Nielsen Engineering & Research, Inc.

Consulting, Analysis, Research, Design, and Development
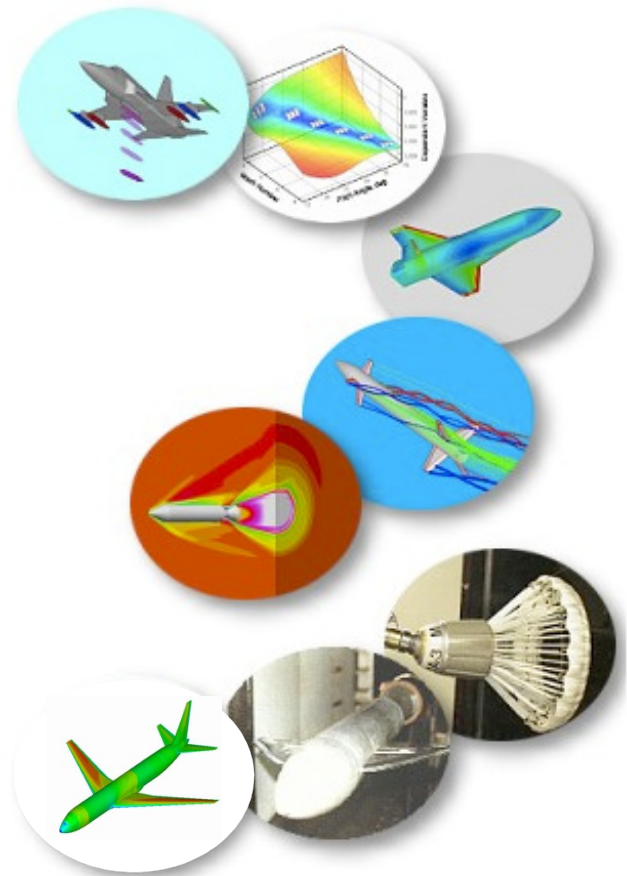
Company Profile

Since 1966, Nielsen Engineering & Research (NEAR) has been providing its customers with analysis, research, design, and development services in the areas of fluid mechanics, aerodynamics, hydrodynamics, flow-related sensors, and aerodynamic hardware solutions. NEAR's staff of highly competent engineers and scientists offer a unique combination of depth and breadth of knowledge, generating innovative and effective solutions in a cost- and time-efficient manner. Analytical services are available to customers who require data for evaluating new ideas, for supporting wind tunnel and flight tests, and for FAA certification efforts. In addition, NEAR's research, design, and development resources satisfy the needs of customers who require assistance with the creation of new products or the enhancement of existing systems or processes.

To accomplish these objectives, NEAR offers 1) a range of aero/hydrodynamic analysis tools including computational fluid dynamics, engineering level numerical methods, and custom-designed analytical software, 2) laboratory and wind tunnel testing, 3) hardware development and evaluation, and 4) a knowledgeable and dedicated staff with the experience to know which tool or combination of tools is the most applicable and effective for a given situation.

Mission Statement

NEAR's mission is to work with our current and future customers to develop data, hardware, and/or intellectual property that will provide them with a competitive advantage for years to come. NEAR is guided by the sense of excellence, integrity, and ethics that has allowed us to maintain the trust of our customers, gained through more than forty years of service to large and small companies in all areas of technical endeavor.

Core Competencies

NEAR specializes in providing analysis, research, design, and development services in the following areas:

- **- Aerodynamic Design and Analysis**
- **- Advanced Computational Fluid Dynamics**
- - **Knowledge Management Systems**
- - **Reduced-Order Modeling**
- **- Flow-Related Sensors**
- **- Aerodynamic Hardware Solutions**

