability solution to prevent a future gap" (CJCSI 5123.01I, October 30, 2021, p. GL-8).

# Electric Vertical Takeoff and Landing (eVTOL) Illuminates Challenges for Transitioning Commercial Innovation

- Misalignment with Capability Gaps
- Limited Options without Sponsorship
- Disincentives to Sponsorship
- Uncertainty in Transitioning from Experimentation
- Limited Influence on Commercial Design
- Supply Chain Risks



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Amping Airpower —Electric Vertical Takeoff and Landing for the U.S. Air Force

Military Utility, Market Dynamics, and Warfighter Adoption





NOTE: Capability *sponsorship* refers to formal programmatic support from an authorized defense organization, tied to a validated capability requirement, which enables entry into the Defense Acquisition System.

## eVTOLs Also Illuminate Possible Transition Routes



# Possible Transition Routes for Emerging Commercial Technologies



NOTE: This figure reflects transition routes specific to the USAF as of July 2022.

## Findings and Recommendations for Transitioning Emerging Commercial Technologies

### Findings

Feasible Transitions Experimentation

Prototyping Small-scale purchase

#### **Flexible Mechanisms**

Other Transactions (OTs) Commercial Solutions Openings (CSOs) Adaptive prototyping and

incremental funding

### Recommendations

- Explore New Routes and Mitigate Barriers to Support Use of Emerging Commercial Tech
  - Investigate mechanisms to unlock new routes
  - Develop approaches to mitigate remaining barriers
- Refine Model and Raise Awareness
  - Refine model to tailor transitions
  - Assess long-term outcomes of transition routes
  - Develop and promulgate best practices for exploiting routes
  - Broaden model for application across DoD
- Leverage Findings to Better Exploit Available
  Transition Routes



NOTE: Recent Executive Orders on acquisition reform emphasize the need for agile and adaptive approaches to integrate emerging technologies. See, for example, Executive Order 14265, "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base," April 9, 2025.

## Questions and Feedback Are Welcome

#### **References to RAND Reports**

Goldfeld, Dahlia Anne, Lauren A. Mayer, Jeffrey S. Brown, Shawn Cochran, Elizabeth Hastings Roer, Sydney Litterer, Richard Mason, Jim Mignano, Samantha McBirney, and Carlos A. Villegas, *Amping Airpower—Electric Vertical Takeoff and Landing for the U.S. Air Force: Military Utility, Market Dynamics, and Warfighter Adoption*, RAND Corporation, RR-A1524-2, 2024. As of April 29, 2025: <a href="https://www.rand.org/pubs/research\_reports/RRA1524-2.html">https://www.rand.org/pubs/research\_reports/RRA1524-2.html</a>

Mayer, Lauren A., Elizabeth Hastings Roer, Jeffrey S. Brown, Richard Mason, and Dahlia Anne Goldfeld, Department of Defense Considerations for Leveraging Commercially Developed Emerging Technologies: Preliminary Insights from Advanced Air Mobility, RAND Corporation, RR-A1524-1, 2023. As of April 29, 2025: <u>https://www.rand.org/pubs/research\_reports/RRA1524-1.html</u>

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