David Taylor Research Center
Bethesda, MD 20084–5000

DTRC–91/CT07 October 1991

Valuable Patents for U.S. Businesses

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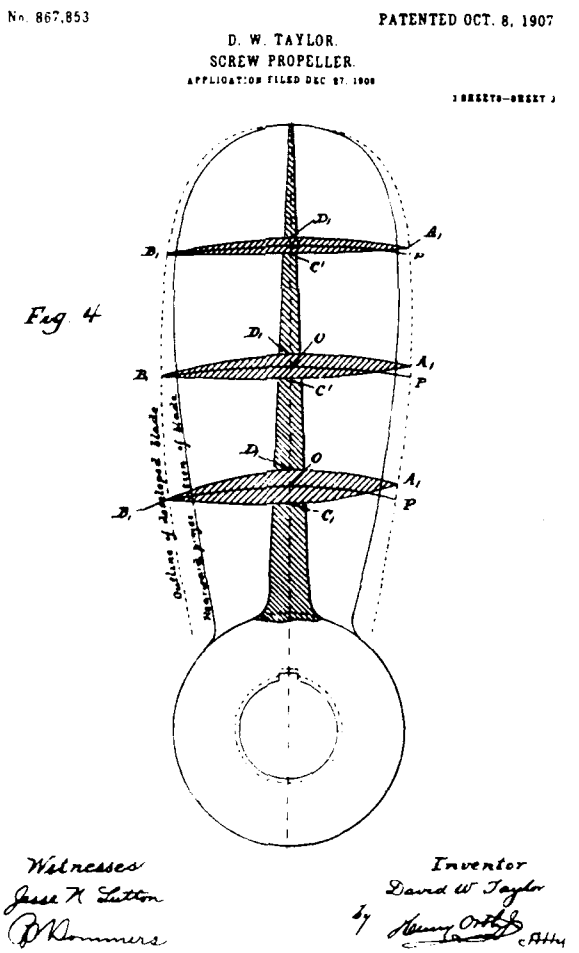

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MAJOR DTRC TECHNICAL COMPONENTS

CODE 011 DIRECTOR OF TECHNOLOGY, PLANS AND ASSESSMENT

12 SYSTEMS DEPARTMENT

14 SHIP ELECTROMAGNETIC SIGNATURES DEPARTMENT

15 SHIP HYDROMECHANICS DEPARTMENT

17 SHIP STRUCTURES AND PROTECTION DEPARTMENT

19 SHIP ACOUSTICS DEPARTMENT

27 PROPULSION AND AUXILIARY SYSTEMS DEPARTMENT

28 SHIP MATERIALS ENGINEERING DEPARTMENT

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Nakonechny, Dr. Basil V.

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The Stevenson–Wydler Technology Innovations Act of 1980 and the Federal Technology Transfer Act of 1986 encourage the transfer of technology derived from Federally sponsored research and development (R&D) to both the public and private sectors. The acts require each Federal agency conducting R&D and its major laboratories to identify and encourage transfer of technologies having potential commercial or practical application. Under new regulations, exclusive licensing is offered as an incentive to transfer Federal technology to U.S. industry and to encourage venture capital investment in improving the nation's technology base.

The mission of the David Taylor Research Center (DTRC) is to serve as the principal Navy RDT&E Center for naval vehicles and logistics and to provide RDT&E support for the U.S. Maritime Administration and the maritime industry. DTRC is an active participant in various domestic technology transfer activities sponsored by the U.S. Navy. These include the Navy Potential Contractor Program (NPCP), Cooperative Research and Development Agreements (CRDAs), the Federal Laboratory Consortium (FLC) for technology transfer, and the National Technology Transfer Center (NTTC).

The present document provides examples of Center inventions having potential for commercial use. (Continued on reverse page.)

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Block 19 (Continued)

This document contains a list of patents issued to DTRC employees from June 1977 through June 1991. These selected patents have been examined by the Center's Patent Review Committee and are considered to have possible commercial application. They are grouped in accordance with technological areas so as to facilitate search and identification of promising inventions by businesses.

PREFACE

The Stevenson–Wydler Technology Innovations Act of 1980 and the Federal Technology Transfer Act of 1986 encourage the transfer of technology derived from Federally sponsored research and development (R&D) to both the public and private sectors. These acts require each Federal agency conducting R&D and its major laboratories to identify and encourage transfer of technologies having potential commercial or practical application. Under new regulations, exclusive licensing is offered as an incentive to transfer Federal technology to U.S. industry and to encourage venture capital investment in improving the nation's technology base.

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The present document provides examples of Center inventions having potential for commercial use. This document contains a list of patents issued to DTRC employees from June 1977 through June 1991. These selected patents have been examined by the Center's Patent Review Committee and are considered to have possible commercial application. They are grouped in accordance with technological areas so as to facilitate search and identification of promising inventions by businesses.

An Appendix containing a brief description of Center facilities and capabilities is also included in this document.

For any additional information concerning the contents of this document, please contact either of the following:

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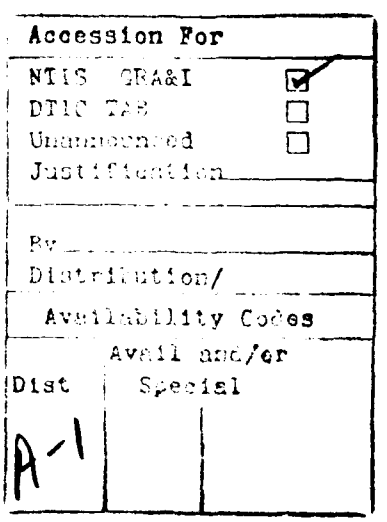

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CONTENTS

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MATERIALS

METALLIC

TITLE:	Flexible Extendable Backing Shield for Welding Reactive Metals
INVENTOR(S):	Robert DeNale, William E. Lukens and Luther A. Marsh
PATENT NO:	4,866,236
DATE OF PATENT:	Sep. 12, 1989
TITLE:	Chromium Based Corrosion Resistant Hard–Facing Alloy
INVENTOR(S):	Donald C. Vreeland
PATENT NO:	4,728,493
DATE OF PATENT:	Mar. 1, 1988
TITLE:	Liquid Metal Brush Material for Electrical Machinery Systems
INVENTOR(S):	Om P. Arora and James H. Brady
PATENT NO:	4,623,514
DATE OF PATENT:	Nov. 18, 1986
TITLE:	Flexible Trailing Shield for Welding Reactive Metals
INVENTOR(S):	William E. Lukens and Robert DeNale
PATENT NO:	4,599,505
DATE OF PATENT:	Jul. 8, 1986
TITLE:	Platinum Underlayers and Overlayers for Coatings
INVENTOR(S):	Robert L. Clarke
PATENT NO:	4,477,538
DATE OF PATENT:	Oct. 16, 1984
TITLE:	Alloy–Cored Titanium Welding Wire
INVENTOR(S):	Joseph R. Crisci, Robert DeNale and Gene L. Franke
PATENT NO:	4,331,857
DATE OF PATENT:	May 25, 1982
TITLE:	Porous Interface Stabilized Liquid Metal Current Collector
INVENTOR(S):	Michael J. Cannell, Slade L. Carr, Jr., Howard O. Stevens and Harold Surosky
PATENT NO:	4,284,918
DATE OF PATENT:	Aug. 18, 1981

NONMETALLIC

TITLE:	Anti–Fouling Castable Polymers and Anti–Fouling Polyurethanes and Similar Materials
INVENTOR(S):	Alexander Lebovits, William L. Yaeger, William B. Mercer and Timothy L. Dapp
PATENT NO:	4,996,261
DATE OF PATENT:	Feb. 26, 1991

TITLE:	Antifouling Organometallic Polymer Rubber Coverings
INVENTOR(S):	Vincent J. Castelli and William L. Yeager
PATENT NO:	4,966,925
DATE OF PATENT:	Oct. 30, 1990
TITLE:	Load Bearing Connective Damper
INVENTOR(S):	Eugene C. Fischer and Roger M. Crane
PATENT NO:	4,954,377
DATE OF PATENT:	Sep. 4, 1990
TITLE:	Nickel Oxide, Ceramic Insulated, High Temperature Coating
INVENTOR(S):	Louis F. Aprigliano
PATENT NO:	4,639,399
DATE OF PATENT:	Jan. 27, 1987
TITLE:	Underwater Formulation and Method for Cleaning and Waxing Simultaneously
INVENTOR(S):	Robert F. Supcoe, Harold H. Singerman and Jack E. Whitacre
PATENT NO:	4,631,303
DATE OF PATENT:	Dec. 23, 1986
TITLE:	Wideband Sonar Energy Absorber
INVENTOR(S):	Irvin R. Kramer and Wayne T. Reader
PATENT NO:	4,628,490
DATE OF PATENT:	Dec. 9, 1986
TITLE:	Damage Assessment Systems for Composite Plastic Structures Using Fiber Optics
INVENTOR(S):	Roger M. Crane and Aleksander B. Macander
PATENT NO:	4,581,527
DATE OF PATENT:	Apr. 8, 1986
TITLE:	Method and Apparatus for Coating Submerged Portions of Floating Structures
INVENTOR(S):	Herman S. Preiser, Arthur Ticker and Kenneth J. Hatley
PATENT NO:	4,522,882
DATE OF PATENT:	Jun. 11, 1985
TITLE:	Automatic Vacuum Urinal Flush Mechanism
INVENTOR(S):	Milton W. Raupuk, Jr. and Edward M. Pennington
PATENT NO:	4,520,513
DATE OF PATENT:	Jun. 4, 1985
TITLE:	Organotin Antifouling Coatings with Novolac and Bisphenol–A Epoxy Resins
INVENTOR(S):	Albert R. Parks
PATENT NO:	4,480,056
DATE OF PATENT:	Oct. 30, 1984

