Good morning Chairwoman Granger, Ranking Member Visclosky, and Members of the Defense Subcommittee. Thank you for providing me and other Members of the House with the opportunity to testify to the Subcommittee on issues that are important to our national security.

The Air Force estimated needing $497.7 million for its Technology Transition Program (TTP) during fiscal year 2018, in its fiscal year 2017 RDT&E President's budget request to Congress.   This program is in the Advanced Component Development and Prototypes budget activity for efforts to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment. Of this amount, **Only $87.4 million (a mere 18 percent) is set aside for all other technologies relevant to the diverse Air Force mission set,** while the vast majority, $410.3 million (82 percent) is dedicated for advanced engine development.

The Technology Transition Program (TTP) in the Air Force's budget provides funding to demonstrate and/or experiment with technologies and concepts to enable or accelerate their transition to acquisition programs of record and operational use. It addresses the gap that exists between when a technology or concept is first developed and demonstrated to when it can be successfully acquired and implemented as an operational capability. TTP bridges that gap by providing funding and enabling integration and demonstration to continue beyond the laboratory. It also allows acquisition program managers and warfighters to prototype, integrate, demonstrate, and experiment with candidate technologies and assess them in an operational environment in partnership with PEOs, schools, simulation facilities, and development planning organizations.

TTP includes research and development funds for the following transition activities:

(1) experimentation campaigns to support Air Superiority 2030+ promising, high-priority concepts and technologies in an operational environment;

(2) prototyping to lower acquisition risk by raising the technology readiness level and assessing implications to CONOPS, tactics, techniques, and procedures;

(3) performing pre-acquisition systems engineering to facilitate transition of concepts and technologies from a demonstration program into acquisition programs of record;

(4) assessing external interface requirements of candidate concepts, technologies, and demonstration projects to better understand true engineering costs resulting from insertion of new technologies into the AF enterprise architecture; and

(5) capturing data through information technology tools and databases to help formulate technology transition acquisition strategies and gather proposals for technology and prototype development that have the potential for application to the performance of Department of Defense missions.

The $87.4 million estimated for technology transition of non-engine technologies during fiscal year 2018 is insufficient to address critical Air Force technology development and insertion needs.

In addition, there are now opportunities emerging for the Air Force to team with states, universities, national laboratories, and small and medium businesses to identify novel technologies and concepts on a **100 percent cost-shared basis**. The Air Force's FY 2018 budget estimate does not allow the service to take advantage of these opportunities, particularly due to the skew towards aircraft engine development.

The Air Force is particularly interested in new systems-of-systems research, mixing low-tech and high-tech assets into a synergistic and more combat-effective framework. Additional funds are urgently needed in FY18 to rapidly evaluate new system-of-system solutions and develop the trust methodologies required to provide rapid, cost effective, flight qualified, and reliable mission solutions for a wide range of DOD high/low mission operations. The focus of this effort would be on scalable and modular technologies using additive manufacturing solutions which could be deployed in multiple defense applications across a variety of platforms, technologies, and varying terrain and weather conditions.

Critical to these flexible systems-of-systems solutions are the capabilities to facilitate **manned-unmanned teaming**. These concepts can have the added benefit of extending the useful life of existing fleets of fourth generation fighters and weapons. The exponential growth of the commercial unmanned aerial vehicle sector is facilitating the creation of novel, low-cost concepts of employment that create new opportunities for current Air Force aerospace systems. Commercial interests and a large and active open source community have enabled rapid improvement of unmanned capabilities in general, which should be properly integrated and could rapidly enhance U.S. warfighter effectiveness and increase cost effectively enhance. These emerging systems will enhance operational flexibility in multiple mission environments to include ISR, electronic warfare, kinetic and cyber weapon delivery.

I strongly urge the Subcommittee to provide a generic program increase of $15.0 million to the Air Force's fiscal year 2018 budget request for the Technology Transition Program when it marks up its Department of Defense Appropriations Act, 2018 -- specifically for cost-matched technology transition that can be fully competitively awarded by the Air Force. This funding will support research, development, system performance

modeling and simulation, additive manufacturing, demonstrations and rapid evaluation of system-of-systems prototypes and would allow fully cost-matched investments in:

- **A diverse portfolio of capabilities that enable multiple combinations of air-to-space to- cyberspace operations in all environmental conditions and in highly-contested and permissive environments.**

- **New concepts and capabilities to counter the increasing technology and proliferation of anti-access and area denial threats, to include multi-domain approaches and systems that can be rapidly modified when adversaries adapt their defenses.**

- **Tailored forward presence from small, resilient bases, using dispersal, warning, active and passive defenses, rapid repair capabilities, and streamlined logistics through the use of additive manufacturing.**

- **Algorithm-based (as opposed to hardware-based) human-computer interface systems that work with humans to provide predictive analysis, and assist in rapid, multi-domain course of action development by providing Big Data analytics, emulation, and testing, as well as present easily visualized information through a tailorable, user-defined operating picture.**

Thank you again for the opportunity for me to bring this important issue to the Subcommittee's attention today.