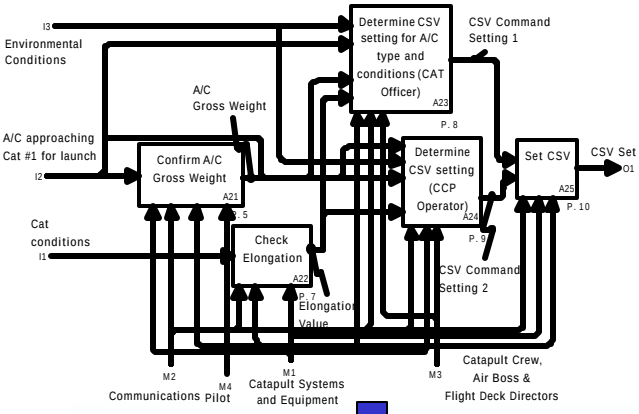
R&D Applications of Modeling and Simulation Technology

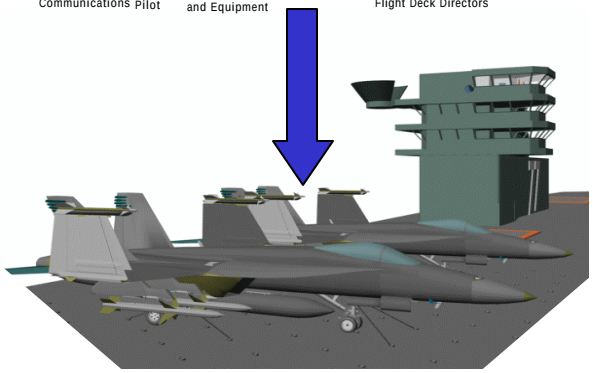
Advantages and Features

NAVAIR Lakehurst is linking process modeling, product modeling, and information modeling to analyze the factors involved with launch, recovery, flight deck, and maintenance activities and their impact on aircraft carrier design. Unlike other modeling and simulation applications that either evaluate flow processes involving people-in-the-loop systems or complex machinery operations and interrelationships, Lakehurst's approach optimizes both.

Technology Description

As the Navy's leader in Aircraft Platform Interface, it is Lakehurst's responsibility to guarantee the performance of all of the systems, equipment, processes and know-how that permit fixed or rotary wing aircraft to operate safely and effectively from an aircraft carrier and other air-capable ships. For one program, a major upgrade to catapult and arresting gear systems is being developed that will take advantage of existing and emerging technologies to integrate all operating, sequence and interlock, equipment monitoring, and data acquisition functions into a redundant microprocessor based control system. These new control systems will improve performance, reliability, and safety while reducing the life-cycle cost of existing and future catapult control systems on aircraft carriers. Although the potential improvements for the return on investment and operational efficiency are significant, the risks involved are massive. The most appropriate way to reduce these risks at reasonable research, development, test, and evaluation (RDT&E) costs is through the application of modeling and simulation technology. Modeling and simulation are also being used to assess the impact of future carrier design changes to the ship's geometry or flight deck design.





If the improvements in technology do not work in the Fleet as projected for aircraft operations, the entire carrier could be incapable of conducting effective air operations. In other studies, NAVAIR Lakehurst and other Naval Aviation Systems Team activities are using process modeling to reduce workload and improve effective use of people on board carriers in a variety of areas including materials handling; launch and recovery; weapons movement; berthing and habitability; supply, hull, mechanical, and electrical equipment; and communications. Under an advanced concept demonstration study, NAVAIR Lakehurst is using distributed simulation to analyze the relationship of current and future war fighting concepts to future carrier designs.

Potential Applications

Modeling and simulation technology can be used to analyze all of the factors that are involved with shipboard aviation operations. Lakehurst's ability to connect with Naval Aviation mock-up laboratories around the country provides the capability to perform state-of-the-art man-in-the-loop assessments. Additionally, Lakehurst's modeling and simulation capability can be applied to the assessment of wind dynamics around air capable ships, arresting gear performance, and weapons handling of the carrier deck. Commercially, the modeling and simulation technology being used by NAVAIR Lakehurst can be applied to evaluate improvements to any complex system that is part of a fixed infrastructure. Potential applications include large industrial systems such as power plants, business process re-engineering, workload analysis, or ship building applications. Currently, NAVAIR Lakehurst is working with Newport News Shipbuilding under a cooperative agreement.

Licensing and Partnering Opportunities

Domestic technology transfer and partnership activities are integral elements of the Department of Defense's national security mission and concurrently improve the economic, environmental, and social well being of U.S. citizens. At the same time, technology transfer supports a strong industrial base that the Department of Defense may use to supply U.S. defense needs.

Several mechanisms exist for partnering with NAVAIR Lakehurst. These include cooperative research and development agreements (CRADAs), commercial service agreements (CSAs), and licensing of government-owned technologies. Under a CRADA, Lakehurst engineers and scientists work cooperatively with their peers in industry or academia on mutually beneficial research and development. The Navy has been given statutory authorization, via CSAs, to use Navy facilities to perform specific types of work for private parties. NAVAIR Lakehurst frequently produces patented, innovative discoveries of commercial value that are available for licensing to the private sector. Information about partnering with NAVAIR Lakehurst is available from the Business Development Office.

For more information contact

Business Development Office
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The Naval Air Warfare Center Aircraft Division Lakehurst, known as NAVAIR Lakehurst, is part of the Naval Aviation Systems Team. NAVAIR Lakehurst researches, develops, tests, and procures aircraft launch and recovery systems and support equipment for Navy and Marine aviation.