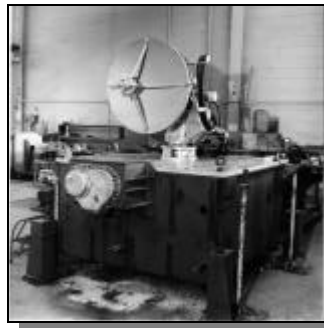
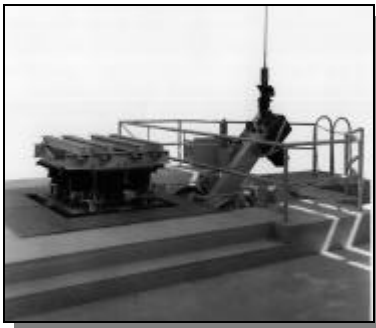


**MILITARY
AND
COMMERCIAL
TESTING
SERVICES**

- *Shipboard Shock & Vibration*
- *High Intensity Acoustic Noise*
- *High Frequency Vibration*
- *Acoustic Noise Emission*
- *Architectural Acoustics*
- *Engineering Services*
- *Climatics*



HIGH INTENSITY ACOUSTIC NOISE

- **Sound Pressure Levels > 180 dB**
- **Reverberation Chambers 15, 64, & 300 ft³ to 180 dB**
- **Progressive Wave Tubes 16'x4'x4', 8'x9"x9" to 180 dB**
- **Impedance Matching Horns with Various Cut-Off Frequencies**
- **Complete MIL-STD-810 Capability**
- **Multi-Channel Real-Time Monitoring**
- **400 Hz Power**
- **Airborne & Structureborne Noise Emission Testing**



of 180 dB over a broadband frequency spectrum. With the added capability of progressive wave tubes, we can test complete structures such as missile systems designed for captive carry implementation.

NU Laboratories also provides complete airborne and structureborne noise testing in accordance with Military, ANSI, and ISO specifications.

Early in the initial stages of Aerospace research, it was determined that high intensity acoustic noise could greatly stress every part and structural element of an aerospace structure. Further study yielded a need for gauging the reliability of parts and structures designed for aerospace deployment. Hence the development of acoustic fatigue testing where noise levels simulating those generated

by a rocket engine were used to test the ability of parts to withstand the fatigue.

NU Laboratories was formed to supply services and hardware to simulate jet and rocket engine noise used for testing the reliability of aerospace parts and structures. Using the NUI 204B siren, we continue to achieve sound pressure levels in excess



ARCHITECTURAL ACOUSTICS (CKAL)

- ***Sound Transmission Loss***
- ***Sound Power Level***
- ***Sound Absorption***
- ***Two Reverberation Rooms; 10,700 ft³ Receiving Room and 5,600 ft³ Source Room, Equipped with Rotating Diffusers for Even Acoustic Distribution***
- ***Transmission Loss Test Opening of 14' Wide by 8'-8" Tall***
- ***Floor-Ceiling Test Opening of 9' by 14'***
- ***Capability to Construct Floors, Walls, Ceilings, and Barriers***



CKAL tests in complete accordance with the specifications developed by organizations such as ASTM and ISO, and maintains a highly qualified and experienced staff.

Cedar Knolls Acoustical Laboratories (CKAL) provides full service architectural acoustical testing for product evaluation of building materials such as wall sections, office panels, ceiling tiles, carpets, windows, and highway barriers. The unique combination of facilities, experience, and the most up-to-date test methods ensures accurate test results.

CKAL provides testing services for many kinds of clients. For example,

companies who want to develop more marketable products such as quieter machinery and appliances need more efficient materials and hardware to better control sound and vibration. Also, architects, engineers and consultants who require evidence that products will satisfy their specifications use CKAL. Further, vendors who have to meet Federal, State, and local regulations such as OSHA and EPA standards and BOCA building codes use CKAL.