Aerodynamic Design and Analysis

NEAR provides all levels of aerodynamic design and analysis ranging from basic engineering methods to advanced CFD calculations. These tools, coupled with NEAR's capabilities for analyzing complex fluid phenomena, are applied to customers' problems to achieve accurate and efficient solutions. Practical project experience in both analytical and experimental aerodynamic techniques is the basis for NEAR's excellent reputation for delivering results for commercial programs.
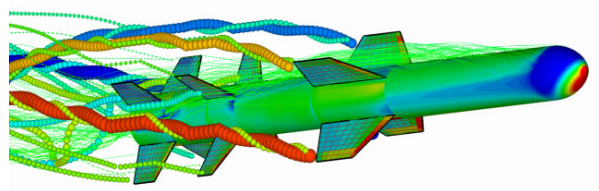
Advanced Computational Fluid Dynamics

NEAR develops advanced CFD technology, including high-accuracy methods, and techniques for rapid estimation of error and uncertainty in CFD results. Complex CFD software development and design optimization are also addressed.

Knowledge Management Systems

NEAR has a wide range of experience in developing knowledge management systems for the purpose of preserving corporate memory, lessons learned and best practices for high technology aerospace disciplines. These integrated systems provide companies with a means to preserve and maintain their valuable, hard-earned knowledge and experience for continued use in the future.

Reduced-Order Modeling

NEAR's multidimensional response surface technology allows users to make powerful inferences from limited computational or experimental data. Examples of applications include intelligent data fusion and the creation of probabilistic metamodels usable in uncertainty and risk-based optimization. NEAR has considerable experience in designing reduced order models of unsteady system responses based on nonlinear indicial theory and the Volterra theory of nonlinear systems.

Flow-Related Sensors

NEAR utilizes its expertise in aerodynamics and hardware development to create advanced flow sensors for industrial applications and for use in the development and testing of aerodynamic components and systems. One example of this is NEAR's ultrasonic vortex detection system which can simply and reliably detect, locate, and quantify unwanted axial vorticity that may be present in wind tunnels and turbine engine test cells.
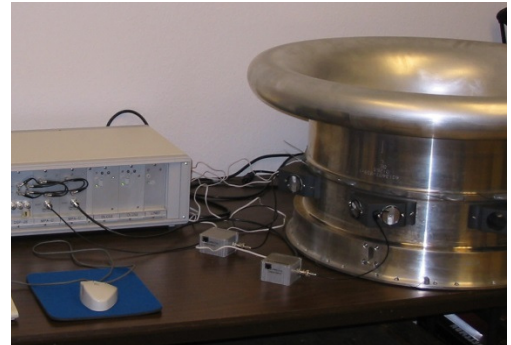
Aerodynamic Hardware Solutions

NEAR develops hardware solutions that take advantage of aerodynamic principles to enhance performance and functionality. One example of this is the work NEAR is conducting with the Air Force and Navy to develop advanced hose-and-drogue-style aerial refueling systems. NEAR has incorporated innovative aerodynamic features to create a simple and robust controllable drogue which can actively stabilize the hose end to facilitate the refueling of manned and unmanned aircraft in even the worst weather conditions.
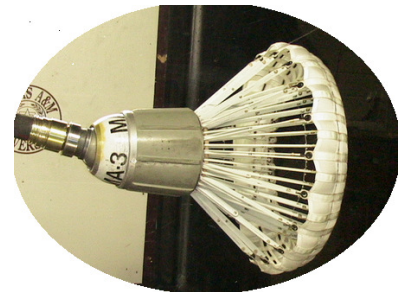
Nielsen Engineering & Research, Inc.

Proprietary Software

(The codes listed below are among the tools used by NEAR to assist our customers. Standard and custom versions of these codes are available for license. For more information go to www.nearinc.com)

