S-3 VIKING TWENTIETH ANNIVERSARY REVIEW

by David Reade

As 1994 approaches, another milestone in US Naval aviation is about to be set. It will have been 20 years ago that the S-3 Viking joined the fleet and began an inevitable conquering of the domain of the super carrier. Over the years the Viking has become a remarkable versatile platform in the Battle Group and an intrinsic component of the Navy's power projection mission.

With the demise of the CVS anti-submarine aircraft carrier in the early 1960s in favor of the more self-contained "super carriers" a need was created for a new, modern, sophisticated ASW capable airplane to replace the venerable piston driven sub-hunting S-2 Tracker. The new aircraft was to be jet powered (to rid the carrier of highly volatile AVGAS) and equipped with state-of-the-art electronics to match the continued advances being made in Soviet submarine technology.

These and other concerns prompted the Navy to initiate the VSX program which subsequently led to the production of the S-3 Viking.

The Navy's VSX program requirements were released in 1964. An initial contract for a series of flight test research and development aircraft was awarded to Lockheed in 1969. Lockheed had teamed with LTV/Vought and UNIVAC to develop the new concept. Each company brought particular expertise to the VSX program. Lockheed brought an ASW aircraft background, having produced ASW/patrol aircraft since before WWII with continued production of the P-3 Orion. LTV/Vought brought an experience in carrier-based aircraft having produced the successful F-8 Crusader and the A-7 Corsair. UNIVAC contributed a vast expertise in data processing acoustics and had been ASW systems specialists for several years.

Lockheed produced the main fuselage and integrated all the major avionics and systems components and performed final aircraft assembly. LTV/Vought fabricated the wings, vertical stabilizers, engine nacelles and landing gear components.

UNIVAC developed a new ASW package based on the proven systems of the P-3C Orion, but with a much higher degree of automation and ruggedness to withstand the stress of carrier arrested landings and high-g catapult launches.

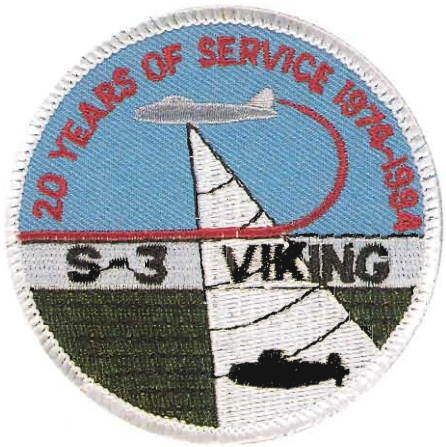
The S-3, from the beginning, was supposed to be more than just a replacement for the S-2 Tracker. It was developed as a quantum leap in technology with ten times the mission capabilities than its predecessor, performing new missions never before conceived for the Tracker. The S-3 encompassed twice the speed, range and ceiling of the S-2 with a maneuvering envelope more comparable to that of an attack aircraft.

The S-3A avionics suite includes the OL-82 acoustic data processor, an AN/APS-116 high resolution nose mounted search radar, the OR-89 FLIR sensor housed in a ventral retractable cupola and an aft retractable AN/ASQ-81 MAD for localization of submerged targets. The S-3A is also equipped with an AN/ALR-47 ESM system for quick omni-directional electromagnetic signals detection.

At the heart of the S-3 is the AN/AYK-10 digital central computer which integrates all onboard functions, including managing sonobuoy activities and weapons stores. It is also capable of performing hands-off flight to TACCO calculated fly-to-points for automatic release of sonobuoys. The computer maintains the aircraft's threat library to assist in classifying unknown contacts and performs all flight/mission record keeping using digital magnetic tape for later analysis.

Other aircraft features include 60 sonobuoy tubes, an internal weapons bay plus wing pylons for additional ordnance as well as an airborne refueling probe.