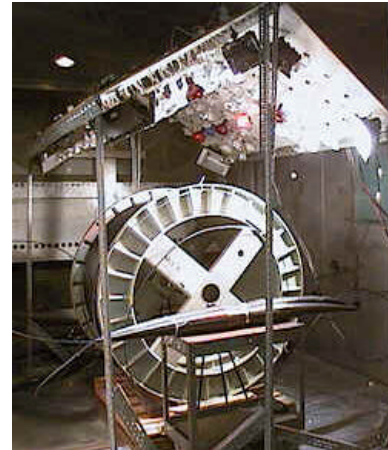


CLIMATICS

- **Temperature Cycling to 22°C/min from -70°C to 180°C**
- **Humidity**
- **Altitude to 100,000 feet**
- **Salt-Spray**
- **Combined Environment**
- **Solar/ Wind / Rain / Icing**
- **Pressure**
- **Fungus**
- **Enclosure**

Testing chambers suited to a variety of environmental simulations are used by NU Laboratories to conduct nearly every climatic test for commercial and military specifications. Of the many test chambers available at the lab, the largest provides 1400 cubic feet of work space and temperature variations from extreme heat to arctic cold. With a 10'x10'x14' temperature humidity chamber, large test articles

are no problem. Several chambers are capable of rapid temperature transitions of up to 22°C/min. Other chambers combine temperature variation with nearly all levels of humidity, temperature, or atmospheric conditions with altitude of up to 100,000 feet. Vibration can also be induced in at least half of the lab's testing chambers for true combined temperature/humidity/vibration environment testing. All of our chambers



also can be equipped to simulate solar effects.

For testing the effect of salt water corrosion on marine equipment, the lab contains a salt spray chamber in which accelerated simulations can be produced at varying temperature and salinity levels. We also provide complete enclosure testing that tests for spraytight, watertight, dripproof, immersion, and wind and rain conditions.



EMI / EMC

- **DC to 20 GHz Frequency Range**
- **3500 cubic ft. of shielded area**
- **10 Meter FCC Open Area Test site**
- **Electro Static Discharge (ESD) Testing available**
- **CE Mark Testing**
- **All Equipment NIST traceable**
- **Test reports complete with data and photographs**

- Ark Model PS16T16, Serial #369, 16' x 16' x 10' Shielded Room
- 12' x 9' x 9' Ante Room
- 10 Meter Open Area Test Site

Applicable Specifications:

- MIL-STD 461/462 A/B/C/D
- Belcore GR-1089-Core
- IEC 1000-4
- IEC CISPR Series
- RTCA DO-160 C/D
- FCC Part 15

NU Labs is equipped with two shielded enclosures to provide electromagnetic interference testing required by current Military, European, Commercial, and FCC specifications. Both enclosures are electromagnetically isolated and equipped to perform conducted and radiated interference testing over a frequency range from DC to 20 GHz. NU Laboratories maintains a semi-automated measurement system that provides tabular as well as graphical data. We provide testing and engineering services

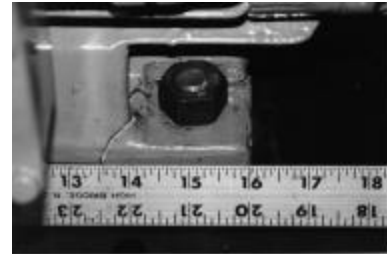
from engineering evaluation to full qualification tests. NU Laboratories can aid in troubleshooting as well as provide solution engineering for EMI/EMC problems and test failures. Other features include a wide array of input power configurations with a maximum of 3 phase 440VAC @ 50A. NU Laboratories can also supply 50 V/Meter for susceptibility and immunity.

Facilities:



ENGINEERING

- **Noise & Vibration Analysis & Control**
- **Community Noise**
- **Analytical Services**
- **Test Fixture Design & Fabrication**
- **Fully Equipped Machine Shop**
- **Test Procedures & Test Program Development**
- **Field Data Acquisition**
- **Remote Data Systems**
- **Finite Element Analysis**
- **Product Evaluation**
- **Failure Analysis**



analysis for hearing conservation programs related to potential corporate liability issues. We have a large inventory of portable instrumentation that can be used for measurements at the test site.

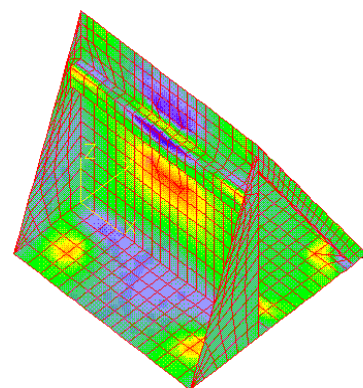
Our test fixture design services feature state-of-the-art computer based finite element analysis programs. We design the test fixture structure, analyze the structure, its stiffness, weight, and shock response, and complete the job by fabricating the fixture in our own fully equipped machine shop.

