



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE
WASHINGTON DC**

**Assessing Advanced Aerospace Mobility Concepts
Abstract**

The Mobility Air Forces (MAF) have operated under an umbrella of air dominance for as long as they have existed. They have trained and been equipped for that level of protection. Today we find that we are facing challenging threats that require new capabilities. The pacing threat in the Pacific now implies that the MAF will need to operate in a contested environment in support of Agile Combat Employment (ACE) operations. To operate in this anticipated environment, the MAF Airlift and Air Refueling fleets will need to move cargo and fuel over extreme distances into distributed bases while maintaining a high operational tempo. New concepts of operations (CONOPS), enabled by new technologies, many of which are commercially driven, will enable this novel capability.

Commercial enterprise is advancing aerospace engineering at a dramatic pace, ranging from the development of commercial air taxis and short-hop air cargo transportation to inexpensive space launch. Department of the Air Force (DAF) needs are more challenging due to the contested environment in which it will need to operate, but the opportunity to capitalize on commercial investment and innovation is substantial. There are industry-government partnerships already in place addressing some of the challenges that are posed by the anticipated operating environment, particularly tanker and cargo platforms with significantly reduced fuel requirements. The potential benefits offer higher fuel offload capabilities at longer ranges and more ton-miles of cargo per ton of fuel. Moreover, re-usable space launch capabilities are also part of an industry-government partnership. These partnerships enable the DAF to participate in technology development that has a commercial market, reducing cost and expanding the scale of production capacity. How and when such commercial capabilities will deliver military value, and what enabling technologies they are built on, remain to be defined.

Air Force leadership tasked the Department of the Air Force Scientific Advisory Board to conduct a study on "Assessing Advanced Aerospace Mobility Concepts" to assess new mobility concepts in the context of a contested environment in the Pacific. The study identified opportunities to build on advanced aerodynamics concepts and enhance both tanker and cargo transport efficiencies and effectiveness. These technologies and others would enable greater levels of survivability in contested settings while improving ACE operations. Moreover, the study identified needs, and technological enablers, for sustainment. Finally, the study defined a Science and Technology roadmap, suggesting appropriate near-, mid-, and far-term investments.

The Study Team received briefings from organizations within the Department of the Air Force, other governmental organizations, Federally Funded Research and Development Centers (FFRDCs), and Industry, and benefited from advisors from the Air Force Research Laboratory, Headquarters Air Force, and the MAF. The Study Team received outstanding support from a cadre of volunteer Executive Officers (who were also domain expert in their own right), and DAF SAB Secretariat members throughout the duration of the Study.