Although the S-3A was principally designed as an ASW aircraft, to detect, track and sanitize the sea through which the battle group would pass, the versatile Viking was recognized as capable for additional missions. New tasking included sea surface surveillance out to 300 miles from the ship, electronic picket, scene of action commander and search and rescue. As time went on, deployments found the S-3 performing communications relay, low level navigation for other battle group aircraft, aerial mining, and threat warning surveillance. Additional modification allowed for inflight refueling tanker duties, and logistics / liaison (COD) flights. At times the S-3 was used for early ship's EMCON (emissions condition) operations, where all the ships radars and electronic systems were shut down in a blackout condition and an S-3 would be perched at the edge of the flight deck, using its FLIR system as the eyes of the ship.

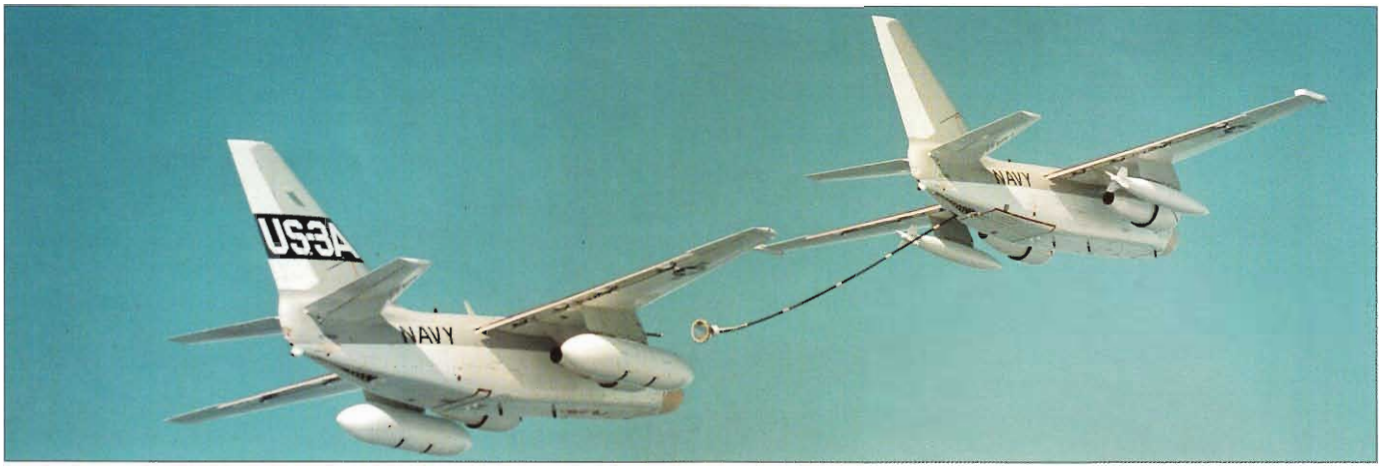


The S-3 VIKING design concept was to provide the type of system versatility of the P-3C Orion, but with a higher degree of sophistication and automation in a smaller package and a crew of only four, the pilot, COTAC, TACCO and SENSO.

The Pilot is the mission commander and manages all aircraft flying functions.

Once designated the Copilot, the COTAC acronym is more representative of the multiple tasks this position per-

VIKING'S 20TH YEAR



The KS-3A refuels the US-3A.

forms. He is copilot, tactical coordinator and non-acoustic operator for the Radar, ESM, FLIR, MAD sensors, and provides all navigation and communications duties.

The TACCO (Tactical Coordinator) is the manager who directs the tactical operations and is the pivotal point where all the mission data flows. It's the TACCO that interprets the information in order to initiate the proper action.

The SENSO is the sole enlisted person aboard the aircraft and is the primary acoustic operator. Sensor operators know all the systems well, however, and handle a large workload which does not exclude inflight maintenance.

Versatile Vikings

Long before the first S-3A ever rolled off the Lockheed production line, numerous S-3 variants began to take shape on engineers' drawing boards. Anticipating the Navy's future requirements, Lockheed proposed various mission concepts based on the S-3A.