Aerodynamic Software Licensing and Training
- Missile Aerodynamics: MISL3
- Detailed Missile Loads: MISDL
- Euler Solver: NEARZEUSIN
- Aircraft Store Separation and Carriage Loads Analysis: STRLNCH
- Unsteady Maneuvering Aerodynamics: SHAMAN
- Unsteady Hydrodynamic Analysis: SUBFLO_2
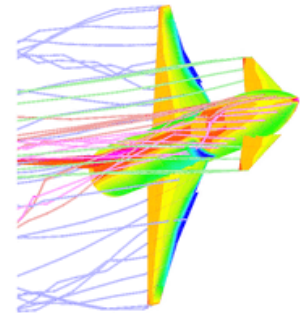
Knowledge Systems Software
- Launch Vehicle Expert System: LVX
- Best Practices Expert System for CFD: BPX
- Rocket Sled Aerodynamics: RSX
- Intelligent Database Systems : DIXIE
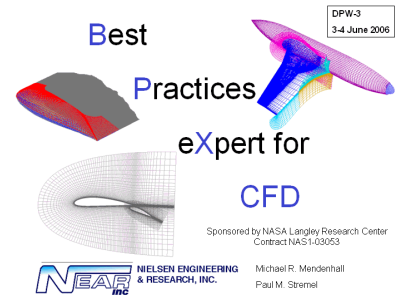
Mathematical Modeling Software
- Multidimensional Response Surface Technology: NEAR RS
- Risk-based optimization module: NEAR RS-opt
- Nonlinear Indicial Prediction System: NEAR IPS
- Volterra Kernel Identification System: NEAR VKS
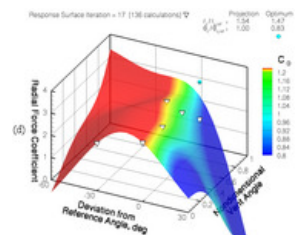
Customers
(A sampling from our 40+ years of history)

U. S. Government

Air Force Research Laboratory (AFRL)
Defense Advanced Research Projects Agency (DARPA)
Holloman High Speed Test Track, Holloman AFB, NM
National Aeronautics and Space Administration (NASA)
Naval Air Warfare Center
Naval Intelligence Agency
Naval Undersea Warfare Center
Office of Naval Research (ONR)
US Army Aviation and Missile Command
US Army Topographic Engineering Center

U. S. Private Industry

Air Launch, LLC
ATK
BAE Systems
Boeing
Dynetics
GE Aircraft Engines
Raytheon Missiles Systems
Lockheed - Martin
Orbital Sciences Corporation
Sargent Fletcher
Space Exploration Technologies
t/Space
Zona Tech
Panasonic Avionics Corp.
General Dynamics, Electric Boat

International Organizations

Aerodan Systems LTD, Israel
Bodenseewerk GmbH, Germany
DIEHL Munitions GmbH, Germany
INTA, Spain
Japan Defense Agency, Japan
Kawasaki Heavy Industries, Japan
Ministry of Defense, UK
National Research Council, Canada
Thales Air Defense, N. Ireland
TNO/PML, The Netherlands
Tubitak-Sage, Turkey
OtoMelara, Italy
QinetiQ, UK
DLR, Braunschweig, Germany
Kongsberg Defence
          & Aerospace AS, Norway

Contracting Activities

NEAR routinely engages in business activities with organizations having complementary technical capabilities. Some representative contract relationships are shown below.

LaRC – CFD Uncertainty Estimation and Quantification

LaRC – Best Practices System for CFD Users

ARC – Innovative Risk-Based Optimization
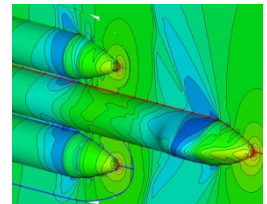
Shear Stress Sensor Development Partner

Advanced Refueling Drogue Development Partner

Configuration Aerodynamics Design Support

Large Payload Fairing Design

Engine Inlet Vortex Detection Sensor System

Paper Positioning Device Design and Development

PRODAS Software Aerodynamic Component

History of NEAR

Nielsen Engineering & Research (NEAR) was founded and incorporated in the State of California in 1966 by Dr. Jack N. Nielsen, a noted aerodynamics researcher, to perform applied research in the aerodynamics of flight vehicles. Originally, NEAR focused on the prediction of missile aerodynamic characteristics and store separation analyses, but since 1980, NEAR's technical interests have broadened to include basic and applied research in other areas of fluid mechanics and related technologies to better serve its customers. NEAR has always emphasized high quality analysis to promote better understanding of critical flow phenomena, technology development, and problem solving. The NEAR staff is well-known around the world for its analysis capabilities.