TITLE:	Method and Apparatus for Coating Submerged Portions of Floating Structures
INVENTOR(S):	Herman S. Preiser, Arthur Ticker and Kenneth J. Hatley
PATENT NO:	4,420,533
DATE OF PATENT:	Dec. 13, 1983
TITLE:	Antifouling Tile Containing Antifoulant Reservoirs for In Situ Replenishment
INVENTOR(S):	Stephen D. Rodgers
PATENT NO:	4,401,703
DATE OF PATENT:	Aug. 30, 1983
TITLE:	Superior Ohmic Contacts to III–V Semiconductor by Virtue of Double Donor Impurity
INVENTOR(S):	Max N. Yoder
PATENT NO:	4,344,980
DATE OF PATENT:	Aug. 17, 1982
TITLE:	Organotin Antifouling Coating with Epoxy and Polyacrylate Compositions
INVENTOR(S):	Albert R. Parks
PATENT NO:	4,344,875
DATE OF PATENT:	Aug. 17, 1982
TITLE:	Method and Apparatus for Coating Submerged Portions of Floating Structures
INVENTOR(S):	Herman S. Preiser, Arthur Ticker and Kenneth J. Hatley
PATENT NO:	4,321,101
DATE OF PATENT:	Mar. 23, 1982
TITLE:	Blue–Gray Low Infrared Emitting Coating
INVENTOR(S):	Robert F. Supcoe
PATENT NO:	4,311,623
DATE OF PATENT:	Jan. 19, 1982
TITLE:	Piezoelectric Polymer Antifouling Coating
INVENTOR(S):	Bruce J. Wooden and Seymour Edelman
PATENT NO:	4,283,461
DATE OF PATENT:	Aug. 11, 1981
TITLE:	Copper Base Antifouling Paints with Ph Control
INVENTOR(S):	Vincent J. Castelli and Eugene C. Fischer
PATENT NO:	4,286,988
DATE OF PATENT:	Sep. 1, 1981
TITLE:	Polyisobutylene Rubber Antifouling Paint
INVENTOR(S):	Stephen D. Rodgers and Bernard R. Appleman
PATENT NO:	4,282,126
DATE OF PATENT:	Aug. 4, 1981

TITLE: Low Leaching Antifouling Organometallic Polyesters
INVENTOR(S): Edward J. Dyckman, Jean A. Montemarano and Eugene C. Fischer
PATENT NO: 4,082,709
DATE OF PATENT: Apr. 4, 1978

TITLE: Low Leaching Antifouling Organometallic Polyvinyls
INVENTOR(S): Edward J. Dyckman, Deborah M. Andersen, Eugene C. Fischer
PATENT NO: 4,075,319
DATE OF PATENT: Feb. 21, 1978

TITLE: Antifouling Coating for Aluminum Structures
INVENTOR(S): Irvin R. Kramer
PATENT NO: 4,130,466
DATE OF PATENT: Dec. 19, 1978

PROCESSES AND PROCESSING

TITLE: Flexible Extendable Backing Shield for Welding Reactive Metals
INVENTOR(S): Robert DeNale, William E. Lukens and Luther A. Marsh
PATENT NO: 4,866,236
DATE OF PATENT: Sep. 12, 1989

TITLE: Resin Impregnation and Processing Technique for Rigidizing Net–Shaped Fibrous Skeletal Composite Preforms
INVENTOR(S): Roger M. Crane and Aleksander B. Macander
PATENT NO: 4,695,344
DATE OF PATENT: Sep. 22, 1987

TITLE: Nickel Oxide, Ceramic Insulated, High Temperature Coating
INVENTOR(S): Louis F. Aprigliano
PATENT NO: 4,639,399
DATE OF PATENT: Jan. 27, 1987

TITLE: Flexible Trailing Shield for Welding Reactive Metals
INVENTOR(S): William E. Lukens and Robert DeNale
PATENT NO: 4,599,505
DATE OF PATENT: Jul. 8, 1986

TITLE: Integrated Fire–Resistant Flexible Metal Conductor Derived Insulated Coating
INVENTOR(S): Alfred A. Wolf and Ernest H. Halpern
PATENT NO: 4,369,204
DATE OF PATENT: Jan. 18, 1983

TITLE: Motor/Generator Armature Portable Baking Oven
INVENTOR(S): James L. Moore
PATENT NO: 4,366,370
DATE OF PATENT: Dec. 28, 1982

TITLE:	Superior Ohmic Contacts to III–V Semiconductor by Virtue of Double Donor Impurity
INVENTOR(S):	Max N. Yoder
PATENT NO:	4,344,980
DATE OF PATENT:	Aug. 17, 1982

TITLE:	Apparatus and Method for Molding of Submerged Surfaces
INVENTOR(S):	Arthur Ticker, Herman S. Preiser, William Klemens and John L. Drake
PATENT NO:	4,303,608
DATE OF PATENT:	Dec. 1, 1981

TITLE:	Method of Protecting Incinerator Surfaces
INVENTOR(S):	Irvin R. Kramer
PATENT NO:	4,253,408
DATE OF PATENT:	Mar. 3, 1981

TITLE:	Shipboard Blackwater Physical/Chemical Treatment System
INVENTOR(S):	Craig S. Alig
PATENT NO:	4,197,200
DATE OF PATENT:	Apr. 8, 1980

TITLE:	Process for Making a Plastic Antenna Reflector
INVENTOR(S):	Richard P. Hockensmith, Elmer E. Skelton and Daniel L. Thomas
PATENT NO:	4,154,788
DATE OF PATENT:	May 15, 1979

TITLE:	Ozone Reactor for Liquids
INVENTOR(S):	Craig S. Alig
PATENT NO:	4,072,613
DATE OF PATENT:	Feb. 7, 1978

TITLE:	Antifouling System for Active Ships at Rest
INVENTOR(S):	Herman S. Preiser and Arthur Ticker
PATENT NO:	4,046,094
DATE OF PATENT:	Sep. 6, 1977

MECHANICAL

MACHINERY COMPONENTS

TITLE:	Propeller Unit with Controlled Cyclic and Collective Blade Pitch
INVENTOR(S):	Frank B. Peterson, William E. Schneider, Christopher N. Sears, Darrel J. Brydebell and Mark W. Smith
PATENT NO:	5,028,210
DATE OF PATENT:	Jul. 2, 1991

TITLE:	Single Screw Mechanism with Gaterotor Housing at Intermediate Pressure
INVENTOR(S):	David C. Winyard
PATENT NO:	5,018,952
DATE OF PATENT:	May 28, 1991

TITLE: Vibration Reducing Thrust Bearing
INVENTOR(S): Thomas L. Daugherty
PATENT NO: 4,963,039
DATE OF PATENT: Oct. 16, 1990

TITLE: Load Bearing Connective Damper
INVENTOR(S): Eugene C. Fischer and Roger M. Crane
PATENT NO: 4,954,377
DATE OF PATENT: Sep. 4, 1990

TITLE: Leakage Path Interconnection for Single Screw Mechanisms
INVENTOR(S): David C. Winyard
PATENT NO: 4,941,811
DATE OF PATENT: Jul. 17, 1990

TITLE: Elastomeric Mount for Thrust Bearing Shoe
INVENTOR(S): John D. Spargo and Joseph W. White
PATENT NO: 4,892,417
DATE OF PATENT: Jan. 9, 1990

TITLE: Rigid Support Structure for Single Screw Compressors
INVENTOR(S): Thomas W. Bein
PATENT NO: 4,880,367
DATE OF PATENT: Nov. 14, 1989

TITLE: Phase Control Mechanism for Wave Energy Conversion
INVENTOR(S): Paul N. Jaenichen, Sr.
PATENT NO: 4,872,309
DATE OF PATENT: Oct. 10, 1989

TITLE: Variable Capacity Centrifugal Pump
INVENTOR(S): Joseph H. Morris, Edmund J. Jarski and Gregory E. Harris
PATENT NO: 4,828,454
DATE OF PATENT: May 9, 1989

TITLE: Multiple Tooth Engagement Single Screw Mechanism
INVENTOR(S): David C. Winyard
PATENT NO: 4,824,348
DATE OF PATENT: Apr. 25, 1989

TITLE: Centrifugal Scavenging System for Single Screw Compressors
INVENTOR(S): Thomas W. Bein
PATENT NO: 4,775,304
DATE OF PATENT: Oct. 4, 1988

TITLE: Vibration and Shock Resistant Heat Exchanger
INVENTOR(S): William G. Patton, Victor H. Dilling and Geoffrey F. Green
PATENT NO: 4,719,969
DATE OF PATENT: Jan. 19, 1988

TITLE:	Hydrostatic Supporting Device
INVENTOR(S):	John D. Spargo and Joseph W. White
PATENT NO:	4,749,282
DATE OF PATENT:	Jun. 7, 1988
TITLE:	Compressor–Scavenging Eductor System
INVENTOR(S):	David C. Winyard
PATENT NO:	4,655,698
DATE OF PATENT:	Apr. 7, 1987
TITLE:	Oil/Water Disperser Device for Use in an Oil Content Monitor/Control System
INVENTOR(S):	Ray F. Schmitt, Chadwick L. Trent, Joseph A. Gavin and Francis D. Kempel
PATENT NO:	4,647,371
DATE OF PATENT:	Mar. 3, 1987
TITLE:	Fluid Sampler
INVENTOR(S):	Scott Gowing
PATENT NO:	4,635,487
DATE OF PATENT:	Jan. 13, 1987
TITLE:	Liquid Metal Brush Material for Electrical Machinery Systems
INVENTOR(S):	Om P. Arora and James H. Brady
PATENT NO:	4,623,514
DATE OF PATENT:	Nov. 18, 1986
TITLE:	Variable Camber Tandem Blade Bow for Turbomachines
INVENTOR(S):	John G. Stricker
PATENT NO:	4,599,041
DATE OF PATENT:	Jul. 8, 1986
TITLE:	Apparatus for Attaching an Underwater Explosive Pad Eye
INVENTOR(S):	Terry E. Hill, George R. Riley, Vonne D. Linse, Sheryll C. Green and Paul G. Tack
PATENT NO:	4,552,298
DATE OF PATENT:	Nov. 12, 1985
TITLE:	Fluid Equalized Tilting Pad Thrust Bearings
INVENTOR(S):	Wilbur Shapiro, Richard W. Graham, II, and Hugh G. Anderson,Jr.
PATENT NO:	4,544,285
DATE OF PATENT:	Oct. 1, 1985
TITLE:	Pressure Balanced Floating Seal
INVENTOR(S):	John D. Spargo
PATENT NO:	4,494,760
DATE OF PATENT:	Jan. 22, 1985

