



History of NSRP, MARITECH and ASE

Short Synopsis

The founding NSRP began as an R&D program in 1971 under the guidance of MARAD. The program's initial goal was to respond to the direction given to the Secretary of Commerce in the Merchant Marine Act of 1970 [Section 212(c)] to collaborate with shipbuilders in developing plans for the economic construction of vessels. To provide industry management and technical input, MARAD selected the SNAME SPC to carry out these responsibilities. Since its inception the NSRP's basic goal has remained the same: to reduce production costs and to accelerate delivery schedules through improved shipbuilding methods.

- MARAD funded and administered the program from 1971 to 1979.
- From 1980 to 1985 MARAD was responsible for the administration of the program but the funding came from the Navy's MANTECH program, which at the time fell under the Naval Materials Command.
- From 1986 to 1991 the MANTECH Program, at that time administered at ASN offices, funded NSRP while NSWCCD administered the program.
- From 1992 to 1994 the MANTECH Program, which is now administered at ONR, again funded NSRP while UMTRI MSD (Univ of Michigan Trans Research Inst) played a role in the program.
- From 1995 to 1997 the ONR MANTECH Program and the DARPA MARITECH Program jointly funded NSRP, again with NSWCCD managing the program in cooperation with MARAD and ONR.
- In early 1998 the program was moved to NAVSEA, where the administration and management functions were performed.
- In mid 1998, the NSRP-ASE collaboration of nine shipyards was formed and NAVSEA charged the collaboration to manage the program.

Sources:

- NRC Marine Board Study entitled "Shipbuilding Technology and Education", 1996
- Potomac Institute Study entitled "MARITECH Program Impacts on Global Competitiveness of the U.S. Shipbuilding Industry and Navy Ship Construction", 1998
- NSRP ASE Strategic Investment Plan
- Bob Schaffran (DARPA MARITECH Program Manager and former NSRP PM at MARAD and NSWCCD),
- Paul Mentz (NSRP Concept originator while serving at MARAD)
- Rick Self (NSRP ASE Director who helped transition from MARITECH to ASE)

1970-71: Origins of the National Shipbuilding Research Program

John Nachtsheim and Paul Mentz were sent by then Maritime Administrator Andrew Gibson to the Scandinavian Maritime Community for 3 weeks in November (7-27)1970. They visited the Norwegian Shipbuilder's Association, the Swedish Shipbuilder's Association, the Danish Shipbuilder's Association, Akers, Kockums, Arendal, Eriksbergs and Burmeister & Wain shipyards. They visited a number of the universities and research facilities as well. One of their principal findings was that the Scandinavians voluntarily entered into partnerships and relationships for various purposes, particularly research, with the support of their governments.

Nachtsheim and Mentz recommended to Gibson that he personally support the formation of a National Shipbuilding Research Program in the U. S. and meet with the yard CEO's to make the case. He did so and NSRP was born in 1971. The Department of Commerce and the White House (OMB) were briefed and the initial funding approved by the Administration and then appropriated by the Congress. Jack Garvey was assigned the responsibility to put the program in place.

In the 1970's there was both a Navy market and an equally strong, domestic commercial market for US shipyards. However, the commercial market was being kept alive by the payment from government (MARAD) of a construction differential subsidy (CDS). The CDS paid the difference between the cost of building a ship in US yards as compared to building a ship overseas.

Because the size of CDS payments was reaching 55% of the total cost of the ship it was imperative that something be done to get shipyards to improve their efficiency. In 1970, President Nixon instituted amendments to the Merchant Marine Act of 1936 that called for an immediate 10% reduction in Construction Differential Subsidies and another 10% reduction over the next 10 years. To help the industry meet these reductions he established CDS funding levels that would support the construction of 300 US Flag Commercial Ships over a 10-year period.

President Nixon also called for the establishment of a collaborative, government/industry research program to assist the US shipbuilding industry improve their productivity and reduce the cost of ship construction in US yards. The collaborative program, sponsored by MARAD, became known as the National Shipbuilding Research Program.