NU Laboratories maintains a complete engineering department staffed with engineers and physicists who provide a wide range of technical services.

Our engineers are capable of evaluating your testing requirements and submitting program procedures to help you sell your test program. We are also experts in the field of acoustics, shock and

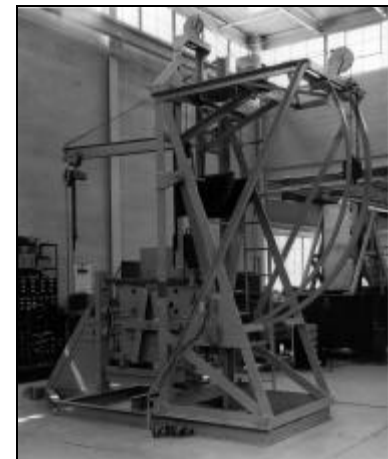
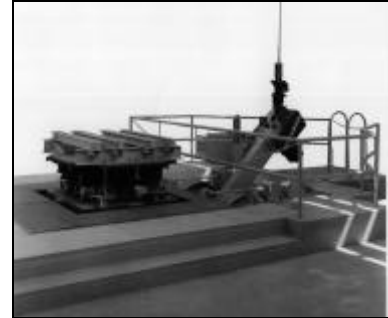
vibration, and dynamics.

Field engineering and data acquisition are a large part of our engineering efforts. We can provide multiple position noise monitoring systems on an around the clock basis to adhere to community noise regulations. Remote systems can also be designed for automated data collection on any time interval. We also provide noise exposure



SHIPBOARD SHOCK & VIBRATION

- ***MIL-S-901 Medium Weight Shock to 7000 lbs***
- ***MIL-S-901 Lightweight Shock to 250 lbs***
- ***MIL-STD-167 Vibration from 4 Hz to 100 Hz up to 7000 lbs***
- ***Test Fixture Design and Fabrication***
- ***US Navy Approved for Light and Medium Weight***



A wide variety of acceleration and deceleration-type shock equipment is available for controlled laboratory simulation of field conditions. High-impact testers that simulate underwater detonations and shipboard gunfire are available for test items and fixture weights up to 7000 pounds.

Shipboard vibration simulation is produced ranging from 4 to 100 Hz and can be performed on items or systems weighing

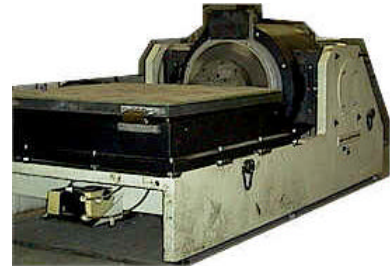
up to 7000 pounds. All test articles and test fixtures can be fully instrumented for data capture and analysis of peak shock and acceleration levels.

Special test fixtures can be designed and fabricated to meet customer requirements for weight and stiffness using software developed specifically for finite element and modal analysis.



HIGH FREQUENCY VIBRATION

- ***Electrodynamic Vibration to 12,000 force-lb from 2 to 5000 Hz***
- ***Over 5 Shakers that Handle Any Size and Weight Test Article***
- ***Sine, Random, Sine on Random, Random on Random, SRS - Pyrotechnic, Gunfire, Half-Sine, Sawtooth Shock***
- ***Aircraft and Guided Missile Profiles***
- ***Precision Shock from 2 to 100 g's***
- ***Fully Automated and Computer Controlled***
- ***Acceleration to 15,000 G/lb***



multi-channel frequency response spectrum, amplitude and shock levels.

Acceleration of aircraft flight and missile launch conditions is performed in a centrifuge that can generate acceleration levels of 15,000 g/lb on test items weight up to 150 pounds. 24 slip rings are provided for operation of test items during acceleration testing.

Modern vibration equipment that can simulate frequency and amplitude ranges corresponding to field environments are used for precision testing of structural stress conditions. With fully automated computerized vibration controllers, NU Laboratories can test to any frequency and amplitude profile.