TITLE:	Mechanism for Proportionately Loading Dual Thrust Bearing Assemblies Against Axial Thrust Loads
INVENTOR(S):	John W. Henry, IV
PATENT NO:	4,493,514
DATE OF PATENT:	Jan. 15, 1985
TITLE:	Closed Cycle Vaporization Cooling System for Underwater Vehicle Inner–to–Outer Hull Heat Transfer
INVENTOR(S):	Robert D. Rogalski and George F. Wilhelmi
PATENT NO:	4,474,228
DATE OF PATENT:	Oct. 2, 1984
TITLE:	Mechanical Clutch/Decoupler for Hydraulic Pumps
INVENTOR(S):	Dennis A. Woolaver and A. Erich Baitis
PATENT NO:	4,449,469
DATE OF PATENT:	May 22, 1984
TITLE:	Mechanical Actuation Device for Ship Roll Stabilization
INVENTOR(S):	Dennis A. Woolaver and A. Erich Baitis
PATENT NO:	4,398,486
DATE OF PATENT:	Aug. 16, 1983
TITLE:	Acoustic Baffle for High–Pressure Service, Modular Design
INVENTOR(S):	John J. Eynck
PATENT NO:	4,399,526
DATE OF PATENT:	Aug. 16, 1983
TITLE:	Acoustic Signal Conditioning Device
INVENTOR(S):	John J. Eynck
PATENT NO:	4,390,976
DATE OF PATENT:	Jun. 28, 1983
TITLE:	High Pressure Electrolytic Oxygen Generator
INVENTOR(S):	Robert E. Smith and Donald R. Gormley
PATENT NO:	4,374,014
DATE OF PATENT:	Feb. 15, 1983
TITLE:	Centrifugal Pump Recirculation Diffuser
INVENTOR(S):	John W. Henry, IV and David E. Cassel
PATENT NO:	4,371,310
DATE OF PATENT:	Feb. 1, 1983
TITLE:	Fluid Lubricated Floating Bushing Seal
INVENTOR(S):	John D. Spargo and Kenneth R. Sasdelli
PATENT NO:	4,334,688
DATE OF PATENT:	Jun. 15, 1982

TITLE: Self–Aligning Rolling Contact Thrust Bearing/Vibration Reducer Element
INVENTOR(S): Hugh G. Anderson and Philip J. Hatchard
PATENT NO: 4,342,488
DATE OF PATENT: Aug. 3, 1982

TITLE: Optimized Diesel Engine Exhaust Silencer
INVENTOR(S): Donald C. Thomson
PATENT NO: 4,310,067
DATE OF PATENT: Jan. 12, 1982

TITLE: Hydrodynamic Bearing with Extended Pressure Gradient
INVENTOR(S): Thomas L. Daugherty
PATENT NO: 4,290,656
DATE OF PATENT: Sep. 22, 1981

TITLE: Quiet Impulse Steam Trap
INVENTOR(S): Richard D. Claffy and Reginald B. Lovelace
PATENT NO: 4,296,771
DATE OF PATENT: Oct. 27, 1981

TITLE: Porous Interface Stabilized Liquid Metal Current Collector
INVENTOR(S): Michael J. Cannell, Slade L. Carr, Jr., Howard O. Stevens and Harold Surosky
PATENT NO: 4,284,918
DATE OF PATENT: Aug. 18, 1981

TITLE: Pressure Compensated Potable Water Chlorinator
INVENTOR(S): John R. Braden
PATENT NO: 4,260,587
DATE OF PATENT: Apr. 7, 1981

TITLE: Shock–Crush Subfoundation
INVENTOR(S): Kurt G.F. Moeller
PATENT NO: 4,254,727
DATE OF PATENT: Mar. 10, 1981

TITLE: Bending Pad Thrust Bearing
INVENTOR(S): Hugh G. Anderson, Earl R. Quandt and A. Bayne Neild
PATENT NO: 4,240,676
DATE OF PATENT: Dec. 23, 1980

TITLE: Friction Reducing Arrangement for Hydraulic Machines
INVENTOR(S): Joseph H. Morris
PATENT NO: 4,236,867
DATE OF PATENT: Dec. 2, 1980

TITLE: Fluidic Controlled Diffusers for Turbopumps
INVENTOR(S): Sydney Davis and John M. Durkin
PATENT NO: 4,228,753
DATE OF PATENT: Oct. 21, 1980

TITLE:	Anti–Sway Device for Hoists and Cranes
INVENTOR(S):	Henry J. Bernaerts
PATENT NO:	4,227,677
DATE OF PATENT:	Oct. 14, 1980
TITLE:	Shock Crush Sub–Foundation
INVENTOR(S):	Kurt G.F. Moeller
PATENT NO:	4,215,645
DATE OF PATENT:	Aug. 5, 1980
TITLE:	Discharge and Pressure Relief Ports for Mechanisms with Involute Shaped Vanes
INVENTOR(S):	Thomas W. Bein
PATENT NO:	4,204,816
DATE OF PATENT:	May 27, 1980
TITLE:	Pump Piston with Flexible Member
INVENTOR(S):	William E. Schneider
PATENT NO:	4,197,787
DATE OF PATENT:	Apr. 15, 1980
TITLE:	Vibration Isolator and Method for Manufacturing Same
INVENTOR(S):	Robert E. Belfield, Chester L. Gilbert and Euland M. Bickham
PATENT NO:	4,190,227
DATE OF PATENT:	Feb. 26, 1980
TITLE:	Relative Orbiting Motion by Synchronously Rotating Scroll Impellers
INVENTOR(S):	William G. Thelen and Thomas W. Bein
PATENT NO:	4,178,143
DATE OF PATENT:	Dec. 11, 1979
TITLE:	Pressure Tight Valve Seat for Valves Consisting of Two Opposing Tubes
INVENTOR(S):	Henry J. Bernaerts
PATENT NO:	4,170,244
DATE OF PATENT:	Oct. 9, 1979
TITLE:	High Current Switches Using Multi–Louvered Contact Strips
INVENTOR(S):	Donald B. Steen
PATENT NO:	4,163,135
DATE OF PATENT:	Jul. 31, 1979
TITLE:	Controllable and Programmable Fluid Flow Modulation System
INVENTOR(S):	Kenneth R. Reader and Joseph B. Wilkerson
PATENT NO:	4,132,500
DATE OF PATENT:	Jan. 2, 1979
TITLE:	Coaxial Polarity Reversing Switch with Rotary Actuation
INVENTOR(S):	Donald B. Steen
PATENT NO:	4,097,701
DATE OF PATENT:	Jun. 27, 1978

TITLE: Axial Fan with Automatically Controlled Variable Pitch Blades
INVENTOR(S): David D. Moran
PATENT NO: 4,090,812
DATE OF PATENT: May 23, 1978

TITLE: Rotational Energy Absorbing Coupling
INVENTOR(S): William H. Buckley and Garnett Ryland, II
PATENT NO: 4,086,012
DATE OF PATENT: Apr. 25, 1978

TITLE: Load Limiter Coupling
INVENTOR(S): Edwin M. Petrisko
PATENT NO: 4,058,301
DATE OF PATENT: Nov. 15, 1977

TITLE: Cavity Producing Underwater Sound Source
INVENTOR(S): Rufus K. Reber
PATENT NO: 4,007,805
DATE OF PATENT: Feb. 15, 1977

SYSTEM DESIGNS

TITLE: Smokestack Having Reduced IR Emission
INVENTOR(S): Robert W. Keimel, Arthur C. Keimel and John F. Thomas
PATENT NO: 5,000,161
DATE OF PATENT: Mar. 19, 1991

TITLE: Convectively Cooled Hot Gas Exhaust Structure to Reduce Infrared Radiation
INVENTOR(S): John R. Braden, Robert H. Burns and Melvin Greenberg
PATENT NO: 4,993,314
DATE OF PATENT: Feb. 19, 1991

TITLE: Phase Control Mechanism for Wave Energy Conversion
INVENTOR(S): Paul N. Jaenichen, Sr.
PATENT NO: 4,872,309
DATE OF PATENT: Oct. 10, 1989

TITLE: Underwater Acoustic Baffle Enhancer
INVENTOR(S): Jerome Goodman
PATENT NO: 4,669,573
DATE OF PATENT: Jun. 2, 1987

TITLE: Compressor–Scavenging Eductor System
INVENTOR(S): David C. Winyard
PATENT NO: 4,655,698
DATE OF PATENT: Apr. 7, 1987

