

DEWEY, FORERUNNER OF THE FUTURE

In the Spring
In ~~February~~ 1961, Commander Sixth Fleet, looking toward the west from his flagship, will see a strikingly different destroyer come into view. USS DEWEY (DLG 14) the world's first guided missile destroyer leader, the first ship designed and built from the keel up as a guided missile ship, will be joining the fleet.

This moment of historic naval importance will come 4 years after the first 10 DLGs were authorized and nearly 10 years after destroyer sailors began the program to restore to the balanced fleet a truly modern destroyer with capabilities sufficient to meet the future. Individuals, staffs, division, squadron and type commander^s, together with their counterparts in the bureaus and offices of Washington, saw to it that discussions and studies became ideas; ideas became a program; a program became reality with appropriations provided and contracts let.

Even as keels were laid and hulls erected, the vision carried forward, with new technological breakthroughs exploited to keep these ships truly modern. This process, always a compromise between time and money, has been so fortuitously monitored with the Dewey class that it will be several years before a more potent destroyer type joins the fleet and today DEWEY with the first of the advanced Terrier BT3 missile systems capable of destruction at ^{mid} 20 miles and ~~through~~ ^{very high altitude} 80,000 feet represents a more powerful threat than any of

~~9~~ cruiser~~s~~ in our own fleet. ~~DEWEY, unlike the Russians, could in fact have shot down U2 at altitude.~~

At birth in 1955 DEWEY was not heralded to be unique for she was the ninth of 10 sister ships for which contracts were let. However, those remarkable shipbuilders at Bath Iron Works delivered her 10 months ahead of schedule, thus making her a prototype. So rapid was her progress in the late stages that the Navy had to practice heroic measures to get her manned and outfitted in time. Key subsidiary systems, of government-provided equipment, had to be speeded up. Critical technical training had to be projected in advance of the regularly scheduled naval schools. Experienced personnel had to be assembled earlier than planned. These problems required unusual and unorthodox measures. As the Prospective Commanding Officer and later first Commanding Officer of the ship involved, ^{I want to record} ~~I am here to tell you about that remarkable ship and her unique story. In this film you have seen DEWEY making 25 knots, in a hard rudder turn, and firing 3 BNL Terrier missiles.~~

~~When DEWEY enters Sixth Fleet's waters she will have travelled from Norfolk via London, Rotterdam, Oslo and Goteberg. She could have done this with only one refueling or she could have come direct from Norfolk at 21 knots without refueling. On completion of her Mediterranean tour one month later it would be possible for DEWEY to return home by way of Red Sea, Indian Ocean, Hawaii, and Panama,~~

distance of 17.5 thousand miles, with only 3 refueling stops.

ComSixthFlt will see a destroyer 512.5 feet long, displacing 5,600 tons, with a draft of 24.5 feet. He will be misled by a bow so successfully streamlined by Gibbs & Cox (in a design they have been trying to sell for years) that he may not judge well without any bow waves the ~~35~~ *35 speed in excess of* knots DEWEY will be making. This speed will be provided by 4 Babcock & Wilcox integral superheater boilers each rated at 167,000 lbs steam flow per hour under 1275 lbs per square inch pressure at 975 degrees F. The integral superheaters together with return oil flow atomizers, permit DEWEY to accelerate from 0 to 35 knots and down again, at will, without changing sprayer plates.

Further during this entire cycle, except for manual insertion of additional burners above 25 knots, automatic combustion control permits a "look daddy no hands" situation in the engine and firerooms with shutters and valves opening and closing, Pumps starting and stopping, all untouched by human hands. For most plane guarding situations DEWEY's 29 knots on 2 boilers will be ample and she can travel at 23 knots on one boiler for long hauls. DEWEY's 35 knots is turned up by the 85,000 shaft horsepower generated by her 2 Main series-parallel, hp-lp velocity compounded DeLaval turbines.