That the quality of the NEAR staff is recognized in the U.S. and abroad is demonstrated by the numerous invited lectures and papers they present worldwide. NEAR engineers have received nine NASA awards for "the creative development of a technical innovation" and NEAR staff members have served on numerous domestic and international technical committees, U. S. Government-organized review boards, and international advisory boards.

Facilities

NEAR is located in the heart of Silicon Valley near the intersection of three major freeways and within short driving distance of three major international airports. The company facility, cleared for Government work, has more than 4,600 square feet of office and technical library space. NEAR has networked computer resources to permit onsite computations of complex fluid flow problems using advanced CFD codes, thus reducing response time to its customers.

NEAR Management Team

Mr. Michael R. Mendenhall, President and CEO, is the director of the applied aerodynamics research and the corporate memory preservation work at NEAR, and he has more than 40 years experience in aerodynamics. He has been Project Manager and Principal Investigator for aerodynamics on a number of commercial launch vehicle programs and on many government research contracts involving the prediction of the nonlinear aerodynamic characteristics of flight vehicles. He directs the CFD aerodynamic loads analysis of radome installations on commercial airliners as required for Special Type Certificate issuance by the FAA.

Dr. Patrick H. Reisenthel, Vice President and Chief Scientist, supports basic and applied research activities at NEAR. He has over 20 years experience in fluid mechanics and aerodynamics. He is the developer of modeling techniques which have been applied to a diverse range of technical fields, including aeroservoelasticity, aeroacoustics, and electromagnetic pulse response of aircraft. More recently, he has been involved in the quantification of computational uncertainty, the development of multidimensional response surface technology, and their combined application to risk-based optimization.

Dr. Daniel A. Pruzan, Vice President and Director of Engineering, leads NEAR's efforts in the development and marketing of aerodynamic hardware solutions. Dr. Pruzan has been the Principal Investigator for the development of advanced aerial refueling drogues, flow-related sensing systems, adaptive submarine control surfaces, and aerodynamically enhanced production equipment for the printing industry. He has conducted research and development efforts for NASA, DoD, and many aerospace companies including Boeing and GE Aircraft Engines.

Dr. Marnix F. E. Dillenius, President Emeritus, joined NEAR in July 1969 and retired in 2008. He originated and made major contributions to analytical investigations of external store separation trajectory characteristics, supersonic wing loading theory, and detailed missile aerodynamic prediction methods. Dr. Dillenius has managed numerous projects including aerodynamic support for the NAVAIR AARGM missile, aerodynamic data bases for the dart dispense project of the ONR Mine and Obstacle Breaching Technology Program, and store separation analysis for the NAVAIR HSAD system. Dr. Dillenius is available to discuss the licensing of NEAR codes.

More background information on this management team and the NEAR staff can be found on the NEAR web site www.nearinc.com

Nielsen Engineering & Research, Inc.

Contact Information

Nielsen Engineering & Research, Inc.
900 Lafayette St., Suite 600
Santa Clara, CA 95050
408-727-9457
408-727-1428 fax
info@nearinc.com
www.nearinc.com

For Knowledge Management, CFD, and Applied Aerodynamics:
Mr. Michael R. Mendenhall, President and CEO
mrm@nearinc.com, 408-727-9457 x224

For Mathematical Modeling and Response Surface Technology:
Dr. Patrick H. Reisenthel, Vice President and Chief Scientist
phr@nearinc.com, 408-727-9457 x225

For Aerodynamic Hardware Solutions:
Dr. Daniel A. Pruzan, Vice President and Dir. of Engineering
dap@nearinc.com, 408-727-9457 x226

For Aerodynamic Software Licenses:
Mr. Stanley C. Perkins, Jr., Senior Research Engineer
scp@nearinc.com, 408-727-9457 x230