TITLE:	Oil Content Monitor/Control System
INVENTOR(S):	Ray F. Schmitt, Joseph A. Gavin, Francis D. Kempel and Charles N. Waltrick
PATENT NO:	4,649,281
DATE OF PATENT:	Mar. 10, 1987
TITLE:	Rocket–Powered Training Missile with Impact Motor Splitting Device
INVENTOR(S):	David G. Rousseau
PATENT NO:	4,589,342
DATE OF PATENT:	May 20, 1986
TITLE:	Direct Open Loop Rankine Engine System and Method of Operating Same
INVENTOR(S):	Herman B. Urbach and Earl R. Quandt
PATENT NO:	4,509,324
DATE OF PATENT:	Apr. 9, 1985
TITLE:	Mechanical Clutch/Decoupler for Hydraulic Pumps
INVENTOR(S):	Dennis A. Woolaver and A. Erich Baitis
PATENT NO:	4,449,469
DATE OF PATENT:	May 22, 1984
TITLE:	Laser Pumped Superconductive Energy Storage System
INVENTOR(S):	Alfred A. Wolf
PATENT NO:	4,414,461
DATE OF PATENT:	Nov. 8, 1983
TITLE:	Electrical Actuator for Ship Roll Stabilization
INVENTOR(S):	A. Erich Baitis, Dennis A. Woolaver and Richard T. Nigon
PATENT NO:	4,388,889
DATE OF PATENT:	Jun. 21, 1983
TITLE:	Ship Roll Stabilization System
INVENTOR(S):	A. Erich Baitis and Dennis A. Woolaver
PATENT NO:	4,380,206
DATE OF PATENT:	Apr. 19, 1983
TITLE:	Structural Damper for Eliminating Wind Induced Vibrations
INVENTOR(S):	William H. Buckley
PATENT NO:	4,350,233
DATE OF PATENT:	Sep. 21, 1982
TITLE:	Method of Suppressing Radiation from Ship Stack Gases
INVENTOR(S):	Robert H. Burns
PATENT NO:	4,303,035
DATE OF PATENT:	Dec. 1, 1981
TITLE:	Isolated Reverse Turbine System for Gas Turbine Engines
INVENTOR(S):	Samuel R. Shank, Jr. and Thomas L. Bowen
PATENT NO:	4,245,267
DATE OF PATENT:	Jan. 20, 1981

TITLE: Fluidic Controlled Diffusers for Turbopumps
INVENTOR(S): Sydney Davis and John M. Durkin
PATENT NO: 4,228,753
DATE OF PATENT: Oct. 21, 1980

TITLE: Anti–Sway Device for Hoists and Cranes
INVENTOR(S): Henry J. Bernaerts
PATENT NO: 4,227,677
DATE OF PATENT: Oct. 14, 1980

TITLE: Combination Pursuit and Compensatory Display System
INVENTOR(S): Joseph G. Dimmick, William J. Weingartner, Alan S. Fields, Donald L. Fairhead and Rosemary Musson
PATENT NO: 4,129,087
DATE OF PATENT: Dec. 12, 1978

TITLE: Roll, Pitch, and Heave Stabilization Device for Air–Cushion–Borne Vehicles
INVENTOR(S): Allen H. Magnuson
PATENT NO: 4,046,217
DATE OF PATENT: Sep. 6, 1977

TITLE: Multiple Hyperplane Recognizer
INVENTOR(S): Erik Rosenbaum and Edward G. Klimchak
PATENT NO: 4,001,820
DATE OF PATENT: Jan. 4, 1977

MEASUREMENT COMPONENTS/SYSTEMS/TECHNIQUES

TITLE: Embedded Fiber Optic Beam Displacement Sensor
INVENTOR(S): Roger M. Crane and Eugene C. Fischer
PATENT NO: 5,023,845
DATE OF PATENT: Jun. 11, 1991

TITLE: Dual Demodulating Circuit Tracer
INVENTOR(S): Richard T. Nigon, David P. Bochinski, Roy H. Long, Jr. and James A. Kallio
PATENT NO: 4,998,059
DATE OF PATENT: Mar. 5, 1991

TITLE: Multiple Channel Automatic Concentration Meter
INVENTOR(S): Robert G. Howard and Edwin L. Zivi, Jr.
PATENT NO: 4,984,452
DATE OF PATENT: Jan. 15, 1991

TITLE: Combustion Efficiency Analyzer, Acoustic
INVENTOR(S): Herbert A. Palmer
PATENT NO: 4,959,638
DATE OF PATENT: Sep. 25, 1990

TITLE:	Automatic Underwater Acoustic Apparatus
INVENTOR(S):	Jerome Goodman
PATENT NO:	4,763,524
DATE OF PATENT:	Aug. 16, 1988
TITLE:	Oil Content Monitor/Control System
INVENTOR(S):	Ray F. Schmitt, Joseph A. Gavin, Francis D. Kempel and Charles N. Waltrick
PATENT NO:	4,649,281
DATE OF PATENT:	Mar. 10, 1987
TITLE:	Underwater Acoustic Impedance Measuring Apparatus
INVENTOR(S):	Jerome Goodman
PATENT NO:	4,648,275
DATE OF PATENT:	Mar. 10, 1987
TITLE:	Oil/Water Disperser Device for Use in an Oil Content Monitor/Control System
INVENTOR(S):	Ray F. Schmitt, Chadwick L. Trent, Joseph A. Gavin and Francis D. Kempel
PATENT NO:	4,647,371
DATE OF PATENT:	Mar. 3, 1987
TITLE:	Fluid Sampler
INVENTOR(S):	Scott Gowing
PATENT NO:	4,635,487
DATE OF PATENT:	Jan. 13, 1987
TITLE:	Damage Assessment Systems for Composite Plastic Structures Using Fiber Optics
INVENTOR(S):	Roger M. Crane and Aleksander B. Macander
PATENT NO:	4,581,527
DATE OF PATENT:	Apr. 8, 1986
TITLE:	Acoustical Testing of Hydraulic Actuators
INVENTOR(S):	Joseph W. Dickey and Lloyd E. Powell
PATENT NO:	4,571,994
DATE OF PATENT:	Feb. 25, 1986
TITLE:	Method and Apparatus for Determining Small Magnitude Fluid–Dynamic Drag Resistance Differentials Between Different Structural Configurations of a Model
INVENTOR(S):	David W. Coder, Benjamin B. Wisler, Jr., Albert P. Clark and Raymond J. Ratcliffe
PATENT NO:	4,532,801
DATE OF PATENT:	Aug. 6, 1985
TITLE:	Dual Capability Piezoelectric Shaker
INVENTOR(S):	Anthony A. Sheridan
PATENT NO:	4,495,433
DATE OF PATENT:	Jan. 22, 1985

TITLE: Weld Metal Cooling Rate Indicator System
INVENTOR(S): Richard A. Morris, William E. Lukens and Charles A. Zanis
PATENT NO: 4,555,614
DATE OF PATENT: Nov. 26, 1985

TITLE: Crack Susceptibility Test Utilizing an Airport Restraint Specimen
INVENTOR(S): Thomas Montemarano and Michael E. Wells
PATENT NO: 4,343,424
DATE OF PATENT: Aug. 10, 1982

TITLE: Acoustic Leak Detector
INVENTOR(S): Joseph W. Dickey, Paul M. Moore and Lloyd E. Powell
PATENT NO: 4,327,576
DATE OF PATENT: May 4, 1982

TITLE: Method of Determining Fatigue and Stress Corrosion Damage
INVENTOR(S): Irvin R. Kramer, Sigmund Weissman and Robert N. Pangborn
PATENT NO: 4,287,416
DATE OF PATENT: Sep. 1, 1981

TITLE: Expendable Bathythermograph for Use Under Ice
INVENTOR(S): Ralph P. Crist
PATENT NO: 4,215,571
DATE OF PATENT: Aug. 5, 1980

TITLE: Fiber Optic Machinery Performance Monitor
INVENTOR(S): Gerald J. Philips
PATENT NO: 4,196,629
DATE OF PATENT: Apr. 8, 1980

TITLE: Method and Apparatus for Molding and Replicating Minute Surface Characteristics
INVENTOR(S): Arthur Ticker and Herman S. Preiser
PATENT NO: 4,198,362
DATE OF PATENT: Apr. 15, 1980

TITLE: Method and Apparatus of Testing a Model
INVENTOR(S): Karl L. Schoenherr and Charles Devin
PATENT NO: 4,188,822
DATE OF PATENT: Feb. 19, 1980

TITLE: Underwater Displacement Probe
INVENTOR(S): Robert J. Singleton and John F. Stasiewicz, Jr.
PATENT NO: 4,140,991
DATE OF PATENT: Feb. 20, 1979

TITLE: Performance Evaluation Facility for Seal Skirt–Fingers of Surface Effect Ships
INVENTOR(S): Alexander B. Stavovy and Richard H. Chiu
PATENT NO: 4,044,598
DATE OF PATENT: Aug. 30, 1977

ELECTRONICS/ELECTRICAL

TITLE: Solid–State Photometer Circuit
INVENTOR(S): Arthur V. Stiffey, David L. Blank and George I. Loeb
PATENT NO: 4,689,305
DATE OF PATENT: Aug. 25, 1987

TITLE: Inrush Current Limiter
INVENTOR(S): Carl W. Kellenbenz
PATENT NO: 4,396,882
DATE OF PATENT: Aug. 2, 1983

TITLE: Electrical Energy Storage Type Filter
INVENTOR(S): James P. Goodman and David B. Boswell
PATENT NO: 4,328,474
DATE OF PATENT: May 4, 1982

TITLE: Thrustor Firing Circuit Module with Integral Optical Isolation, DV/DT Limitation, and Bidirectional Voltage Transient Suppression
INVENTOR(S): Carl W. Kellenbenz and George R. Boney
PATENT NO: 4,217,618
DATE OF PATENT: Aug. 12, 1980

TITLE: Transformer Movable Along Power Cable
INVENTOR(S): Westley F. Curtis
PATENT NO: 4,186,663
DATE OF PATENT: Feb. 5, 1980

TITLE: Solid State Programmable Dynamic Load Simulator
INVENTOR(S): Carl W. Kellenbenz, James P. Goodman and Randall C. Rector
PATENT NO: 4,042,830
DATE OF PATENT: Aug. 16, 1977