One of the first proposed S-3 variants was a tanker concept for inflight refueling of carrier based aircraft. Designated KS-3, the dedicated tanker concept consisted of a standard S-3 wing fuel tank and refueling probe but added a conformal weapons bay fuel tank, wing pylon mounted drop tanks and a dual internal hose and reel drogue system. The aircraft also included additional dual ground refueling receptacles. This would speed the on-deck refueling turnaround time. The tanker concept also comprised state-of-the-art navigational and communications avionics with provisions for secondary mission capabilities to conduct EW (electronic warfare) and C^3 (communications relay) operations.

In order to prove the S-3 tanker concept to the Navy, Lockheed proposed developing an operational KS-3 Demonstrator aircraft. To keep costs down, an existing flight test S-3 Vikings was modified into the inflight tanker configuration. Ship No. 5 of Lockheed's S-3A flight test program was diverted and equipped with a bolt on belly tank (simulating the proposed conformal weapons bay tank) modified wing pylons for 600 gallon drop tanks and a single hose and reel drogue system incorporated into the fuselage.

The designated KS-3A prototype was flown for almost two years and proved to be a remarkably stable and efficient refueling platform. It demonstrated the ability to move large quantities of fuel with a minimum fuel consumption which maximized available fuel for inflight transfer.

During tests the KS-3A refueled a variety of Navy aircraft. With its ability to be replenished itself in-flight using its refueling probe, the S-3 could give up more fuel than any other carrier based tanker aircraft to date. But despite its laurels, the Navy did not buy the KS-3, so none were produced. The modified KS-3A was later used for pilot training by VS-41 before being re-configured as a US-3A COD aircraft.

Although the KS-3 never went into production, there was still a great need for large quantities of fuel in the air. This prompted the Navy to adopt the ARS - Airborne Refueling System. The ARS or buddy refueling system was designed and developed by NADEP Alameda. It consists of a refueling pod (stores) housing a hose and drogue stationed on the left (port) wing with a 400 gallon drop tank on the starboard wing. This system provides the S-3A an added capability that does not interfere with its normal aircraft operations.

In the Gulf War, S-3s guided flights of strike aircraft north into Iraq refueling them enroute. Upon reaching the target area, the Vikings would climb to waiting KC-135 tankers to replenish, then refuel the strike aircraft on their return

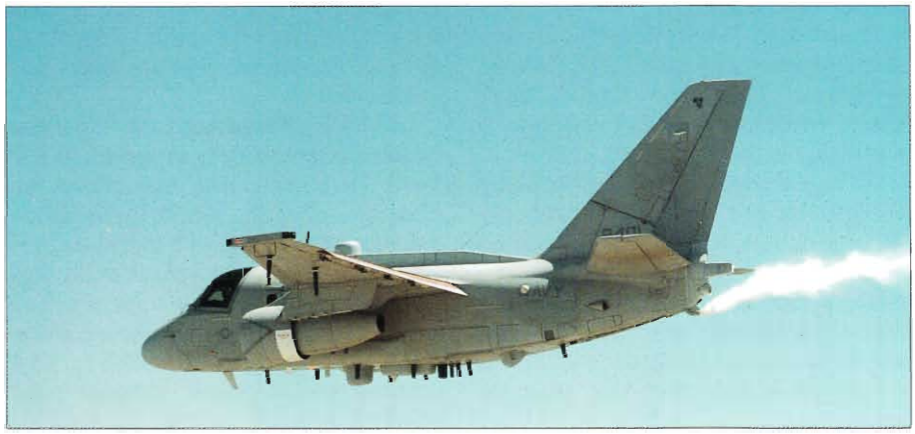
VS-29 fires a 5" Zuni rocket.

to the ship. In some cases the S-3s would refuel from the KC-135s several times allowing strike aircraft to press the attack longer.

