A Beginning or Just a Change in Course?

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On 5 September 1947, Radar Destroyer Division 142 sortied from buoys M1 and M2 in Narragansett Bay. These two buoys were the most seaward, barely inside Bull Race Point, providing almost no shelter from the sea most days and nights. The division included USS Everett P. Larson (DDR 830), the flagship; USS Goodrich (DDR 831); USS Hanson (DDR 832); and USS (Dirty Herbie) Thomas (DDR 833). They each masted the high-powered Mk 16 stabilized parabolic dish antenna of the SP1-M three-dimensional radar, designed and built by Westinghouse Corporation. The division was to rendezvous with USS Midway (CV 41) in the mid-Atlantic to conduct a classified event code-named Operation Sandy. Midway's construction was newly completed at Philadelphia. She put to sea with a contingent of Germans and Americans, along with a captured V-2 rocket on her flight deck. The purpose of the event was to determine the feasibility of launching a large, liquid-fueled ballistic rocket from a ship. The four radar pickets were oriented along the expected trajectory toward the south and east for a range of about 200 miles, and the rocket was to be detected by the SP-1M radars. Goodrich was the terminal ship in which I, then an ensign in the U.S. Naval Reserve, was embarked as radio, radar, sonar, and combat information officer. LTJG Robert Lundy, also in the Naval Reserve, was embarked in Midway as project officer for the operation. 'Twas a momentous occasion indeed.

Unfortunately, the V-2 prematurely exploded about six miles from Midway. Several outcomes resulted from this:

- It greatly affected my life and the life of LTJG Lundy. We came together two decades later, Robert Lundy as commanding officer of USS Dale (DLG 19), and I as the project officer and M. E. Oliver as the deputy for the conduct of the first operation of destroying Army ballistic missiles launched from St. Nicholas Island in the Pacific with Terriers from Dale’s batteries. (Unlike the previous event, this one was hugely successful!)
- The Navy retreated for over a decade from attempts to launch ballistic missiles from aboard ship. It further determined that, if given a choice, the Navy would prefer solid-fueled engines over liquid-fueled engines.
- The Navy vigorously pursued development and pressed into service cruise missiles, the most notable being Regulus, which was fired from submarines, cruisers, and aircraft carriers.
- It caused the Navy’s new cruisers (Long Beach, Chicago, Albany, and Columbus) to be holed for attack ballistic missiles, even though none were yet ready for service.
• Probably the more significant outcome was that it
  reinforced and brought new energy to the Navy’s
  belief (originally fueled by Japanese Kamikaze attacks)
  that defense against these missiles was absolutely
  vital to any effective future naval and amphibious
  operations. Thus, an unprecedented alliance was cre-
  ated that is in existence to this day.

  To further examine this half-century, let me step
back to look at history from a different tack.

  “Fire control” is our expression for the compelling need
and scheme to destroy the target. It is an expression as old
as naval guns. Fire control is characterized by the need to
achieve closed-loop operation. Causing the target vector
and the interceptor vector, be it projectile or missile, to
coincide spatially and temporally achieves the required
loop closure. It is axiomatic that this is difficult.

  Over time, many implementations of fire control
loop closure have evolved. The earliest, of course, was
man. He caused closure by aiming at the target or lead-
ing the target if it was in motion. When high rate of
fire semi-automatic guns were first fielded to counter air
targets, the man literally sat in or on the gun mount to
direct the fire. Tracer shells were subsequently added to
aid in closing the loop.

  Later still, a radar director assisted the man, and an
advanced mechanical analog computer supplemented
the man’s brain to compute lead angle and ballistics.
A time-set fuze improved the shells. During World
War II, a group from the Department of Terrestrial
Magnetism of the Carnegie Institute of Washington
undertook to design and build a highly classified radar
frequency proximity fuze, the VT fuze, one of the signifi-
cant instruments in turning the tide of the war. From
this effort emerged APL.

  By 1945, after tremendous losses to the Navy due to
the Japanese Kamikaze attacks, the Navy opined that
guided missiles afforded better capability than projectiles
to kill them, and the “Bumble Bee” program was estab-
lished. From this sprung the Navy’s Bureau of Ordnance
alliance, with a cadre of scientists, engineers, and tech-
nicians, executed through an instrument referred to
as the “Section T” contract with The Johns Hopkins Uni-
versity. This program, led by the budding APL, included
industry, other universities, and government laboratories
in pursuit of developing the Talos, Tartar, Terrier, and
Typhon systems. To better close the loop, a receiver was
put in the missile to “ride” the fire control director radar
beam to the target. This worked, but the longer the range
to the target, the greater the miss distance, thus prompt-
ing the use of warheads with fuzes, called target detection
devices, to enhance the “loop closure.”

  The long-range Talos system employed “beam riding”
to the vicinity of the target, then switched to semi-active
homing for the terminal phase. This was accomplished
by adding another receiver to the missile to “home”
on the reflected radio-frequency energy of the fire con-
trol director tracking radar. Terrier, and its smaller ver-
sion Tartar, went to semi-active homing all the way to
better cope with low-altitude difficulties associated with
beam riding.

  It has been suggested that this half century could be
characterized into overlapping epochs:

  • In the forties and fifties, Kamikaze attacks
  • In the sixties, Elath sinking
  • In the seventies, Backfire bombers
  • In the eighties, Sunburn supersonic cruise missiles
  • In the nineties, Theater Missile Defense (No Dong,
    Scud)

  Even as this issue of the Technical Digest is being pre-
pared, the 11 September 2001 attacks on the United
States may have defined an entirely new epoch, surely
characterized by the defense of our immediate homeland.
I have lived through these epochs, all of which possess
a common denominator—the determination, technical
and leadership prowess, patriotism, professionalism, and
downright brilliance of the people involved. So this past
response by our Navy is just a story of people who have
enabled us to live our lives as we do. Few of my asso-
ciates are alive, and even fewer of my hardy original
mentors remain. Yet every one of them continues to be
active today in this vocation to our country. Surely their
spirit will inspire and haunt this generation to press on
to the demanding future response in furtherance of their
initiatives.

  Stay tuned for Part II of this endeavor (related to
Aegis) and the “way ahead” in the third issue of this
extraordinary series.
RADM WAYNE E. MEYER, USN (Ret.), holds three B.S. degrees in electrical engineering as well as an M.S. in astronautics and aeronautics from MIT. He began his naval career in 1943 as an apprentice seaman and retired in 1985 as Deputy Commander for Weapons and Combat Systems, Naval Sea Systems Command; and Ordnance Officer of the Navy. RADM Meyer had numerous tours at sea, including Fire Control and then Gunnery Officer to the first Talos cruiser USS Galveston (CLG 3). He has also served as Director of Engineering, Naval Ship Missile Systems Engineering Station, Port Hueneme, CA; Manager, Aegis Weapons System, Naval Ordnance Systems Command; first Director of Surface Warfare, Naval Sea Systems Command; and Project Manager, Aegis Shipbuilding. He holds the Distinguished Service Medal along with 14 other medals and numerous awards including the Navy League’s RADM William Parsons Award (1985) for scientific and technical progress in construction of the Aegis Fleet.