NRL Space-Based Solar Power Concept Wins Secretary of Defense Innovative Challenge

By Daniel Parry, U.S. Naval Research Laboratory

A team of scientists led by Dr. Paul Jaffe, spacecraft engineer at the U.S. Naval Research Laboratory (NRL), have been named winners of the first-ever Department of Defense (DoD) Diplomacy, Development, and Defense (D3) Innovation Summit Pitch Challenge, for the innovative concept to harness space-based solar energy to power terrestrial assets.

Selected, March 2, from the top six innovation teams from across the DoD, Department of State (DoS) and the U.S. Agency for International Development (USAID), the NRL team was named winner in four of the seven possible award categories for Innovation, Presentation, Collaboration, and People's Choice.

"The proposed approach entails collection of solar energy, its conversion to microwave energy, and the wireless transmission of the microwaves to the Earth," said Jaffe. "This offers the benefit of providing base-load power while avoiding diurnal cycles and atmospheric losses often associated with terrestrial solar power."

The Secretary of Defense's Innovation Challenge is a groundbreaking interagency initiative intended to spur innovative thinking and to encourage collaboration on policy issues that matter most to our nation's security and prosperity, converging technological innovation with defense, diplomacy and development objectives.

Comprised of members from the Department of State Bureau of Energy Implementation, Defense Advanced Projects Agency (DARPA), Joint Staff Logistics Directorate, Air Force's Air University Center for Space Innovation, and industry stakeholders Mankins Space Technology Inc. and Northrop Grumman, the team, according to Jaffe, seeks to empower global prosperity and security through a three-step program leading to an ambitious international on-orbit demo of an orbital power station within 10 years.

"We are extremely excited and honored that this ambitious idea has been selected out of nearly 500 original entries," Jaffe said. "Other major powers around the world, particularly in Asia, are

also investigating this idea in earnest, and it's gratifying to see interest in it domestically ... It's hard to overstate the significance and benefits of this concept if it comes to fruition."

If successful, this project — based on an interagency proposal led by Jaffe entitled Carbon-Free Energy for Global Resilience and International Goodwill — will make possible the construction of huge platforms from tens of thousands of small elements that can deliver, remotely and affordably, tens of thousands of megawatts using wireless power transmissions. This novel approach to the challenge of space-based solar power will enlist the support of a world-class international team to determine the conceptual feasibility by means of integrated systems analyses, supported by selected "proof-of-concept" technology experiments.