The Admiral won't see them as DEWEY joins up but each engine room and fire room will be monitored and controlled from a fully enclosed, air conditioned operating station ~~the~~

~~control panel of which is shown here.~~ And no old time naval engineer will feel completely at home in the relatively quiet, cool, clean and tastefully finished engineering spaces. He will like the fact that the 25,000 gallons per day of water she can make (and the temperature at which she operates her evaporators) make her logistically independent in port as well as at sea.

But ComSixthFlt will be no happier than DEWEY engineers who continue to be amazed at the versatility and reliability of her plant. During ^{for} the 6 months ^{contractor} guarantee period ~~just ended~~, DEWEY steamed 13 thousand miles at a standard speed of 27 knots, an average speed of 16 knots and remained completely free of significant prototype defects, ~~although occasional turbine vibration has made it desirable to~~ replace steel packing with bronze. This is being accomplished during ~~our present post-shakedown availability~~. This plant with the 110 engineers who man it will certainly satisfy ComSixthFlt that DEWEY is competent in an engineering sense to fulfill her present mission: "To screen fast Carrier Task Forces and to operate offensively"

But to answer the question "How well can the DEWEY screen a fast carrier task force and how does she operate offensively?" we are going to have to move the Admiral aboard during the next fleet exercise.

The first impression DEWEY will make as he comes to the pilot house will be of the spaciousness and facility of her bridge. At last the destroyer navy has been provided a ship's bridge in which there is room, visibility, comfort, and ample display. Fully enclosed, with wide, heated windows, DEWEY provides visibility nearly straight aft from the sides of the pilot house enclosure and 150 degrees either side of the bow from the center line.

Rather than having to rely on telephone reports of skunks or bogies, the conning officer merely watches the display of a closed loop TV scope which shows him a picture of the summary plotting board in CIC. This information incidentally goes to 2 other stations which also have TV. Walking aft from the pilot house and on the same level, the Admiral will enter CIC. This area, like gracious living, is split level. Further, CIC is modular in concept with all equipment associated with a given function located in one module, to reduce noise and confusion. It works. In the lower level, in the ECM (Electronic countermeasures) module, the Admiral will find DEWEY sailors acquiring on the Navy's new MLRI ECM equipment information of the bearing and signal characteristics of enemy planes or ships out beyond radar range. This information is not only disseminated to the rest of the task force but is also used to alert search

radar operators.

The Admiral walks to starboard to the detection and tracking module. Here other operators on the AEW (That is airborne early warning) consoles have begun to receive the scope presentation of the AEW plane 200 miles to the west; the direction from which the enemy is expected. The bogies presented at 350 miles check with the ECM bearing picked up earlier and do not show IFF (identification friend or foe). This information, together with a predicted time of pick up, goes from the evaluator to the operators on SPS33 remote PPIs (Radar plan position indicator). The operators are searching in various aspects, with their units tied into the SPS29 long range air search radar. They can expect to pick up a single bogey in excess of 200 miles.

Also in the detection and tracking module, forward of the SPS 29, is the SPS 42. Successor to the SPS 26. Its unusual antenna is shown here. By either designation this Hughes Aircraft Corp. radar has been reported to be a nightmare. DEWLY's experience has been emphatically the reverse. Once the problem of spare part support had been resolved, all hands were delighted with its accuracy and stability. I consider it one of the finest precision radar instruments in service.

With it the Admiral will see the bogey (now being tracked at 190 miles with the 29) passed to the 42 at about 80 miles. The 42 will produce with its 3 dimensional hemispherical scan precise bearing, range and altitude with sufficient accuracy for weaponry. It is capable of acquiring a single FJ-3 jet (At altitude at an average range of 86 miles. Now the 42 holds the bogey and the Admiral goes to upper CIC to watch the handling of this simulated raid. As shown here the upper CIC consists of 4 modules. On the port side is the surface operations module where the navigator has his own private DRT (Dead Reckoning Track) and radar repeater, and where the surface tracking team with its DRT and radar repeater watch the Admiral's fleet and track all surface contacts on the scope; the second module on the starboard side is for the installation of NTDS (Naval Tactical Data System) equipment as soon as available. In the third module, centrally located, where all the facilities and displays of CIC are available to him, is the Squadron Commanders station. He has, in addition, his own radar repeater and radio/tactical desk. As the Admiral arrives the Squadron Commander and his staff are busily engaged in carrying out responsibilities as SADC (Sector Air Defense Commander.)