MARINE VEHICLES

NAVAL ARCHITECTURE

TITLE: Ship Roll Stabilization System
INVENTOR(S): A. Erich Baitis and Dennis A. Woolaver
PATENT NO: 4,380,206
DATE OF PATENT: Apr. 19, 1983

TITLE: Supported Membrane Planer for SES Seals
INVENTOR(S): Alexander Malakhoff and Sydney Davis
PATENT NO: 4,285,414
DATE OF PATENT: Aug. 25, 1981

TITLE: Interplaner Hinge Joint for SES Seals
INVENTOR(S): Alexander Malakhoff
PATENT NO: 4,254,842
DATE OF PATENT: Mar. 10, 1981

TITLE: Surface Effect Ship Internal Sidewall Drag Reduction Device
INVENTOR(S): David D. Moran
PATENT NO: 4,196,686
DATE OF PATENT: Apr. 8, 1980

TITLE: Roll, Pitch, and Heave Stabilization Device for Air–Cushion–Borne Vehicles
INVENTOR(S): Allen H. Magnuson
PATENT NO: 4,046,217
DATE OF PATENT: Sep. 6, 1977

TITLE: Stabilization and Motion Alleviation of Air Cushion Borne Vehicles
INVENTOR(S): Allen H. Magnuson
PATENT NO: 4,029,036
DATE OF PATENT: Jun. 14, 1977

PROPULSION

TITLE: Solar Breeze Power Package and Saucer Ship
INVENTOR(S): Sidney E. Veazey
PATENT NO: 4,553,037
DATE OF PATENT: Nov. 12, 1985

TITLE: Transverse Waterjet Propulsion with Auxiliary Inlets and Impellers
INVENTOR(S): John G. Stricker
PATENT NO: 4,531,920
DATE OF PATENT: Jul. 30, 1985

TITLE: Mastless Sails
INVENTOR(S): Sidney E. Veazey
PATENT NO: 4,497,272
DATE OF PATENT: Feb. 5, 1985

TITLE: Thrust Deflector and Force Augmentor
INVENTOR(S): James H. Nichols, Jr., Roger J. Furey, Robert J. Englar and David G. Lee
PATENT NO: 4,463,920
DATE OF PATENT: Aug. 7, 1984

TITLE: Mono–Element Combined Supercritical High Lift Airfoil
INVENTOR(S): Robert J. Englar and Gregory G. Huson
PATENT NO: 4,457,480
DATE OF PATENT: Jul. 3, 1984

TITLE: Thrust Deflector and Force Augmentor
INVENTOR(S): James H. Nichols, Jr., Roger J. Furey, Robert J. Englar and David G. Lee
PATENT NO: 4,398,687
DATE OF PATENT: Aug. 16, 1983

TITLE: Transcavitating Propeller
INVENTOR(S): Bohyun Yim
PATENT NO: 4,293,280
DATE OF PATENT: Oct. 6, 1981

TITLE: Semi–Tandem Marine Propeller
INVENTOR(S): Pao C. Pien
PATENT NO: 4,306,839
DATE OF PATENT: Dec. 22, 1981

TITLE: Supercavitating Propeller with Air Ventilation
INVENTOR(S): Alexander J. Tachmindji, Marlin L. Miller and William B. Morgan
PATENT NO: 4,188,906
DATE OF PATENT: Feb. 19, 1980

TITLE: Boundary Layer Inlets and Transverse Mounted Pumps for Water Jet Propulsion Systems
INVENTOR(S): John G. Stricker and John G. Purnell
PATENT NO: 4,086,867
DATE OF PATENT: May 2, 1978

OTHER (HYDRODYNAMICS/AERODYNAMICS)

TITLE: High–Speed Faired Towline
INVENTOR(S): Reece Folb and Shelton M. Gay, Jr.
PATENT NO: 4,655,155
DATE OF PATENT: Apr. 7, 1987

TITLE: Paravane with Automatic Depth Control
INVENTOR(S): David M. Pickett, Richard K. Knutson and William VonFeldt
PATENT NO: 4,463,701
DATE OF PATENT: Aug. 7, 1984

TITLE: Thrust Deflector and Force Augmentor
INVENTOR(S): James H. Nichols, Jr., Roger J. Furey, Robert J. Englar and David G. Lee
PATENT NO: 4,463,920
DATE OF PATENT: Aug. 7, 1984

TITLE: Thrust Deflector and Force Augmentor
INVENTOR(S): James H. Nichols, Jr., Roger J. Furey, Robert J. Englar and David G. Lee
PATENT NO: 4,398,687
DATE OF PATENT: Aug. 16, 1983

TITLE: Mono–Element Combined Supercritical High Lift Airfoil
INVENTOR(S): Robert J. Englar and Gregory G. Huson
PATENT NO: 4,387,869
DATE OF PATENT: Jun. 14, 1983

TITLE: Integrated Faired Towline with Integral Locking Feature
INVENTOR(S): Richard K. Knutson, Bruce L. Webster, John W. Johnston and Peter P. Rispin
PATENT NO: 4,350,110
DATE OF PATENT: Sep. 21, 1982

TITLE: Surface Effect Ship Internal Sidewall Drag Reduction Device
INVENTOR(S): David D. Moran
PATENT NO: 4,196,686
DATE OF PATENT: Apr. 8, 1980

TITLE: Faired Tow Cable with Stubs for Strum Reduction
INVENTOR(S): Peter P. Rispin, Bruce L. Webster, John Stasiewicz and Jesse Diggs
PATENT NO: 4,190,012
DATE OF PATENT: Feb. 26, 1980

TITLE: Tilt–Rotor Wing Fold Mechanism and Method
INVENTOR(S): John C. Vaughan and Russel L. Perkins, Jr.
PATENT NO: 4,691,878
DATE OF PATENT: Sep. 8, 1987

TITLE: Leading Edge Augmentor Wing–In–Ground Effect Vehicle
INVENTOR(S): David G. Rousseau
PATENT NO: 4,442,986
DATE OF PATENT: Apr. 17, 1984

TITLE: Variable Wing Position Supersonic Biplane
INVENTOR(S): Robert M. Taylor
PATENT NO: 4,405,102
DATE OF PATENT: Sep. 20, 1983

ENVIRONMENTAL PROTECTION

TITLE: Oil Content Monitor/Control System
INVENTOR(S): Ray F. Schmitt, Joseph A. Gavin, Francis D. Kempel and Charles N. Waltrick
PATENT NO: 4,649,281
DATE OF PATENT: Mar. 10, 1987

TITLE: Oil/Water Disperser Device for Use in an Oil Content Monitor/Control System
INVENTOR(S): Ray F. Schmitt, Chadwick L. Trent, Joseph A. Gavin and Francis D. Kempel
PATENT NO: 4,647,371
DATE OF PATENT: Mar. 3, 1987

TITLE: Automatic Vacuum Urinal Flush Mechanism
INVENTOR(S): Milton W. Raupuk, Jr. and Edward M. Pennington
PATENT NO: 4,520,513
DATE OF PATENT: Jun. 4, 1985

TITLE: Situ Incineration/Detoxification System for Antifouling Coatings
INVENTOR(S): Carl M. Adema and Paul Schatzberg
PATENT NO: 4,421,048
DATE OF PATENT: Dec. 20, 1983

TITLE: Shipboard Blackwater Physical/Chemical Treatment System
INVENTOR(S): Craig S. Alig
PATENT NO: 4,197,200
DATE OF PATENT: Apr. 8, 1980

TITLE: Ozone Reactor for Liquids
INVENTOR(S): Craig S. Alig
PATENT NO: 4,072,613
DATE OF PATENT: Feb. 7, 1978

MISCELLANEOUS

TITLE: Low–Cost, Expendable, Crushable Target Aircraft
INVENTOR(S): John S. Attinello and David G. Rousseau
PATENT NO: 4,865,328
DATE OF PATENT: Sep. 12, 1989

TITLE: Frangible Target with Hydraulic Warhead Simulator
INVENTOR(S): David G. Rousseau
PATENT NO: Reg. Number: H485
DATE OF PATENT: Published: Jul. 5, 1988

TITLE: Deep Depth UNDEX Simulator
INVENTOR(S): Robert R. Higginbotham and Alexander Malakhoff
PATENT NO: 4,495,809
DATE OF PATENT: Jan. 29, 1985

TITLE: Method and System for Determining Effect of Underwater Explosion on Submerged Structures
INVENTOR(S): Alexander Malakhoff
PATENT NO: 4,479,378
DATE OF PATENT: Oct. 30, 1984

TITLE: Dual Dependent Stores Ejector Assembly for Angular Rate and Position Control
INVENTOR(S): Gerald E. Kovalenko
PATENT NO: 4,377,103
DATE OF PATENT: Mar. 22, 1983

TITLE: Torpedo Guards
INVENTOR(S): Judd O. Baker, Jerome J. O'Brien, Westley F. Curtis and Frederick M. Varney
PATENT NO: 4,270,279
DATE OF PATENT: Jun. 2, 1981

TITLE: Submarine Communications System
INVENTOR(S): Morton Gertler, Lester F. Whicker and Thomas Gibbons
PATENT NO: 4,227,479
DATE OF PATENT: Oct. 14, 1980

TITLE: Acoustic Decoy and Jammer
INVENTOR(S): Leon E. Wedding and William H. Gilbert
PATENT NO: 4,207,626
DATE OF PATENT: Jun. 10, 1980

TITLE: Acoustic Jammer and Torpedo Decoy
INVENTOR(S): Vivian L. Chrisler, William H. Gilbert and George L. Boyer
PATENT NO: 4,202,047
DATE OF PATENT: May 6, 1980

TITLE: Noisemaker Beacon
INVENTOR(S): Ralph P. Crist
PATENT NO: 4,194,246
DATE OF PATENT: Mar. 18, 1980