We have a large inventory of electrodynamic shakers that can provide levels up to 12,000 force pounds from 2 to 5000 Hz.

NU Laboratories also can provide engineering services for proper fixturing of test articles. All test articles can be fully instrumented to capture





NU LABORATORIES, INC.

CUSTOMER LIST

ABERDEEN PROVIN
 ACME OFFICE
 GROUP
 ACOUSTICAL INT
 ADAMS-RUSSELL
 ADRICK MARINE
 AERO ACOUSTIC
 AEROFLEX INTL
 AEROSPACE
 AVIONICS
 AEROSPACE
 RESEARCH
 AIL SYSTEMS
 AIR BALANCING
 AIRTRON LITTON
 ALCATEL
 ALLIED BENDIX
 ALLIED SIGNAL
 ALLSTATE
 AMERADA HESS
 AMERICAN
 WARMING
 AMERICAST
 AMETEK
 AEROSPACE
 AMP, LYTEL DIV.
 ANAREN
 MICROWAVE
 ANSCHUTZ & CO.
 AQUA SIGNAL
 ARMOUR DIAL
 ARTISAN ELEC.
 ARTOPEX INC.
 ASBESTOS
 CONTROLS
 ASCO FIRE SYS
 ASTRONAUTICS
 AT&T
 ATMOS
 ENGINEERING
 ATV INC.
 AUBURN PLASTICS
 AURORA PUMP
 AUTOMATIC SWITCH
 AVCO SYSTEMS
 AVIONICS INST
 AVL SYSTEMS INC
 AXEL ELECTRONIC
 AXSYS MODULAR
 AYDIN VECTOR
 AZTEC INDUSTRIE
 B.F. GOODRICH
 BACHARACH INC.
 BALLY S CASINO
 BASE 10 SYSTEMS
 BATH IRON WORKS
 BB&N
 BEECH AIRCRAFT
 BELL AEROSPACE
 BELL OF PA
 BENDIX
 BEVEL STAMP
 BILT-RITE STEEL
 BIODYNAMICS
 BIRD JOHNSON CO
 BIRUM CORP.
 BLACKMER PUMP
 BLANDIN PAPER
 BLILEY ELECTRIC
 BOSCHEN IRON
 BREEZE EASTERN
 BROOKLYN UNION
 BROWN & ROOT
 BROWN BROTHERS
 BRUCE HARDWOOD
 BURLGTN ENGRG
 C-CURE CHEMICAL
 CAE ELECTRONICS
 CALTRONIX
 CARNEGIE HALL
 CARVER PUMP
 CATALYST RES.
 CD NETWORKS INC
 CELWAVE DIV.
 CENTRAL MICRO
 CEPEDA ASSOC.

CHAMPION WINDOW
 CHEMFAB CORP.
 CHICOPEE
 CHU ASSOCIATES
 CIRCLE INDUSTRI
 CIRCUIT FOIL
 CLAREMONT CO.
 CLARK RELIANCE
 CLARK-COOPER
 COLE
 COLGATE PALMOLIVE
 COLORSTONE INC.
 COLT FIREARMS
 COMMERCIAL DOOR
 COMPONENTES MEC
 CONAIR CORP.
 CONGOLEUM CORP
 CONHAGEN
 CONTROLLED SYST
 CONWED
 COOPER ROBERTS
 CPV MFG. INC.
 CRANE DEFENSE
 CRYODYNAMICS
 CRYOTEK
 CURTISS-WRIGHT
 CYRO INDUSTRIES
 D&A ELECTRONICS
 DAVID TAYLOR RES.
 DAHL, G.W. CO.
 DALE ELECTRONIC
 DARE ELECTRONIC
 DATCON INSTRUME
 DATUM FILING
 DECK MANUF.
 DELTA T PRODUCT
 DERBYSHIRE
 DEUTSCH RELAYS
 DIAGNOSTIC RETR
 DIRECT PORT VA.
 DORAN TEXTILES
 DOW CHEMICALUSA
 DOWCRAFT
 DRESSER PUMP
 DUPONT
 DYNAMIC CONTROL
 E. SYSTEMS
 EAR - CABOT
 EATON AIL
 EATON CUTLER
 EDPAC
 EG&G ROTRON
 ELECTRO CATALYTIC
 ELECTRO IMPULSE
 ELECTRODYNAMICS
 ELLANEF MANUF
 ELLIOTT, B.W.
 ENTWISTLE CO.
 ENVIRO SCIENCE
 ETHICON
 EVEREST ELECTRO
 EXXON RESEARCH
 FAIRCHILD SPACE
 FERRANTI TECHNO
 FIBER FLEX CO
 FL AEROSPACE
 FLIGHT INSULATI
 FLODYNE CONTROL
 FLOMEGA
 FORBO-VICRACOUS
 FREQ ENG LABS
 GARDEN STATE
 PAPER
 GE AEROSPACE
 GE COMPUTER SER
 GEC AEROSPACE
 GEC MARCONI
 GENERAL ACOUST
 GENERAL ATOMIC
 GENERAL ATRONIC
 GENERAL DYNAMICS
 GENERAL ELECTRIC
 GENERAL MOTORS
 GIL, INC.
 GLOBAL SYSTEMS
 GLOBAL TERMINAL

