

## **Air force analytic excellence: 75 years and counting**

It's an honor to be part of this inaugural issue of the *Journal of Defense Analytics and Logistics*. As you can tell from the title, operations research (OR) has been a part of the Air Force for quite some time – in fact, you could even say that within the DoD, the Air Force was the early adopter of it.

The Air Force was recently recognized for its analytic excellence in a significant way. On April 3, I accepted the 2017 INFORMS prize on behalf of the US Air Force for our pioneering and enduring integration of OR and analytic programs into the organization. Every year, the INFORMS prize is awarded for effective integration of advanced analytics and operations research/management sciences (OR/MS) in an organization. The award is given to an organization that has repeatedly applied the principles of advanced analytics and OR/MS in pioneering, varied, novel and lasting ways (INFORMS, 2017).

The Air Force received nomination endorsements from US and allied defense leaders, Members of Congress, academics, professional societies and industry representatives.

Our heritage officially began on October 24, 1942 when the commanding general of the US Army Air Forces, General Henry “Hap” Arnold, directed the establishment of OR units at the air staff and at each major command. After viewing the OR units in the British Army, he stated “this method of using officers and civilians for purely analytical work has proven fruitful in many fields and the Army Air Forces should make use of it”. And indeed it was very fruitful. The OR team that arrived in England in 1942 was given the task of applying OR to improve bombing accuracy in daylight precision bombing and they did.

From the very beginning Air Force OR was making big impacts. While working the 1947 Task Force Project Scientific Computation of Optimal Programs (SCOOP), Dr George Danzig developed the simplex algorithm, one of the most important computational advancements of the twentieth century. In 1951, the Air Force installed the first computer in the Pentagon to solve such mathematical problems. After the Second World War, General Arnold co-founded Project RAND. RAND Project Air Force continues the original project's legacy of analysis for the Air Force.

Over the years, the use of OR has only grown as the complex nature of national defense has grown. Across the conflicts after the Second World War – Korea, Vietnam, the Cold War, Desert Storm, Afghanistan, Iraq and counter-terrorism, OR analytical rigor was brought to bear. During the 1960s and 1970s, mathematical models were used to inform a generation of statesman and commanders on nuclear policy decision strategies. Throughout the 1970s and 1980s, OR was applied to establish the requirements that specified the modern aircraft and systems that are the backbone of today's Air Force. As the space and cyber domains have grown in importance from the 1990s to today, we have worked to understand the implications to best adapt to the emerging opportunities they offer us. OR has played a vital role in such diverse yet inter-related areas as operational effectiveness, logistics,



infrastructure, manpower and acquisition by helping understand how to optimize the application of the limited resources to manage risk (Plate 1).

These accomplishments would not have been possible without a sustained commitment to developing the people who make it happen. Today, the Air Force along with RAND Project Air Force has strategically and effectively integrated OR throughout its structure. The Air Force has approximately 570 military and 850 government civilian OR analysts, serving in over 300 organizations. Our analysts work in a unique team of operations and functional experts collaborating with internal and external organizations. Their products are quantitative and defensible analyses and assessments in support of Senior Leadership decision-making. We have invested in producing operations research graduates dating back to 1968 at the Air Force Academy. We continue today, not only at the Air Force Academy but also with Master's and Doctoral programs at the Air Force Institute of Technology (AFIT). AFIT students publish over 100 OR related papers every year.

As we move into the future, there are many challenges facing the Air Force. Air Force OR initiatives will continue to be at the front of major changes in the military. We are joined with USSTRATCOM and Air Force Space Command to improve our space analyses. We have an urgent need to focus on our cyber analyses, especially as the threat continues to evolve. We will continue to work to bring "big data" analytics to the Air Force with new approaches to networking, collaborating and improving our organizational agility.

The past 75 years have created a lasting legacy of analytic performance and advancements that we will carry forward and build upon to meet the challenges of today and tomorrow. In particular, in terms of challenges, we have to advance our ability to use "big data" analytics to improve our understanding of how our systems of systems can better perform as well as improve our decision-speed. It also holds the promise of getting from reactive mode to predictive. Then there is the potential to reap savings in everything from training to supply chain.

So, I am looking forward to what this journal will do in both the analytics and logistics arenas to advance our knowledge and improve our performance in new, innovative ways that will make us better.



**Plate 1.** 2017 INFORMS prize

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#### Reference

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INFORMS (2017), *INFORMS Prize Press Release: US Air Force and Walt Disney Awarded the 2017 INFORMS Prize for Operations Research*, available at: [www.informs.org/About-INFORMS/News-Room/Press-Releases/U.S.-Air-Force-and-Walt-Disney-awarded-the-2017-INFORMS-Prize-for-Operations-Research](http://www.informs.org/About-INFORMS/News-Room/Press-Releases/U.S.-Air-Force-and-Walt-Disney-awarded-the-2017-INFORMS-Prize-for-Operations-Research)

#### About the Guest Editor



Kevin E. Williams, a Member of the Senior Executive Service, is the Director for Studies, Analyses and Assessments, Headquarters US Air Force, Washington, DC. He is responsible to the Secretary and Chief of Staff of the Air Force for leading, carrying out, reviewing and ensuring the analytic integrity of studies, analyses and assessments across air, space and cyberspace domains for the Department of the Air Force. He implements Air Force-wide policy and guidance for studies, analyses and assessments to provide comprehensive, defensible and time-sensitive processes that underpin Air Force warfighting and force structure capability and sufficiency assessments; informs and illuminates leadership on emerging issues; fireproofs resource investment decisions. He is a retired Air Force officer and was an operational fighter pilot in the A-10, F-16 and F-111. He held flying and command assignments in Iraq, England, South Korea and the USA. Kevin E. Williams can be contacted at: [benjamin.hazen@live.com](mailto:benjamin.hazen@live.com)