

Y-12 Work for Others – a historical perspective, part 2

In the last column I introduced Paul Sooter and his excellent review of the Y-12 Work for Others program. Paul will now take us through the major projects the US Navy has placed in Oak Ridge over the years. Not all were limited to Y-12, some involved the Oak Ridge National Laboratory and others involved work done at the K-25 Gaseous Diffusion Plant/ East Tennessee Technology Park.

These are the major Oak Ridge projects funded by the US Navy, as Paul recalls them.

“Some of the tasks listed were completed primarily at one Oak Ridge facility (ORNL, Y-12, ETPP) and some were collaborative efforts of multiple sites. This information is presented to provide information on the broad scope and magnitude of Oak Ridge support for Navy programs.

“1. Large Scale Vehicle (LSV) Data Acquisition System (DAS) – The Instrumentation and Controls (I&C) Division at Oak Ridge National Laboratory (ORNL) developed the original data acquisition system for the US Navy’s Large Scale Vehicle, an autonomous $\frac{1}{4}$ scale submarine used for submarine R&D. This was a three year, \$1.7M program that began in 1984.

“2. Acoustic Measurement Facility Improvement Program (AMFIP) – This ORNL I&C task was associated with modernizing the US Navy’s Acoustic Measurement Facility in the Bahamas. This \$32M program began in 1986 and was completed in 1999. Oak Ridge developed and implemented an acoustic beam measurement system. The system, when completed, had the ability to acquire 40 million acoustic samples per second and analyze the samples utilizing a data analysis system with 40 Gflops of computational power.

“3. Large Cavitation Channel (LCC) Data Analysis System – Oak Ridge developed a \$5.5M Data Acquisition System for the US Navy’s LCC located in Memphis during a period from 1989 to 1992. The LCC is used to provide hydrodynamic information on surface ship and submarine models. The Oak Ridge developed DAS acquires and analyzes the data utilized by the Navy to determine the performance characteristics of the models.

“4. LSV Scale Prototype Propeller Models for Seawolf Class Submarine (SSN-21) – From 1984 to 1994 Oak Ridge completed design and manufacturing for a series of $\sim \frac{1}{4}$ scale model propeller assemblies for testing acoustic and hydrodynamic parameters. Approximately nine different design concepts were developed as part of the SSN-21 Program. Each design concept was manufactured by Oak Ridge during this \$24M program.

“5. Baseline Model Submarine Enhancement – Oak Ridge modified an existing $\frac{1}{4}$ scale submarine model to include characteristics that matched the SSN-21 hull. The cost of this one year program in 1985 was \$5M. The task required development of new tooling and welding technologies to achieve the assembly accuracy required.

“6. Steelhead Submarine Model Manufacture – The Steelhead Model was designed and manufactured in Oak Ridge using a US Navy concept. The $\frac{1}{4}$ scale submarine required development of specialized manufacturing techniques to achieve the required tolerances. The total cost of this program was \$11M from 1985 to 1988.

“7. Navy Gage and Standards Laboratory (NGSL) Support – Oak Ridge provided design, manufacturing, and certification services to NGSL from 1984 through 1994. During this period a large number of precision inspection gages were designed and/or manufactured. Tasks completed include: Trident Re-Entry Vehicle Contour Gage, Trident Re-Entry Vehicle Bus Gages, Trident Cold Gas Generator Energy Gage, Tomahawk Cruise Missile Wing Gage, and Tomahawk Cruise Missile Mid-Body Gage.

“8. Seawolf (SSN-21) Propulsor – From 1989 through 1993 Oak Ridge completed design and manufacture of the prototype SSN-21 full scale propulsor. This ~ \$65M task required development of new manufacturing processes that have resulted in basic changes in how the US Navy manufactures assemblies of this type.

“9. LSV Scale Prototype Propeller Models for New Attack Submarine (Virginia, SSN-774) – Oak Ridge has participated in design and manufacture of hardware to test the acoustic and hydrodynamic properties of scale model hardware for the SSN-774 submarine that will eventually replace the SSN-688, Los Angeles Class. A total of six sets of trial hardware have been supported by Oak Ridge between 1992 and 2000 with design and fabrication services associated with this \$12M program.

“10. SSN-21/22/23 Risk Mitigation – As part of the Seawolf Program Oak Ridge provided transfer of manufacturing processes to private industry for manufacture of follow-on units. In addition, Oak Ridge manufactured one major assembly for the SSN-22. This \$16M program began in 1992 and was concluded in 2001.

“11. SSN-774 Integrated Product Team (IPT) Support – Oak Ridge has provided design and manufacturing support to the Virginia Class IPT since 1992. In this role Oak Ridge personnel provided design input into the SSN-774 propulsor for cost reduction and product improvement.

“12. Surface Ship Torpedo Defense (SSTD) – Oak Ridge developed a manufacturing process and testing capability in support for this joint US/UK program that began in 1995. In addition, Oak Ridge personnel participated in a failure evaluation team for SSTD. During 2001 Oak Ridge was involved in manufacture of hardware and mechanical properties testing of the hardware.

“13. Remote Sensing for Virtual Presence (RSVP) – ORNL Instrumentation & Controls personnel were involved in this \$15M multi-organization ONR project. Oak Ridge technology in sensors and wireless communications was utilized to reduce shipboard manning requirements through replacement of watch standing personnel with wireless sensors in many shipboard locations. Oak Ridge teamed with the Naval Surface Warfare Center and commercial entities for this three-year Advanced Technology Demonstrator Program (FY99-FY01).

“14. Large Scale Vehicle (LSV) II Duty Propeller – The US Navy procured a second LSV type autonomous model submarine for testing SSN-774 hardware. Oak Ridge was tasked to manufacture the main propeller assembly to be used with this platform. This two-year task was completed in 2000.”

Next, we will look at some benefits of the Work for Others program.