Since the Gulf War, and with the proposed retirement of the existing KA-6 Tanker, the Navy will require additional tanker capability. They have initiated Project Sinclair to modify existing ARS equipped S-3Bs with removable weapons bay mounted fuel cells.

Lockheed has independently investigated several concepts of improving the S-3 refueling system to help meet future requirements.

One concept would have a removable weapons bay mounted fuel tank and



The ES-3A.

not interfere with the operational mission of the aircraft. Another concept would have a permanently mounted weapons bay fuel tank. Other concepts add capability up to a dedicated tanker airframe using fleet reserve aircraft.

Another variant which emerged was the US-3A. Early in the S-3A's deployment the Navy indicated requirements to replace the C-1 Trader Carrier Onboard Delivery aircraft. The COD aircraft is vital to a Carrier Battle Group in its ability to resupply the ship with needed aircraft components like engines, spare parts, food and provisions, personnel replacements and the all important mail from home. An aircraft of this nature would also be required to act as a medical evacuation transport in the event of an emergency.

Originally, Lockheed proposed a cargo version of the S-3 that would be produced with upwards of 85% commonality with the S-3A. The aircraft would have the same cockpit, wings, stabilizers and engines. The fuselage was to be much longer and wider with a scaled down version of a C-130 rear cargo door/ramp. Plans included seating as many as 30 passengers or a straight cargo configuration with room to transport two large jet engines. The aircraft had the option of additional wing pylon mounted cargo pods or auxiliary fuel tanks. Despite its sound design, the aircraft was never built.

With the Navy still requiring a COD replacement, Lockheed developed an alternative design. A flight test Viking was modified into what would become the prototype US-3A. The aircraft was first stripped of all avionics, sensors and ASW gear including sonobuoy launching tubes, ESM Pods, and antennas. The finished product provided over 270 cubic feet interior cargo space or room for six passengers. The prototype also included wing mounted pods for an additional 2000 pounds of cargo. The cockpit remained relatively the same to that of a standard S-3 except for the installation of color weather radar and additional navigational systems. The re-configured crew consists of a pilot, copilot and load master.

The prototype aircraft proved to be a solid concept offering a long range, high speed transport plane able to haul 90 percent of the consumables needed by a carrier.

Lockheed's original design was for the US-3A to be a production S-3 six feet longer in the fuselage. An anticipated order of 30 aircraft was hoped for but again this design was not chosen. The sole US-3A prototype was also relegated to pilot training with VS-41. But eventually, because of the need for a COD aircraft, the US-3A prototype reemerged and five additional US-3As were modified to serve the fleet through

timeline

June 1964
Navy announces concept for fixed wing, carrierborne ASW capable aircraft

December 1968
Navy releases VSX requirements

4 April 1969
Initial pre-production contract for six flight test aircraft is awarded to Lockheed with LTV and UNIVAC

27 August 1971
First flight of S-3 Avionics Flying Testbed, an S-3 avionics suite installed aboard a P-3 Orion

8 November 1971
S-3 prototype aircraft rolls out of Burbank plant

18 January 1972
Lockheed demonstrates S-3 Avionics Systems to the Navy at the Burbank S-3 integration laboratory

21 January 1972
First Flight of YS-3A

May 1972
First series of Navy preliminary evaluations and assessment flight tests begin (through August 73) including initial carrier suit-ability test at Pax River (16 October 1973)

23 August 1972
Flight test S-3 #3 successfully tracks submerged submarine

February 1973
35 additional Vikings are authorized for production

June 1973
Flight test S-3 #5, modified as a tanker, demonstrates S-3 inflight refueling capability, refueling six different types of aircraft

1 October 1973
Board of Inspection and Survey Trials (BIS) begins at Pax River (completed 21 March 1974)

December 1973
Carrier suitability tests aboard USS Forrestal begins

20 February 1974
First production S-3 Viking enters service with VS-41

12 June 1974
Pax River based flight test S-3 conducts the first SAR mission while on a navigational test flight

30 September 1974
S-3 Vikings are assigned to their first operational squadron, VS-21

VRC-50 based in Guam with detachments on Diego Garcia.