As a result of this action, US shipyards made significant gains in productivity during the 1970's. Investments in new facilities, production technologies and processes were made by many yards and the CDS rates were reduced and in some cases (LNG ships) were totally eliminated. Consequently, record numbers of commercial ships were built during the 1970s.

The strength of the program during the 70s was the certainty of funding. It was only \$2.0M per year (1970's dollars equates to roughly \$6.5M in 2004) but it was guaranteed. The industry was able to plan each year's efforts knowing that funding would be available.

1980s and early 90's

The commercial building boom came to an end in the 1980's when the Reagan administration canceled the CDS program and fully concentrated on building a 600-ship Navy. The Navy business, however, was very strong. The NSRP limped along during the 1980s thanks to funding support from the Navy but the funding was always uncertain (sound familiar?). The uncertainty of funding had a dramatic effect on the program. Nothing could be planned because we never knew if or how much funding would be provided. Consequently, while the program still did many worthwhile things it lost its effectiveness and industry interest began to drop.

The pre-ASE NSRP was an industry-driven, industry-led program administered through the Ship Production Committee of the Society of Naval Architects and Marine Engineers and NSWC Carderock. Additional financial support was provided by shipyards, design agents, and government agencies through the time invested by individuals in planning, managing, and reviewing the research performed by the eight panels of the NSRP. Through industry involvement in the selection of and management of projects, the NSRP ensured that the work was relevant to the needs of the shipbuilding and ship-repair industry. Program management was originally overseen by the Maritime Administration (MARAD), then changed to NSWC Carderock and eventually NAVSEA until absorbed into the ASE program in 1999.

1993-1998: DARPA MARITECH Program

It was also the certainty of funding during the 1990's that provided the resurgence of the program and its ability to produce results.

The MARITECH Program began with the 1993 National Defense Authorization Act, which required the President to present a plan to Congress for the revitalization of the U.S. shipyards. The President's Plan, developed in response to this act, embraced five objectives:

- Ensure fair international competition through OECD,
- Improve competitiveness through the MARITECH Program,
- Eliminate unnecessary government regulation,
- Finance ship sales through Title XI loan guarantees, and
- Assist in international marketing.

The DARPA Maritime Systems Technology Office was tasked to establish a technology-development initiative to help shipyards become internationally competitive in commercial markets and thereby help preserve the industrial base for possible future national security needs. ARPA executed this program in collaboration with the Maritime Administration and the Office of Naval Research (ONR). MARITECH, was structured for a five-year period, with \$30 million in the first year, \$40 million in the second year, and \$50 million per year for the next three years.

MARITECH was principally initiated to encourage the U.S. shipbuilding industry to expand into the commercial sector, thereby increasing its potential for staying in business and passing savings gained from commercial efficiencies and economies of scale to the Navy. Five objectives were assigned to the program:

- Encourage and support proactive market analysis and product development,
- Develop a portfolio of U.S. designs,
- Develop innovative design and production processes and technology,
- Facilitate government and industry technology transfer activities, and
- Encourage formation of consortia for short- and long-term technology investment strategies.

MARITECH awarded matching federal funds, on a competitive basis, to develop and implement technologies and advanced processes for the competitive design, marketing, production, and support of commercial ships. A series of Broad Agency Announcements (BAAs) released over FY1994-FY1997 addressed the following:

- Development of innovative, world class ship designs with a specific market and/or customer in mind, as well as the production processes and technology required to construct the ships competitively.
- Development and demonstration of advanced systems that will improve the manufacture, operation, and/or repair of ships (shipbuilding processes).
- Development and demonstration of innovative application of new technologies and processes that would vastly improve a shipyard's capabilities in market analysis, supplier relations, and other advanced business practices.
- Development and demonstration of revolutionary system-wide, integrated design and production technologies that would reduce the total time of the design and construction process.