TITLE: Towed Noisemaker
INVENTOR(S): Ralph P. Crist
PATENT NO: 4,184,209
DATE OF PATENT: Jan. 15, 1980

TITLE: Noise Making Device
INVENTOR(S): Ralph P. Crist
PATENT NO: 4,183,008
DATE OF PATENT: Jan. 8, 1980

TITLE: Chemical Canister
INVENTOR(S): Ralph P. Crist
PATENT NO: 4,152,392
DATE OF PATENT: May 1, 1979

TITLE: Pressure Plate Mine Sweep
INVENTOR(S): Rufus K. Reber
PATENT NO: 4,185,578
DATE OF PATENT: Jan. 29, 1980

TITLE: Self–Driven Underwater Noisemaking Device
INVENTOR(S): Charles W. Sieber, Richard K. Knutson and John W. Johnston
PATENT NO: 4,047,592
DATE OF PATENT: Sep. 13, 1977

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Published by the DTRC Invention Evaluation Board:

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APPENDIX
DTRC FACILITIES AND CAPABILITIES

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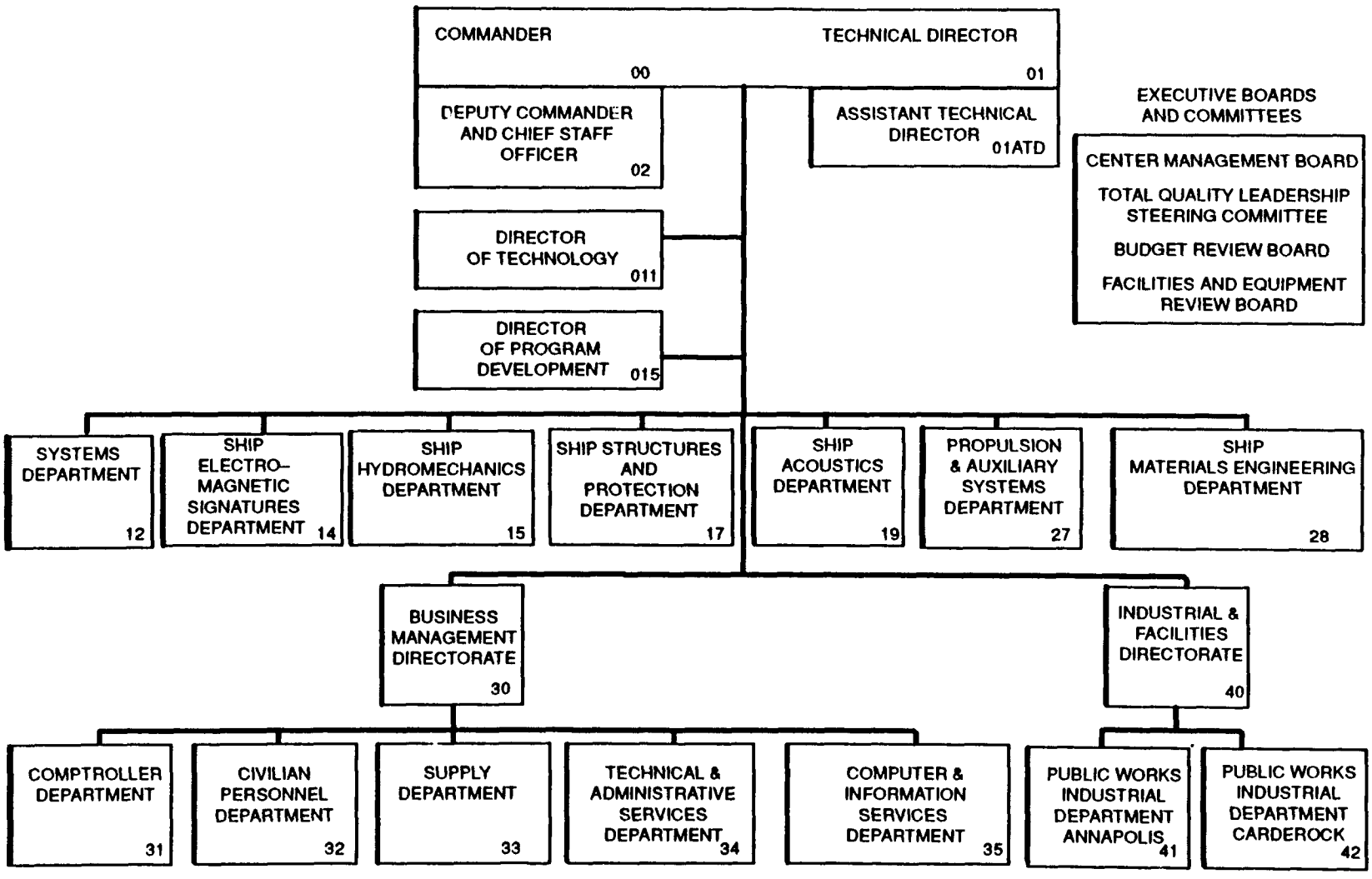
DAVID TAYLOR RESEARCH CENTER ORGANIZATION – OCTOBER 1990



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DTRC

MISSION

Quality is Taylor Made

To be the principal Navy RDT&E Center for naval vehicles and logistics and for providing RDT&E support to the U.S. Maritime Administration and the maritime industry.

REF: NAVMATINST 5450.27C DATED 1 AUGUST 1983

DTRC

Vision to Reality

INTRODUCTION

OVERVIEW

David Taylor Research Center is the largest and most comprehensive establishment of its kind in the free world. Its mission is to be the principal Navy RDT&E center for naval vehicles and logistics and for providing RDT&E support to the U.S. Maritime Administration and the maritime industry. The Center is assigned "Navy-wide leadership in surface and subsurface vehicles, logistics systems technology, and experimental aerodynamics." These leadership responsibilities are carried out by seven technical departments:

- Systems Department
- Ship EM Signatures Department
- Ship Hydromechanics Department
- Ship Structures & Protection Department
- Ship Acoustics Department
- Propulsion & Auxiliary Systems Department
- Ship Materials Engineering Department

Primary facilities are located in Carderock, MD and Annapolis, MD. The Center also conducts RDT&E at five detachments and nine off-station facilities across the continental United States, Alaska and Hawaii.

ORIGINS

The Center was established on 31 March 1967 when the David Taylor Model Basin at Carderock was merged with the Marine Engineering Laboratory at Annapolis. Both laboratories had long, distinguished records of service to the Navy and to the maritime industry.

DTRC is named for Rear Admiral David W. Taylor, a naval engineer who was the driving force in convincing Congress to build the United States' first ship model testing facility. The Experimental Model Basin was established by Congress on 10 June 1896 "for investigating and determining the most suitable and desirable shapes and forms... for... U.S. naval vessels... [and] ... for private ship builders who shall defray the cost... for such experiments."

The model tank became operational in 1898, but soon outgrew its space at the Washington Navy Yard. In 1936, Congress approved construction of the David Taylor Model Basin for "U.S. vessels, including aircraft, and the investigations of other problems of ship design," in Carderock, MD.

About the time Admiral Taylor was petitioning Congress for a model basin, Rear Admiral George Melville, then Chief of the Navy's Bureau of Steam Engineering, decided to develop Fleet standards for machinery operation and maintenance. In 1900, he asked Congress to establish a steam engineering experiment station and testing laboratory to provide basic information to fulfill these needs. Congress authorized the Engineering Experimental Station at Annapolis in 1903. After World War II, the original testing concepts evolved into those of R&D. The laboratory was renamed the Marine Engineering Laboratory in 1963 to reflect the trend to R&D in marine sciences.

A HISTORY OF EXCELLENCE

DTRC has had the distinguished reputation of being the birthplace of superior naval technology since its component organizations were founded at the turn of the century. In fact, it has been the first stop for all new ship and submarine concepts. This heritage of excellence is alive and well at DTRC today, as can be seen by the many DTRC innovations which will be incorporated in the SSN 21 and DDG 51 class ships.

DTRC

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INTRODUCTION (Continued)

PLANNING FOR THE 21ST CENTURY

Ever alert to the new challenges facing our Navy and the need for technologies that will create the vehicles of tomorrow, DTRC has taken bold steps toward the Navy of the 21st Century.

First, the Center recognizes that with tighter budgets, Strategic Planning must be a collaborative process. Planners from many different organizations must come together to create a vision of a future Navy. They must identify and prioritize the technologies needed to bring that vision to reality consistent with affordability goals.

To this end, DTRC implemented the Round Table Process designed to provide information for a long range R&D Master Plan. DTRC's new Strategic Planning and Assessment Center has created a physical environment for this process; a place where multi-disciplinary teams from DTRC, other Navy R&D centers, program sponsors, and industry can meet to discuss, assess, and create the visions, and thus the goals, for a future Navy and maritime industry.

Total Quality Leadership (TQL)

As the world, our country, and the Navy confront changes, DTRC management is also promoting transition and exploring new initiatives. The most important initiative is Center Management's commitment to the philosophy and practice of TQL.

Early in the summer of 1990, DTRC's top executives gathered to learn techniques for implementing TQL at the Center. The group developed a map to take Center employees on a quest for continuous improvement and meeting customer expectations at all levels of the organization. In addition, DTRC's Vision and Policy statements emerged from the process.

DTRC VISION

We will be the innovative provider of choice for research, development, support and integration of cost-effective naval, maritime and related technologies.

DTRC POLICY

(1) We will meet customer expectations every time.
(2) We will continuously improve all aspects of our work.

MAJOR FOCUSES FOR THE 1990s

DTRC's two major focuses for the 1990s are survivability (signature reduction and control, and passive protection) and affordability. Survivability and affordability cut across all the areas of technical expertise at the Center and will serve as central points for the clustering of technologies for application to ships, submarines and logistics. All aspects of signatures will be addressed – acoustic, radar, infrared, magnetic, wake, electro-optical/visual, and others. In the past, DTRC has strived to maximize the performance of naval vehicles. In the future, DTRC will strive to maximize the affordable performance of naval vehicles utilizing both cost and military effectiveness assessment techniques to validate projected improvements.