The latest AEW and radar picket information is being displayed on the large 60 inch, long-range air plot shown here. The SADC evaluates the developing attack and has already directed CAP (Contact Air Patrol) assignments and deployment. Other missile ships have been assigned responsibility for taking specific bogies under fire if they reach the cross over point and have not been destroyed by CAP.

Using the information of the 42 radar he is able to determine weapons release points for the incoming raids and thus establish appropriate missile engagement ranges. His commands are relayed to the force rapidly, using the sector air defense coordination net at his command module in CIC.

The status of sector ECM warfare will always be available to the commander thru the AN/SIQ 4,5, and 6 ECM equipment, when it is installed.

Having evaluated the bogie, he has just assigned primary responsibility for intercept to DEWEY.

Now we enter the fourth and largest module of upper CIC, the display and decision area. On our left the 2 air controllers each on a radar repeater, and separated by a VLI altitude presentation console (manned by the air controllers assistant) are vectoring their assigned caps to intercept position on the bogey.

They use the versatile GRC-27 UHF transmitter receiver or sector arrayed TED/RED combinations. Reliable communications with CAP are assured up to 200 miles range.

The ship's tactical air navigation equipment (Called TACAN) provides the CAP with coded, accurate bearing and range to controlling ship. Thus lost aircraft can quickly return to the vicinity of their control ship. The air controller himself is provided with the radio direction finder, URD 4, which acts as a back up in the event of radar fade or IFF casualty.

On still another repeater the radar control officer is directing his attention to proper radar coverage and displays by all operators at all ranges on all search radars.

The bulkheads of the display and decision module are all plexiglass, forming status boards of strategic and summary plots. These plexiglass boards are set far enough away from ship's bulkheads to permit plotters, plotting inversely, to keep all data up to date without blocking line of sight. In the center of this module, overhead, the Admiral sees the TV kinescope relaying the missile plot picture to Conn, detecting and tracking module and weapons control. Underneath the kinescope, behind the radar repeater and

adjacent to a radio/tactical desk stands the evaluator. At this station is the apex of all information flow. The evaluator has heard and watched the ECM plot of the bogey, followed by the AEW video picture and then DEWEY's own SPS29 contact. At this point the evaluator directs his air controller to take the bogey with the CAP under his control.

As you can see CIC has been a busy brain cell. Nothing has been spared on DEWEY to give the evaluator and SADC a complete picture. And for that reason I have learned, despite tradition, to take my battle station here beside him and will continue to do so except when a close-in tactical situation prohibits it.

The bogey has closed to 60 miles still tracked by the SPS42. His altitude is precisely known. After the evaluator has directed the air controller to make his intercept, he turns his attention to a console on his right. The target selection and Tracking console. Here, an operator, supervised by the Weapons liaison officer, is tracking our Bogey 1. Bogies 2 and 3, at greater range have now been picked up and are also being tracked by this operator. This is in addition to the normal CIC plot being

maintained on these planes. At this point the WLO (Weapons Liaison Officer) designates Bogey 1 from the target selection and tracking console in upper CIC to one of the two identical units at Weapons Control Station, WCS.

The Admiral decides to go one deck below to WCS, located as a separate module just forward of lower CIC. As he leaves he hears the CO tell the Evaluator that bogies 2 and 3 are now to be considered possible weapons targets and should be designated to WCS.

Meanwhile, back at the ranch, in weapons control, the Weapons Officer, successor to the old fashioned gunnery officer, has been patrolling behind four consoles manned by expert personnel. To starboard (as shown here) he has 2 more of the target selection and tracking consoles. One of these is tracking bogey 1 manually (having received designation from the similar console in upper CIC). The other is tracking bogies 2 and 3.