The DARPA approach for MARITECH technology development consisted of an integrated two-part program in which the strategy, goals, planning, and coordination were provided by government. Project costs were shared between industry and government, and the projects typically involved teaming between a yard and its suppliers.

MARITECH sponsored over 65 projects involving 18 shipyards and over 100 other companies operating in over 40 states. The effort included 34 projects related to ship design development and 18 projects in advanced technology development. The early phase of MARITECH resulted in over 30 new ship designs, improvements in build strategies, and improved, proactive marketing and ship sales. Shipyards invested over \$500 million in new facilities and processes based on lesson learned. The later stage, which concentrated on information technology, began the establishment of a national information technology infrastructure.

Key Metrics for DARPA MARITECH

Twenty-four ships were built or are being built that are directly related to the designs developed under the MARITECH program. They had a total market cost of approximately \$2.4B. The ships are listed below:

- NGSS Avondale - 4 product carriers - \$120M & 5 Polar Tankers - \$1.0B
- NASSCO - 4 Crude Oil Carriers & 2 TOTE Ships - \$1.1B
- Newport News - 6 Product Carriers - \$240M
- Atlantic Marine - 2 Chemical Carriers - \$60M
- Halter Marine - 1 Pure Car Truck Carriers - \$70M

There are options for 2 more tankers at NASSCO, 1 more tanker at Avondale and 1 more car/truck carrier at Halter. There are also 2 containerships for Bender awaiting Title XI approval. These are worth approximately \$0.8B.

There were also other ships ordered that were subsequently cancelled like the 2 cruise ships at Ingalls with a market cost of \$1.0B. There were also many small ships built by the likes of Gladding Hearn, Nichols Brothers, Bollinger and Halter there were directly related to MARITECH. They did not have a high dollar value and are thus not included here.

The other important metric is the \$500M+ of investments in new facilities that were made by the shipyards during the MARITECH years to attract commercial business. These new facilities are now being used to build Navy ships.

1998: NAVSEA-sponsors NSRP ASE (aka MARITECH ASE)

A result of MARITECH was that the shipyards learned the benefit and power of collaboration and teaming. A series of studies by industry, government, and others consistently recommended continuing MARITECH. In 1997 as the DARPA MARITECH program was coming to a conclusion, the Navy (NAVSEA Executive Director) offered to continue the momentum by funding a follow-on program – contingent on an industry-led collaborative approach in which shipyards would share results the efforts would focus on consensus industry needs, not shipyard unique needs. It would further encourage project results to be shared so the Navy would not bear investment costs in improvement initiatives at each shipyard individually.

With a number of issues associated with setting up an industry organization perceived by some to be redundant and requiring financial backing, the existing NSRP infrastructure was seen as an alternative to establishing a "new" organization. The nine shipyards who were active participants in the NSRP's Executive Control Board worked together over a nine-month period to develop and execute articles of collaboration sufficient to establish a vehicle for government cost-sharing of an industry-led effort. DARPA MARITECH provided limited funding during 1998 to develop a consensus industry strategy for future collaborative R&D investment. The collaborative program started under the name MARITECH ASE but transitioned to "NSRP ASE" as NAVSEA turned over funding and management of the ongoing NSRP panels to the collaboration.

ASE differs from its predecessor in that U.S. shipyards formed a collaboration to speak with one voice in developing a landmark, industry-wide strategic investment plan to focus cooperative R&D efforts. This Strategic Investment Plan provides a framework to guide collaborative research and development among all segments of the U.S. ship construction and repair industry, educational and research institutions, and government in order to achieve significant reduction in the cost and time required for both commercial and Navy ship construction, conversion, and repair. The plan aims to meet the nation's seapower needs at the lowest attainable cost, provide a cost-effective, responsive industrial support base for maintaining operating ships, and continually improve the U.S. ship construction and repair industry's productivity and rate of best practice migration.