DESERT SHIELD WORKING GROUP

Always attuned to world events and Navy needs, DTRC has formed the Desert Shield Working Group in response to the Persian Gulf crisis. The group's objective is to analyze recent Middle East events and determine how DTRC's future battle force architecture and logistic systems can assist in near and far term maritime efforts.

DTRC
Vision to Reality

INTRODUCTION (Continued)

ESSENTIAL STATISTICS

On 30 September 1990, David Taylor Research Center had 2,765 permanent and temporary employees and 61 military personnel. Total funding for FY 90 was $404.4M. Naval Sea Systems Command accounted for 50% of this funding. Because of the Center's strengths in the tech base, the Office of the Chief of Naval Research was the Center's second largest sponsor. Non-traditional sponsors, such as DARPA and non-Navy sponsors, are accounting for ever larger percentages of the Center's funding. Real Property and Equipment assigned to DTRC have an acquisition cost value of $209.7 million in then year dollars.

DTRC

MAJOR FACILITIES

Quality is Taylor Made

The David Taylor Research Center has two major laboratory locations: the Carderock site in Bethesda, Maryland; and the Annapolis site in Annapolis, Maryland. There are five detachments located at Portsmouth, Virginia; Cape Canaveral, Florida; Bremerton, Washington; Bayview, Idaho; and Memphis, Tennessee.

CARDEROCK

The Carderock Laboratory is located on 187 acres in Montgomery County, Maryland, within a suburban growth area, 12 miles northwest of downtown Washington, D.C. The Carderock site houses the offices of the Commander and the Technical Director and their staffs, and is home to five of the Center's seven technical departments:

SYSTEMS DEPARTMENT

The Systems Department conducts assessments of military effectiveness, cost effectiveness, and affordability of naval vehicles and logistics support; develops ship design, ship systems integration, logistics, and aerodynamics technologies; and develops and assesses advanced vehicle concepts and innovative technology applications. Major facilities include:

- **Special Trials Unit (STU)** — Formally the Surface Effect Ship Support Office (SESSO), STU at Patuxent River, Maryland (with access to open-ocean testing), operates the prototype SES-200. This surface effect ship (SES) provides the U.S. and the NATO navies with the capability to evaluate SES potential in various mission areas. The STU conducts full-scale trials of assigned advanced marine vehicles and related systems utilizing waterfront access, air cushion vehicle (ACV) ramps, a 200-ton syncrolift elevator, and supporting facilities.
- **Simulation Planning & Analysis Research Center (SPARC)** — This warfare simulation facility provides a secure computing environment to evaluate current and future ship and battle force related technologies and systems in realistic scenarios.
- **Navy Computer-Aided Acquisition and Logistics Support (CALS) Technology Assessment Facility** — This facility provides the capability to develop, test, evaluate, and integrate CALS technology and serves as a CALS Test Network (CTN) lead DoD node for IGES (initial Graphics Exchange Standard) testing and lead Navy Node for SGML (Standard Generalized Markup Language) testing. The facility consists of four laboratories: The CAD (Computer-Aided Design) Integration Lab evaluates CAD/CAM (Computer-Aided Manufacturing) technological advances, engineering data exchange between heterogeneous CAD systems, systems data transfer standards, and CAD systems acquisition technical requirements. The CALS SGML Test Node evaluates CALS digital technical information interchange, publishing standards and vendor CALS Publishing Systems. The Interactive Electronic Tech Manual (IETM) Lab advances automation technology for Navy IETM Implementation, including hardware, software, standards, and system implementations. The Communications Integration Lab focuses on data communications technology for interoperability, compatibility, and security.
- **Wind Tunnel Facilities** — Two 8 x 10-foot subsonic wind tunnels, one 7 x 10-foot transonic wind tunnel, and one 18-inch supersonic wind tunnel allow for aerodynamic test and evaluation of aircraft, rotary-wing and missile configurations through a Mach Number range up to M=4.5. Force, moment and pressure tests can be conducted using a variety of measurement systems including a laser vapor screen technique. The transonic wind tunnel is currently inoperable due to a power section casualty.

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MAJOR FACILITIES (Continued)

SHIP ELECTROMAGNETIC SIGNATURES DEPARTMENT

The department conducts R&D across the spectrum of electromagnetic signatures for Navy ships and their associated wakes. Major department facilities include:

- **Santa Cruz Radar Imaging Facility (SCRIF)** — Located on Santa Cruz Island, CA, SCRIF provides diagnostic full-scale radar-cross-section measurements of Navy ships. The facility's powerful radar system makes simultaneous multi-band measurements from a variety of elevation look-down angles. SCRIF features a deep-ocean environment, convenient access to Pacific Fleet ships, and excellent security.
- **Calibrated Infrared Radiometer System** — This portable facility provides dual-band infrared measurements of model-scale or full-scale ships.
- **Radar Image Modeling Systems (RIMS)** — RIMS provides Radar Cross-Section (RCS) measurements of ship models in a simulated ocean environment (the DTRC Maneuvering and Sea Keeping Basin). It allows engineers to cost-effectively evaluate the RCS characteristics of proposed ship designs and backfits. RIMS can also be used as a mobile system for making full-scale ship RCS measurements at various east coast sites.

SHIP HYDROMECHANICS DEPARTMENT

The Ship Hydromechanics Department conducts R&D for the Navy, other Government agencies, and the maritime industry to ensure that ship and submarine systems and subsystems produce the best possible hydromechanic performance including: efficient resistance and propulsion characteristics; quiet, low vibration propeller design; optimum seakeeping, maneuvering and control; minimum hydrodynamic wakes; and effective towed systems.

- **David Taylor Model Basin** — This 3150 foot long building contains two deep water basins, a shallow water and turning basin, and a high speed basin. Models can be towed at various speeds up to 50 knots to measure speed/power, wake, and other hydrodynamic characteristics.
- **Circulating Water Channel** — In this facility, the propeller, ship or submarine model, fishing trawl net, or other object under test is held static in the moving stream (up to 9 knots), while forces exerted by the water are measured with flow characteristics observed as necessary.
- **Variable Pressure Water Tunnels** —The Center's three water tunnels allow simulation of full-scale cavitation patterns on models of propellers, ships and submarines. The tunnel test sections are 0.3, 0.6, and 0.9m (12, 24, 36-in.) in diameter; water speeds can be varied from 14 to 50 kn.
- **Maneuvering and Seakeeping Basin (MASK)** —The MASK is used in measuring model motions, accelerations, control surface deflections, hull strains, and wake characteristics at a wide variety of simulated sea states through a radio-controlled

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MAJOR FACILITIES (Continued)

surface and submarine model capability. The basin is rectangular, 110 m (360 ft) by 73 m (240 ft) with a depth of 6.1 m (20 ft). Wavemakers are on two perpendicular sides. The Rotating Arm Facility, co-located in the building, determines turning characteristics using ship models. Its radius is 39.6 m (130 ft); its depth, 6.1 m (20 ft); V(max) is 25.7 m/s (50 kn) .

- **Dynamic Control System Simulation (DCSS) Facility** — This facility supports submarine ship control system development and evaluation using a combination of computers, radio-controlled models and motion-based simulators.
- **ATHENA Research Ship Systems** — ATHENA I & II have seen extensive service in the development of high speed towed sensors, airborne mine countermeasures, communication systems, and full-scale validations of model predictions for propeller wake surveys and propeller stress studies.

SHIP STRUCTURES AND PROTECTION DEPARTMENT

The department is responsible for developing improved structural concepts, material applications, and methods for analyzing and designing ship structures. Methods are developed for evaluating the vulnerability of ships to the effects of weapons, along with concepts for protecting structures, equipment and personnel. The department assesses warhead effectiveness of anti-ship weapons and plans and conducts at-sea underwater explosion tests of ships and ship components. Major department facilities include:

- **Pressure Tanks & Cyclic Test System** —The major pressure tanks vary in size from 42.9 cm (17.5 in.) in diameter to 3.9 m (13 ft) in diameter, and range in operating pressure capability from 25,000 psi to 3,000 psi, respectively. Each tank has the highest operating pressure for its diameter of any quick opening tank in the United States. Using a unique pressurized system, cyclic experiments may be conducted by varying the pressure within the model while maintaining constant tank pressure.
- **Explosive Test Pond** — At this site, charges up to 3 lb can be used to shock test surface ship and submarine models and components. High-speed photograpy is provided by means of view ports located in the caisson test section. The pond, designed to prevent reflection of the shock wave during testing, is 41 m (135 ft) along the top of each of the five sides and has a water depth of 7.9 m (26 ft) during test operation.
- **Structures Evaluation Laboratory** — The laboratory provides structural evaluation of large-scale models and full-scale ships and components. Both static and fatigue loading determinations of any shape structure to failure are possible. The facility includes a 12 m (40 ft) x 30 m (100 ft) strong floor with tie downs, load systems, control equipment, and recorders.
- **Underwater Explosives Barge (UEB-1)** — The UEB-1 is a self-supporting, floating facility 56 m (185 ft) long with a 15- m (50-ft) beam and 3000-ton displacement used for large and full scale explosives shock testing of surface ship and submarine models and components at remote test sites. The UEB-1 is well equipped with various electric power sources, test instrumentation, and support services and can self-moor in water up to 76 m (250 ft).

