

# Issues for Aeronautics Research and Technology Roundtable Dialogue

## Introduction

A key action from the first meeting of the Aeronautics Research and Technology Roundtable (ARTR) was to develop the focused set of issues for discussion by the Roundtable and the Roundtable Sub-Groups (Commercial Aviation, General Aviation, Unmanned Aircraft Systems, and Vertical Lift). This document articulates the priority issues for ARTR dialogue from ARMD's perspective. We have deliberately described these issues in a general way so that they are applicable to each ARTR Sub-Group as well as the ARTR as a whole.

## 1. What are the Technical Competencies for Sustained Leadership?

The global air transportation system is increasingly being driven by growth and development outside the traditional North American and European markets. For example, the forecast for growth in the Asia Pacific region over the next five years is the addition of 350 million new passengers. China alone is planning to add at least 45 new airports in the next five years. And as operations become more global, aeronautics research and manufacturing capabilities become more global. China is developing its own large commercial aircraft research and manufacturing capability, largely built on their national economic and transportation needs. In the case of other nations, notably Brazil, Canada and Russia, they are using Regional Jets as an entry to the global market but are moving "up market" into large civil transports as opportunities allow. And while drivers for growth vary, global interests in other markets – from general aviation to UAS – are growing. Even areas that we traditionally think of from a U.S. perspective – such as air traffic management – will be more heavily driven by global requirements in the future.

Partnerships across nations and companies will certainly increase in this expanding global market environment. Centers of excellence in various capabilities and disciplines will be developed around the world and will serve to accelerate the overall advancement in the state-of-the-art. However, technical excellence will remain a key leadership differentiator for the U.S. Moreover, many capabilities, (for example composite materials) have key challenges across the life-cycle of development and operation that provide unique opportunities for research and technical leadership.

Identifying candidate areas for establishing technical excellence and identifying life-cycle opportunities in those areas is of significant interest to ARMD. **Therefore, a key issue for discussion is understanding the technical competencies that the U.S. should maintain or develop to sustain excellence and ensure future leadership in aeronautics and aviation. In addition, to stay at the forefront of development we need to be taking the appropriate levels of risk. Near-term technologies tend to be more mature and involve less risk while longer-term technologies at lower levels of maturity tend to entail more risk. What level of technical risk should the U.S. and NASA be taking?**

## **2. What are the Most Important Aviation Risks and Opportunities for Research Focus?**

ARMD pursues goals to advance aviation for the economic and societal benefit of the U.S. These goals include research and technology to improve mobility; increase safety; achieve higher levels of energy efficiency; decrease environmental impact; and, sustain a world-class aeronautics workforce. Key national and global trends intersect with these goals. These trends include: critical global constraints such as rapidly rising energy costs and cost volatility driven by rising demand in emerging economies; air transportation mobility challenges such as the dramatic drop-off in short haul flights over the last decade; new demand drivers such as introduction of regular UAS operations, substitution of telepresence for air travel, or generational changes in travel preferences; and, evolving issues with workforce development, such as the need for continuous, distributed and specialized education or ensuring sufficient and varied opportunities for experience in system and system-of-system developments.

In light of ARMD's goals, ARMD wants to understand the ARTR's perspectives on key trends and the risks facing the U.S. and global aviation systems so we can conceptualize solutions and properly prioritize investments across goals. At the same time, the ARTR's forward-looking views on enabling expanded mobility opportunities and new aviation markets is equally important. **Therefore, ARMD seeks to understand the risks and opportunities facing aviation in the context of our goals. What are the major risks to aviation over the next 5 years? 10 years? 20 years? What opportunities are likely to arise over the next 5 years? 10 years? 20 years?**

## **3. What Research is Most Effectively Accomplished by Public-Private Partnerships?**

Maximum benefit of the nation's investment in ARMD comes when there is a productive pipeline from fundamental research through systems-level research and to the transition of productive knowledge to the broader aeronautics community for application to products and processes. This technology transition process is best accomplished when ARMD's research is performed collaboratively with the community.

Therefore, ARMD seeks to continue, expand and develop new public-private partnerships to accomplish these collaborations. These collaborations can take different forms depending on the needs and nature of the research and technology. **Therefore, ARMD wants to understand the areas for long-term fundamental research or discrete integrated systems-level research projects that could most effectively be accomplished by future public-private partnerships.**

## **Summary**

The issues articulated above are the key topics for ARTR dialogue. Insights from the dialogue will allow ARMD to understand community perspectives on which technical competencies should be emphasized; what key risks and opportunities provide top-down research focus; and, opportunities for collaborative public-private partnerships. We expect that the ARTR will engage in an "organic" discussion considering the issues as a whole, rather than trying to separate and discuss each issue on its own. **In the final analysis,**

**ARMD will get the most value from understanding the several integrated systems-level research investment areas that the members of the ARTR sees as high potential for public-private partnerships, including the context for those investments.** ARMD will integrate the insights from the ARTR with other internal and external inputs and craft a prospective “national agenda” for integrated systems-level research investments. This “national agenda” would be the subject of future dialogue of the ARTR.