US Army Corps of Engineers®
Engineer Research and Development Center

Joint Rapid Airfield Construction

Problem

The technologies being developed as part of the research and development effort called JRAC (Joint Rapid Airfield Construction) address the primary obstacles to rapid airfield construction: inadequate or denied theater airfields, unstabilized airfields that support limited traffic, and the large quantities of additives and long material cure times that are required for traditional stabilization as currently practiced.

Description of Research

The JRAC program focuses on providing engineering tools and systems that will dramatically increase the U.S. military's capabilities related to contingency airfield upgrading and construction. This effort is an approved Army Science and Technology Objective that began in fis-cal year (FY) 02 and is scheduled for completion in FY 07. The first major demonstration of JRAC technologies was completed in July 2004 at Fort Bragg, NC, where two C-130 aircraft aprons were added to an existing airfield in 75 hours.

The Rapid Assessment Vehicle–Engineer (RAVEN), developed by the JRAC program

Key elements of JRAC technologies are performance-based site selection, enhanced construction, and rapid soil stabilization. To optimize site selection, the approach will be to use advanced terrain analysis and material performance prediction methods to minimize engineering effort. Enhancements to reduce airfield construction time will derive from exploiting commercial off-the-shelf technologies, streamlining the design and planning process, and developing rapid quality-control tools. For more rapid soil stabilization, the approach is to use new nontraditional stabilizers that require fewer additives, shorter cure times, and low maintenance.

Expected Products

The JRAC program is destined to revolutionize virtually all facets of contingency airfield engineering. Integrated site selection and assessment software systems will be used by war planners to make rapid decisions on where to go based upon sound engineering principles. Compact assessment and quality-control tools will enable the first “boots on the ground” to quickly validate or modify the initial remote assessments. Global positioning satellite (GSP) systems will be the basis of new surveying equipment and retrofitted control systems for existing earthmoving equipment. New low-dosage and fast-curing soil stabilizers and lightweight matting systems will be used to quickly expand runways and aircraft parking aprons. Product news and download links are available at the JRAC Web site (https://jrac.erdc.usace.army.mil/).

Potential Users

JRAC technologies will be used by all military engineering components involved in contingency airfield construction and by combatant commanders responsible for military theater deployment and transportation analyses. Current design aircraft for the JRAC program are the C-130 and C-17. However, spin-off technologies are certain to

positively impact on other military aircraft facilities, such as helipads, jump jet platforms, and short field-assault strips for unmanned air vehicles and other future aircraft.

Projected Benefits

The revolutionary capabilities being developed as part of JRAC research—whether used separately or as part of an integrated system—will reduce the engineering time line, the manpower requirements, and the logistical footprint, while increasing system reliability. These capabilities will allow the Future Force to meet its deployment objective, which is to deploy a brigade-sized Unit of Action to a distant theater in 4 to 7 days.

Program Manager

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Participating ERDC Laboratory

Geotechnical and Structures Laboratory (GSL)