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MAJOR FACILITIES (Continued)

SHIP ACOUSTICS DEPARTMENT

Conducts RDT&E to ensure that US surface ships and submarines are acoustically superior to those of other navies. Major facilities include:

- **Acoustic Research Detachment** in Bayview, ID, supports experiments in underwater acoustics at Lake Pend Oreille where a free-field ocean-like environment is available without the problems and costs of open ocean operations. Unique experimental hardware and floating platforms have been developed at the detachment to support a wide variety of R&D programs ranging from the measurement of flow induced boundary layer fluctuations on sonar domes to the calibrations of full-scale surface ship sonar transducers. The new **Large Scale Vehicle (LSV)** is housed at the detachment. It is a large scale structural model of the SSN-21 Class submarine and is used for submarine propulsor silencing and target strength reduction experiments. Recently, a high speed tow vessel was added to support cold water towed array measurements.
- **MONOB Acoustic Research Ship** is home ported at the Acoustic Trials Detachment in Cape Canaveral, FL, and is the Navy's primary East Coast Radiated Noise Measurement Facility.
- **DEER ISLAND Acoustic Research Ship** is home ported in Fort Lauderdale, FL, and is the primary facility supporting the Naval Sea Systems Command Noise Reduction Program.
- **Anechoic Flow Facility**, a low speed wind tunnel, enables researchers to study the generation mechanism of flow noise associated with submarines, ships, torpedoes, and large appendages.
- **The Carr Inlet Acoustic Range** in Puget Sound, WA, supports both the Surface Ship and Submarine Noise Reduction Programs and has the unique capability to suspend a submarine in free water while supplying up to 1600 amps shore power for special tests, thus maximizing efficiency and minimizing crew fatigue. The range is managed by the Puget Sound Detachment in Bremerton, WA.
- **Santa Cruz Acoustic Range Facility** (SCARF) on Santa Cruz Island, CA, supports the Surface Ship and Submarine Noise Reduction Programs and the submarine high speed radiated noise reduction efforts on the west coast. SCARF is managed by the Puget Sound Detachment.

SCIENTIFIC COMPUTER FACILITY

This facility supports the entire Center and consists of a CRAY XMP/24 computer, a VAX Cluster (2 VAX 8550 plus 2 VAX 11/780 computers), a CDC Cyber 860A computer, and a MASSTOR trillion-bit storage system.

MAJOR FACILITIES (Continued)

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ANNAPOLIS

The Annapolis laboratory consists of a main site, situated on 66 acres of waterfront property across the Severn River from the United States Naval Academy, and the Annapolis Annex, comprised of 47 acres. Annapolis is home to two of the Center's seven technical departments:

PROPULSION AND AUXILIARY SYSTEMS DEPARTMENT

Conducts R&D of naval shipboard machinery systems (including machinery silencing), ships' electric and magnetic silencing, and shipboard energy conservation. Major facilities include:

- **Magnetic Fields Laboratory** — This laboratory is unique in being the only laboratory in the U.S. which can simulate the ambient magnetic field conditions a ship or submarine will encounter at any location on earth.
- **Fluid Flow Facility** — Oil-free air at flow rates of 35,000 cfm and pressures of 4,500 psig are available for emergency submarine deballasting tests. The facility also simulates conditions for evaluating mechanical and acoustic performance of proposed shipboard fluid and air handling systems and components.
- **Mechanical Shock and Vibration Facility** — The electromagnetically driven explosive shock simulator has the capability of performing mechanical shock qualifications tests on equipment weighing up to 20 tons. A heavyweight vibration table can handle equipment weighing up to 5 tons.
- **Deep Ocean Simulation Facility** — These pressure vessels have the capability to hard cycle pressure test large objects (up to 10 ft in diameter by 27 ft long) at simulated depths to 27,000 ft. The facility provides hydrostatic pressure testing using fresh or salt water for materials, machinery systems, full size manned submersibles and unmanned underwater vehicles (UUV) for the Navy, other government agencies, universities, and industry.
- **Special Equipment Laboratories** — Include laboratories for studying submarine machinery noise, submarine propulsion systems, advanced electric drive, shipboard electrical power, shipboard auxiliary machinery, engines, shaft seals, and waterborne main shaft bearings.

SHIP MATERIALS ENGINEERING DEPARTMENT

The Ship Materials Engineering Department conducts R&D in materials science, technology and engineering. Major department facilities include:

- **Fracture and Fatigue Facility** — A wide range of deformation, fracture, and fatigue studies of materials used in hull structure and machinery components are conducted. State-of-the-art computer-interactive experimental fracture mechanics are employed to characterize and understand material performance under static and dynamic loading, taking into account both material properties and effects of environmental factors, including cyclic load frequency, load range, strain range, etc., in new emergent fracture mechanics technologies such as J-Integral, R-curve analysis, tearing instability, and dynamic fracture toughness.
- **Welding and Non-Destructive Evaluation (NDE) Facility** — In this facility advanced welding methods are developed and non-destructive evaluations are performed. Being the largest DoD activity devoted to welding and inspection research and development, it supports work in the areas of arc welding, welding consumables, concentrated energy beam

MAJOR FACILITIES (Continued)

welding, weld automation, weldability testing (including Gleeble 1500), and NDE (radiography, ultrasonic inspection, and electromagnetic inspection).

- **Spray Forming Facility** — Using a unique manufacturing technology process, this latest generation spray forming facility has the capability to manufacture complex shapes, metal matrix cornposites, laminant hybrids, and difficult-to-fabricate alloys. The process produces, in one operation, near net shape material which is homogeneous, free from macrosegregation, full dense and ready for use without significant additional processing. Deposition rates on the order of 100–400 lb/min are possible.
- **Environmental Protection Facility** — This facility performs investigations of processes, operations, and systems designed to abate shipboard-generated liquid, solid, and gaseous discharges (hazardous/toxic waste, plastics, oily and non-oily fluids, sewage, etc.) It allows the development and evaluation of pilot-plant size discharge processing, full-scale waste treatment, solid waste disposal, and incineration hardware and systems.
- **Fire Research Facility** — Laboratory capabilities include assessing fire safety performance of fire resistant and other materials, fire-safe design methods, fire detection, passive fire protection, and fixed and mobile fire extinguishing equipment. The evaluations are accomplished through small-scale tests with materials of burn samples weighing less than a gram to full-sized burns weighing hundreds of pounds. The facility includes a state-of-the-art cone calorimeter.
- **Acoustic Materials Facility** — Unique within the Navy and DoD this facility evaluates elastomer technology, utilizing an automatic data processing acoustic pulse tube facility. Investigations of low volume production of specialty materials and scale-ups are also conducted to protytype production volume (machinery applications, sound isolations, etc.)
- **Marine Tribology Facility** — Evaluation of lubricants, hydraulic fluids, greases, bearings, and seal materials are performed, including the interaction between elements of the lubricant, bearing, machine, and the environment.
- **Paint Formulation/Application and Testing Facility** — This facility is used for formulating and manufacturing paints, coatings and adhesives to suit specific requirements. Analytical and experimental capabilities allow evaluation of paint materials and components, chemical resins, and coatings for protection against corrosion, erosion and marine biofouling.
- **Marine Corrosion Facility** — Studies of the behavior of high temperature materials are conducted in a simulated gas turbine environment. Marine corrosion research and analysis and electrochemical testing of materials are also accomplished in this same environment.
- **Material Characterization Analysis Facility** — Advanced analysis techniques are used, including metallography, optical microscopy, scanning electron microscopy, dynamic mechanical thermal analysis, scanning-auger analysis, transmission electron microscopy, and x-ray diffraction. Property relationships and phase transformations can be obtained for the entire spectrum of ferrous and non-ferrous metals, alloys, and weldments utilized in naval structural and machinery components.

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MAJOR FACILITIES (Continued)

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- **Advanced Marine Composites Facility** — This laboratory has the capability for material processing, fabrication, and test and evaluation of thermoset and thermoplastic composite materials. Major equipment includes: an autoclave, capable of processing parts up to 3 ft by 6 ft to temperatures of 950° F and pressures of 200 psi; and a filament winder with the capability of winding complex parts. The winder has a control system with 6 degrees of freedom and a programmed winding scenario that can be directly interfaced with a finite element analysis program to determine the mechanical properties of fabricated structures.

FACILITIES UNDER CONSTRUCTION

- **Large Cavitation Channel (LCC)** —This recirculating water test facility in Memphis, Tennessee, is the largest of its type in the world with a 3-m (10-ft) x 3-m (10-ft) x 14-m (46-ft) test section. The LCC is used to conduct hydrodynamic and hydroacoustic tests of ship and submarine models up to 12 m (40 ft) in length and flow velocities up to 30 knots to facilitate noise and vibration reduction for submarine and surface ships and their propellers before full-scale configurations are fixed. The facility furthers the development of more efficient hull/propulsor combinations and provides the capability for conducting large-scale special flow tests. Intial operation, June 1991.

- **Southeast Alaska Acoustic Measurement Facility (SEAFAC)** — As the Navy's primary acoustic engineering measurement facility in the Pacific, SEAFAC will provide the capability to perform RDT&E evaluations to determine the sources of submarine noise, to assess vulnerability, and to develop quieting measures. Located in western Behm Canal near Ketchikan, Alaska, the facility will support operations over a full range of speeds and depths normally required for tests underway during acoustic trials.

- **High Pressure Acoustic Tank (HAT)** — This facility will provide a controlled temperature-pressure environment for the acoustic evaluation of material samples in support of the Target Strength Reduction Program and other critical programs. The tank will accommodate material samples of a size sufficient to demonstrate full-scale performance. HAT is a modification of an existing high pressure tank at Carderock and is projected to become operational late FY 93.

- **USNS HAYES (T-AG)** — This ship conversion project will result in a MONOB replacement for the 1990's and beyond. The HAYES is being modified to enable the conduct of acoustical trials both underway using a towed array and moored when conducting more conventional ship trials. In addition, the HAYES wll permit longer time on station and enable operation in a greater variety of sea states. HAYES is projected to become fully mission operational in June 1992.

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