GODFREY ENG.
 GORE-TEX
 GREAT NORTHERN
 PAPER
 GRIMES AEROSPACE
 GROVE ENGINEERIG
 GRUMMAN LLV DIV
 H.H. ENTERPRISES
 HANSOME ENERGY
 HOEDIE-TYNES MF
 HARNISCHFEGER
 HARRIS TARKETT
 HART ENGINEERS
 HAYWARD
 INDUSTRIES
 HENSHEL CO.
 HERMETIC AIRCRA
 HEWLETT PACKARD
 HI-TEMP SPECIAL
 HOECHST CELANES
 HOECHST ROUSSEL
 HOWELL LABS
 HUGHES AIRCRAFT
 HUGHES LEITZ
 IBM
 ICI AMERICAS
 IMO INDUSTRIES
 INGALLS
 SHIPBUILDING
 INGERSOLL RAND
 INTERTEK LABORA
 IRVINGTON METAL
 ISOLATEK
 ISRAEL AIRCRAFT
 ITO
 ITT AVIONICS
 JANESVILLE PROD
 JERED BROWN BRO
 JERSEY CENTRAL
 JOHANSEN MFG.
 JOHNSON CONTROLS
 JR ENGINEERING
 JTE INC.
 JULES EDLIN INC
 K&L MICROWAVE
 KAHRN INTERNATI
 KB ELECTRONICS
 KEARFOTT
 KELLY A/F BASE
 KENNEDY COMPANY
 KINGS ELECTRON
 KNOLL GROUP
 KOLLMORGEN CORP
 KOMLINE SANDERS
 KULITE
 LAMAR COMPANIES
 LAMBDA CORP.
 LAURSTAN INC
 LESLIE CONTROLS
 LEWIS CORP.
 LITTON AIRTRON
 LOCKHEED SANDERS
 LOCTITE
 LONGO INDUSTRIES
 LORAL CONTROLS
 LORAL DEFENSE
 LORAL FAIRCHILD
 LORAL
 INTERNATIONAL
 LUCAS AEROSPACE
 LUCAS HAZLETON
 LUCAS WESTERN
 LUDGATE ENGINEE
 LUMISCOPE CO.
 MACK TRUCKS
 MAGNAVOX
 MAGNETEK LOUIS
 ALLIS
 MAHER TERMINALS
 MALWIN ELECTRON
 MANNING
 MARINE ELECTRIC
 MARLO COIL
 MAROTTA SCIENTIFIC
 MARTELLO
 MARTIN-MARIETTA

