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NEXESS Center

The Challenge

The Nation needs an agile, aggressive approach to anticipating, deterring, and defeating threats from explosives attacks by terrorists. Determining and preventing the next high-priority threats that terrorists might consider is critical to the safety of the American people.

The National Explosive Engineering Sciences Security (NEXESS) Center

Sandia National Laboratories, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory have united their technical expertise in explosive engineering science and security systems to form the National Explosive Engineering Sciences Security (NEXESS) Center. The NEXESS Center provides informed analysis backed by an engineering science base for short/mid-term priority assessments as well as mid/long-term research and technology development. Our combined resources provide the ability to anticipate the evolving threat from terrorists by integrating intelligence information with detailed technical knowledge of energetic materials.

This graphic illustrates how the NEXESS Center spans the scope of the explosives challenge – from assessment of the evolving threat to research and experimental investigations to applications of technology in the field to advanced concepts with transformational science and innovative concepts.

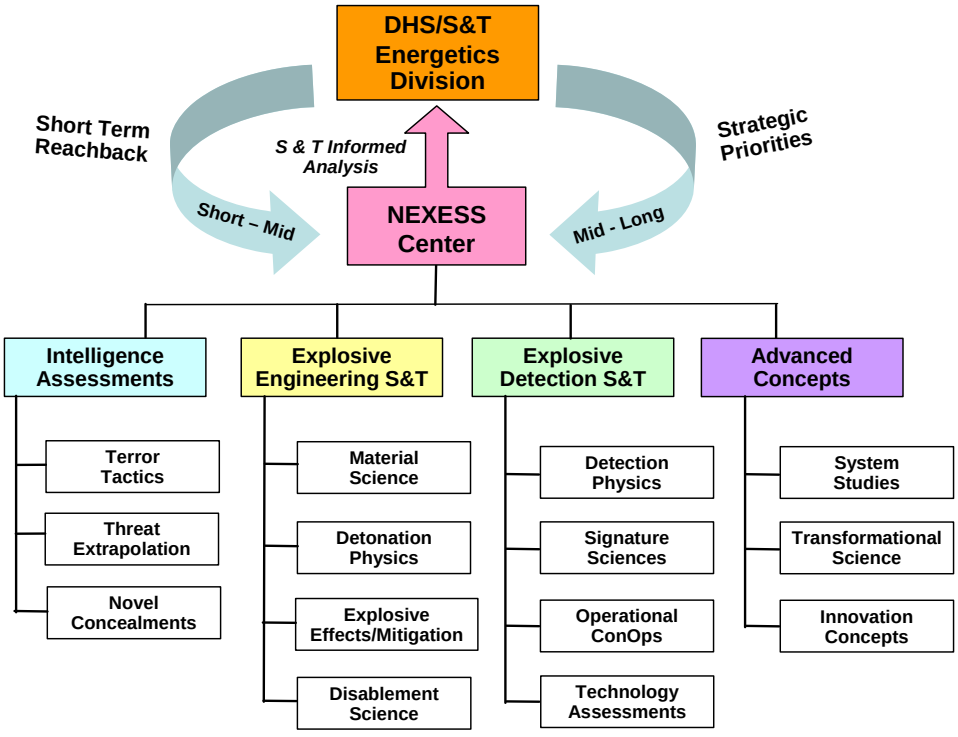

Figure 1. The NEXESS Center emphasizes a science-based approach for solving the nation's most difficult problems in explosives.

Project Newton

Using the scientific basis of three National Laboratories, Project Newton is a NEXESS Center team effort that offers information to the Transportation Security Administration (TSA) to help redefine the requirements for aviation explosives detection security technology. Historically, TSA used results from forensic analysis of terrorist events and actual explosive tests on retired aircraft. Because many factors can influence how explosives can damage aircraft, response modeling offers the opportunity to vary those factors, perform a variety of simulations, and return more data about explosive effects. Using modeling results in combination with tests on actual aircraft offers more in-depth insights for more informed risk-management decisions. This new approach will also enable the evaluation of commercial aircraft in the current fleet, which have significant design differences than retired aircraft. One partner, The Boeing Company, provides structural dimensional information on aircraft models used in the computational analysis and reviews key input data and results.

Project Newton leverages the DOE Advanced Simulation and Computing Program investments over the last decade in modern engineering-science-based computational capabilities.

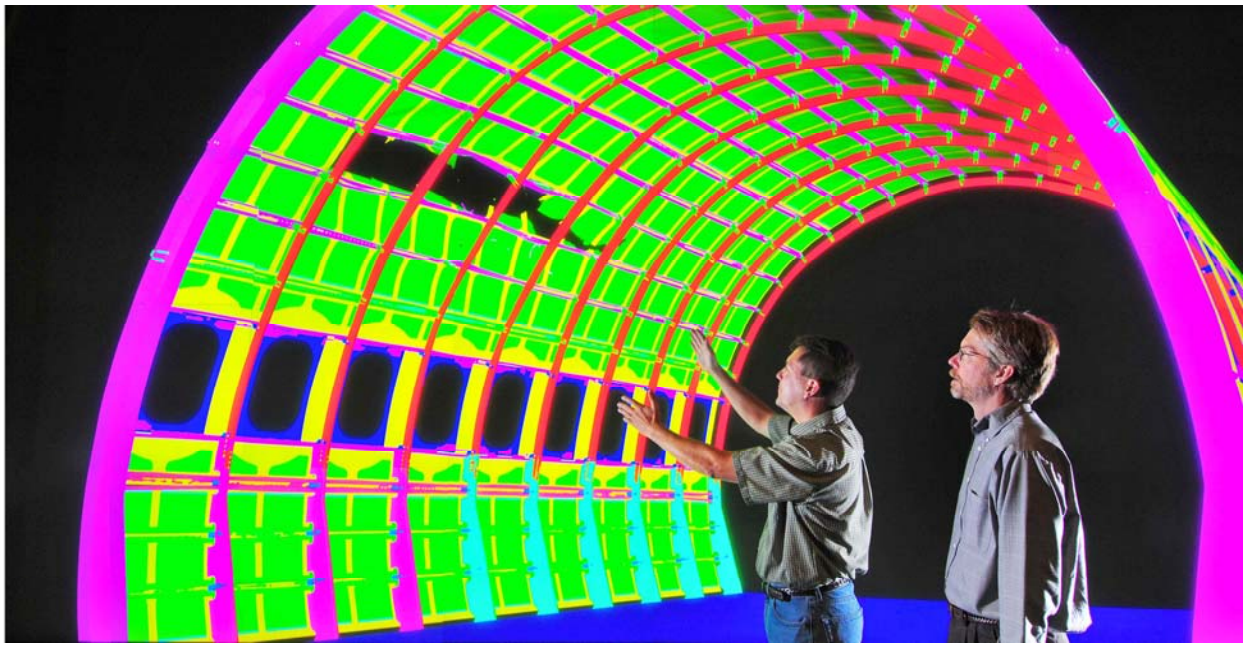

Figure 2. Project Newton models aircraft damage from on-board explosives

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