These tracks are established by placing an electronic pantograph arm over the bogey Pip and inserting a position into a computer which establishes target course and speed, and provides aided tracking. Up to 6 targets may be so tracked. These consoles, do not give the weapons officer his

first information however. Even before these bogies were designated, he had been watching on his closed Loop TV, the development of the raids on summary plot.

As a result, about the time the first bogey was designated to Weapons Control, Weapons Officer alerted the launching system to be ready for missile fire. He did this by operating the missile status indicator to alert the missile area back aft.

Launching system personnel back aft responded by applying power to launching system motors and panels; setting up their panels to receive launcher loading orders from WES, and signalling ready.

Now, by watching the target selection and detection consoles he receives constant information on target bearing, range, height, and even estimated Weapons release point.

Weapons Officer is now doing his preliminary evaluation of targets. For this he uses the third operator at the director assignment console. Each target appears by letter designation on this scope to give him range and bearing. He also has presented course, speed, and height. This console also shows him the time in seconds he has remaining to fire before target reaches the release point.

Also on this scope the Weapons Officer has a video presentation of any director which is acquiring or tracking a target. In summary, this director assignment console is an auxiliary brain, showing where every threatening target is, what it is doing, what the ship has already done to meet the threat, and how much time remains to take more action.

While this is going on, the air controller in upper CIC has talleyhoed bogey one which continues on to the ship to simulate his attack. Evaluator directs air controller to have CAP clear the bogey. The CO via WLO informs weapons officer that his battery is free to fire. Bogey 1 is coming in high. It's a good missile target. Weapons Officer orders the type and code of missile he desires by signalling the missile area on the missile status indicator.

He used the fourth console, weapons assignment console, operated by the missile officer, to signal the launcher system whether to load one or both of the twin rails. The weapons assignment console also orders missiles warmed up. Assuming both rails have been ordered filled, the following action occurs. The two magazine ready service rings, each holding 20 missiles in a machine gun like rotary, rotate to bring the nearest rounds of the selected type or

code to the uppermost position from which hoists can pick them up. Huge zipperlike doors open up in the main deck and the 2 rounds, each nearly 26' long, and weighing nearly 3100 pounds are automatically hoisted up into the loader rails inside the missile house. Two huge blast doors in the after bulkhead of the missile house open, and the rounds move aft into the launcher where missile warm-up begins. The missiles are ready to fire. Back at Weapons Control station, the Weapons Officer takes a final check. A moment before he had a report that missile fire control system 5 was operating erratically. He therefore orders that #4 be assigned to the bogey. Fire control officer presses two buttons on the director assignment console. This action energizes designate circuits in #4 MK 100 computer. This permits the computer to accept signals from WCS designation equipment. The computer then slews the SPQ5A radar director as seen here, to the position of the target. This radar is really 4 concentric radar beams - one for acquisition, one for tracking, a broad beam for capture of the missile and a narrow guidance beam to take it to the target. As the director slews out to the target, an operator on

the missile radar acquisition track console uses a gate to search a small volume of space around the designated spot until the target is acquired. Automatic tracking by this missile FCS commences. Solutions for target future position and missile capability contour are displayed back on the Weapons Assignment Console.

For the final pre-firing evaluation, the weapons officer uses his missile officer on the weapons assignment console. He has one scope for each of the missile FCS. These scopes show sectors that are unclear to fire due to ship's superstructure. A course recommended dial with buzzer is used to request conn to maneuver to unmask if necessary. Conn replies on the course ordered dial. (The WAC shows predicted target position and missile capability contour) Launcher order in train also is indicated on these scopes.

Now the weapons officer notes that the rail loaded lights indicate the launcher is loaded. His study of the tactical situation on the weapons assignment console indicates firing soon. He therefore assigns the launcher to missile FCS #4 with a button on the WAC. The launcher is positioned in space by signals from the MK 100 computer. Signals

indicate satisfactory launcher synchronization.

A final look at the WAC shows that the future target position has just crossed the missile capability contour.

On order from the Weapons Officer the missile officer fires from the WAC.