MARYLAND
 UNIVERSITY
 MATRA MARCONI
 MAYSTEEL CORP.
 MCCORMACK AGG
 MED ADVANCES
 MELSTROM MFG.
 MERCK & CO. INC.
 MICRACRAFT PROD
 MICROLAB/FXR
 MICROPHASE CORP
 MICROWAVE SEMIC
 MIDLAND ROSS
 MIL SYSTEMS
 MILLER EQUIP.
 MILLIPORE
 MIRREX
 MONTREAL BRONZE
 MOOG INC
 MPC PRODUCTS
 MULTILINE TECH.
 NARDA MICROWAVE
 NASA
 NASH
 NCR
 NEWPORT NEWS
 NJ BELL
 NJ DEPE
 NKF ENGINEERING
 NMP CORP.
 NORDEN SYSTEMS
 NORTHEASTERN
 NOVA ELECTRIC
 NUMAX ELEC.
 NURAD
 NWL CONTROL SYS
 O'NEILL INDUSTR
 OBAC CORP.
 OMNI ENVIRONMEN
 OMNTEC/ELECTRO
 OSTEOTECH
 PARADYNE CORP.
 PARAMAX SYSTEMS
 PARAMOUNT
 PARMATIC FILTER
 PATHWAY BELLOWS
 PEARLESS MFG.
 PELLA WINDOWS
 PHF INTERNATIONAL
 PHILLIES
 PIEZO ELECTRIC
 PJ VALVES, INC.
 PLESSEY ELECTRO
 PNEUMAFIL CORP.
 POLYMER TECHNOL
 POLYPHASE INST
 PORTSMOUTH NAVAL
 PRC CORP.
 PRECISION MEASU
 PSE&G
 RADIATION SYSTM
 RADIO CITY MUSIC
 HALL
 RAPISTAN CORP.
 RAY PROOF
 RAYTHEON
 RCA
 RCM CORP.
 RDL INC.
 REHEIS CHEMICAL
 RELIABLE
 REPUBLIC ELECT.
 REXROTH
 RFI CORP
 RITTENHOUSE
 RLC ELECTRONICS
 ROANWELL CORP.
 ROOSEVELT COMM
 ROOTS DRESSER
 ROSEMOUNT
 AEROSPACE
 ROWE, L.L. CO.
 RPG DIFFUSOR SY
 RUDOX ENGINE
 RUSSELL CORP.
 RUTGERS UNIV.

SAFT AMERICA
 SAGINAW METAL
 SANDERS ASSOC.
 SANTA FE CONSTR
 SCHAFFER CO.
 SCHINDLER ELEV
 SCHULLER INT'L
 SCHULTZ & ASSOC
 SEARS
 SECURIPLEX
 SENTINEL ELEC
 SGS-THOMSON
 SHELL CONTAINER
 SHOCK TECH
 SIMMONDS PREC.
 SINGER KERFOTT
 SMITH INDUSTRIES
 SMITH MIDLAND
 SODERBERG MFG
 SOLAREX
 AEROSPACE
 SONETRONICS INC
 SOUTHWEST
 RESEARCH
 SPD TECHNOLOGIES
 SPIRAL METALS
 SPRINGS IND.
 SQUARE D
 SSS CLUTCH CO.
 STANDARD TOOL
 STEINWAY PIANO
 STELLAR TECHNOL
 STOLLE CORP
 SUMITOMO MARINE
 SUNALEX CORP.
 TABET MANUFACTU
 TECH SYSTEMS
 TECHNISERV AG
 TECHNOLOGY DYNA
 TELEDYNE HYDRA
 TELEPHONICS
 TEXTRON DEFENSE
 THIELSCH ENGINE
 THOMAS & BETTS
 TIDEWATER STEEL
 TOLL BROTHERS
 TRACOR APPLIED
 TRANS COIL
 TRANSISTER DEVICES
 TRI-TEC COMPANY
 TRILECTRON
 TRION, INC.
 TRON TECH, INC.
 TROY MILLS
 TURNBULL ENTERP
 TX TECHNOLOGIES
 U.S. MINERAL
 U.S. NAVY
 ULYSSES, INC.
 UNIFIN INTERNAT
 UNION CARBIDE
 UNISYS
 UNITED STEEL PR
 UNITED TELECONT
 UNITRODE INTEGR
 VAMISTOR CORP.
 VECTRONICS MICR
 VERNITECH
 VERNITRON
 VICRACOUSTIC
 VITA MOTIVATOR
 W&B GAS ENTER.
 WAGNER ELECTRIC
 WALBAR METALS
 WARNER LAMBERT
 WARREN PUMPS
 WESTINGHOUSE
 WESTERN GEAR
 WESTON USA
 WHEELLOCK, INC.
 WHIRLPOOL CORP.
 XYBION CORP.
 YORK
 INTERNATIONAL