The SPQ5A radar capture beam has been positioned by the computer on to the target and the launcher fires the missile to intersect this capture beam at the point of booster separation.

The capture and guidance beams are separately coded, so that the missile can distinguish.

Approximately 4 seconds after launching the booster separates from the missile. Roll stabilization occurs, missiles fins actuate, the missile is captured in the capture beam and is directed into the guidance beam. About 6 seconds after booster separation the missile switches codes and rides the guidance beam out to the target.

This proves to be a hit on Bogey #1. We know this from several sources. At the time of flight interval indicated on the Weapons Assignment Console, the SPS42 operator saw a large video PIP and lost the target; the closed loop TV operator in #4 SPQ5A radar control saw a merged PIP and then lost both; the Miss Distance indicator operator in radar

Room #4 saw the calibrated graph deflection.

At this point I can disclose that the ship knew all along that Bogey 1 was a pilotless drone and that we had permission to expend 1 warhead on it.

While this action is going on the Weapons Officer has assigned missile fire control system 5, now operating normally, to Bogey #2, he has simulated firing, bogey 3 is coming in on the deck.

With the director assignment console, Bogey 3 has been assigned to gun fire control system MK 68 which locked on when the MK 47 computer using designation equipment data slewed the MK 68 director on.

Now that the 68 system is on and the 5 inch 54 cal. mount is ready to open fire at 9 miles (and we promise to remove the tompion by that time) The weapons officer tells the director assignment console to designate from the MK 68 to the port MK 63 system. In this way the twin 3 inch 50 cal. mount to port will be ready to back up the 5 inch mount at close in range.

If at any time during these proceedings a casualty had rendered WCS completely inoperable, by a switching arrangement, we could shift to casualty mode in the Director 4 control room. The director officer would take over for the weapons officer.

Targets would be identified by optics, search or fire control radars. Designation of targets to fire control systems would be coordinated by him. Telephone circuits would perform some of the functions previously carried out electronically but the essential procedures would remain intact.

So far we have limited our discussion and demonstration to the Anti-Aircraft mode of DEWEY's Terrier installation. We might interrupt our fleet exercise long enough to describe 2 other modes to our weapons system. It is a tribute to the farsightedness of the systems engineering for the DEWEY class that as soon as the nuclear warheads are available, she will also have surface and missile fire support capability with her missiles. Minor modifications will be necessary in the ship's installation to give it the ability to transmit certain additional command signals to the missile.

In the surface mode of operation the sequence of events remains essentially the same as for air except that the missile directors are restricted to a fixed angle of elevation and track targets in bearing and range only, using the lower part of the beam. During the terminal part of the flight, the computer programs the director down in elevation to secure interception, the director automatically

transmits arm and detonate signals to the missile at pre-set missile-target range differences.

The shore mode of operation using nuclear warheads provides for a unique arrangement. Both missile directors are normally required. One tracks a fixed reference point such as a radar beacon ashore. The other guides the missile to the target. Coordinates of the target and beacon being known, the amount of the target offset from the beacon, in coordinates, is set into the guidance computer together with burst height then with the tracking radar locked on the beacon, the tracking computer continuously generates beacon position data that are used by the guidance computer to generate designation orders for its guidance radar. Just as in the surface mode, the guidance radar is stabilized in elevation during missile flight and during the terminal phase is programmed down to missile burst height.

A secondary method of shore bombardment may be used when only one missile system is available. This consists of passing through a navigational position with predetermined offsets, and with guidance as before.

Now while we were digressing about these modes a logistic support group moved up and the ship is ordered alongside an oiler to fuel. We reverse course at 27 knots and full rudder to show the Admiral our 550 yard turning circle. We round the stern and approach the 12 knot replenishment ship at 25 knots backing down full when our bow reaches her stern to demonstrate that our 13,000 shaft horsepower backing can decelerate our 5,600 tons not only nearly as quickly but with shafts more evenly matched than in earlier destroyer types. This of course, is assuming that fleet policy permitted such an evolution. These ships are remarkably maneuverable. Every watch officer on the DEWEY has successfully made a landing and taken her away from the dock despite her 5,600 tons.

While we are alongside, topping off to our 280,000 gallon capacity, DEWEY's SQS23 picks up a sonar contact at 20,000 yards. There being a destroyer on that bearing at 10,000 yards, we vector them out to investigate.

While our CIC, using its ASW tracking team in the surface operations module, is vectoring

the SQS 4 equipped destroyer to a pick up range, our own ASW system swings into action. The SQS23 has already started to send bearings and ranges to the MK 38 attack console, and a solution is obtained. The MK 38 console sends info to the selected weapon for thrust cut-off point, arming data, and launching train and elevation. ASROC launcher control stations are standing by to assume control if manual or local control is required.

At this point, still perhaps alongside the oiler we are able, if directed, to take this unidentified sub under fire at a range of 10,000 yards. If we do, a solid fuel, rocket propelled torpedo, MK 44 or nuclear depth charge will travel 10,000 yards through the air to water impact and then sink or search. During the tracking phase one of three fire control systems having received designations from underwater battery fire control is slewed to the missile separation point. The missile is picked up at this point, radar tracks it in flight, transmitting range and bearing to the underwater battery. As the missile enters the water, the radar computer sends automatically the range and bearing of the entry point to the underwater battery. Of course

if the sub had not been picked up until close in, one of DE EYs 6 ASW torpedoes MK 43 could have been fired from a conventional MK 32 launcher.

The Admiral becomes anxious to watch the developments from Washington in response to his flash report of unidentified sub so we move to main radio. While waiting he will note the great advance in communications since the crowded radio shacks of World War II destroyers. Grouped by functions, he will find teletype stations on one side and CW positions on the other. While maintaining 4 teletype nets, in addition, the ship can hold 24 hour coverage on its URC 32 single side band with distances up to 3500 miles. As an example, during the recent tension in the Caribbean DE EY spent 2 periods in Ciudad Trujillo in constant single side band teletype communications direct with CNO Flag plot.

DE EY is capable of receiving on 22 circuits at the same time. On line crypto equipment is now installed.

The submarine having surfaced and proven to be a stray Italian, we persuade the Admiral to take a quick look at some of the features that make DE EY a home for the 24 officers and 351 men embarked.

First, to the galley, which is also modular, each module with appropriate equipment. Butchering of meats takes place in the forward module; slicing and peeling of vegetables in the next; meat and vegetables then move aft to the third module where the soup or stew caldrons await them. The fourth module is for baking, roasting & broiling; the fifth contains grills, toaster, and bread stowage. At this point the food moves across an aisle to the cafeteria line locking into a spacious mess hall holding 4 man tables and chairs sufficient to seat 110 men. The entire crew moves through in 1 hour. Surrounded by pictures of Admiral Dewey and other naval heroes. Flowers and plants border the sides. Soft music chimes forth from the ships broadcast system. Small wonder we hear a frequent comment from the wardroom officers when a meal has not turned out well "I don't ask for anything special, I just want to be treated like a DEWEY white hat" Through proper loading and imaginative use of ration dense foods the crew can be fed full ration tasty meals for 90 days without replenishment.

From the mess hall we take our visitor down a passageway past the ship's store. Here laid out with all the decor of the most fastidious luxury shop are the ship's store officer's finest wares. Here again proper loading can support full store service for 80 days.

We drop down a deck to a typical living compartment. All these as well as all working spaces are air conditioned with 175 tons of Carrier air conditioning units.

Each man has a private enclosure containing his bunk and 2 lockers. He has florescent lighting over his pillow. Each compartment has an installed ironing board. A soiled laundry locker and an adjacent head. On the DEWEY the worst punishment we can threaten is to have a man transferred off the ship.

Finally we arrive at the ship's laundry. The laundry is divided into two separate areas and functions. One room is designed solely as a washing area and the other for pressing and finished work. These facilities provide DEWEY's sailors the finest possible laundry service.