The most recent S-3 variant is the ES-3A, a program with deep roots. In January 1977, Lockheed proposed a modification plan to convert a fleet S-3A Viking into a feasibility demonstrator for a Electronic Intelligence/ Communications Intelligence version of the S-3. The program dubbed TASES, Tactical Airborne Signal Exploitation System, consisted of an S-3A airframe with a new sophisticated electronic surveillance package for the carrier based ELINT and COMINT mission roles. Although TASES never progressed past the planning stage, the seed was planted.

The concept reappeared again as Project SEMA, an Army program for Special Electronics Mission Aircraft. This project did not take off but ten years after the initial TASES project, Lockheed was finally awarded a prototype development contract that led to a full scale modification program for an ES-3A. The ES-3A is the Navy's over-the-horizon electronic surveillance aircraft, which provides carrier air wings with higher capability in the wake of the forced retirement of the EA-3 Whale. The mission avionics suite is based on the EP-3E ARIES II, an improved signal intelligence package for intercepting and analyzing electro-magnetic emissions. The ES-3A is a multi-mission aircraft capable of performing the complete OTH-EW role encompassing passive ELINT, COMINT and SIGINT with an additional capacity for Overland Battle Damage Assessment (BDA) and Over-The-Horizon Targeting (OTH-T) missions in the littoral environment.

The ES-3A conversion program, conducted by Lockheed, was said to be the most complicated field modification project ever undertaken outside a production plant. It encompassed a complete conversion of the aircraft with the stripping of all avionics, sensors, black boxes, sonobuoy launcher and associated components.

The airframe had to be structurally strengthened and modified to accommodate more than 60 antennas including high frequency top and bottom spinning, direction finding "domed" antennas. The ES-3A incorporates new avionics, color displays and keyboard controls at revamped sensor stations. Internal spaces and weapons bays were converted into avionics bays for the myriad of black boxes.

As the last of 16 ES-3As rolled off the conversion line, the first ES-3As returned to undergo a series of system upgrades which were not available to the initial aircraft.

Emergence of the S-3B

As the Viking entered the 1980s, its versatility became more appreciated aboard the carrier. Advances being made in the Soviet surface and sub-surface fleets caused the Navy to consider expanding the role of the S-3 to increase its multi-mission capability. Support of both air and surface warfare assets was envisioned.

Initially designated the Weapons System Improvement Program, WSIP featured a new radar and added the Harpoon missile. WSIP included an expanded ESM suite with more sensitive emitter detection to supplement the surface warfare targeting mission. The improvement program also added a new ECM for self-defense and a new acoustic data processor. Although not a part of the WSIP program, an Airborne Refueling System (ARS) and an Auxillary Power unit generator modification were incorporated simultaneously. Plans were also instituted to increase aircraft maintainability and reliability.

WSIP/S-3B Avionic Improvements

A new technology AN/APS-137 Inverse Synthetic Aperature Radar replaced the original APS-116 search radar. ISAR offered a long-range stand-off surface target detection and classification capability. It also featured improved submarine periscope detection, even in high sea states.

ISAR generates a two dimensional radar image and automatically compares the signature to known configurations in the system's tactical library. The system is capable of simultaneous tracking of multiple contacts and accurate targeting. It is integrated in conjunction with the Harpoon missile system.

The AN/UYS-1 is a new upgraded signal processor unit with improved software to enhance undersea detection and attack. It replaces the OL-82 Acoustic Data Processor and adds a 99

channel sonobuoy receiver with a faster, more accurate Sonobuoy Reference System and a new analog tape recorder. The improvement lies in the system's ability to differentiate signal characteristics from background noise.

The new ESM system, the ALR-76, replacing the ALR-47,is used for passive electronic warfare. In conjunction with ISAR, the ESM is utilized as a secondary contact identification and targeting system. Alone, it can detect and identify contacts without compromising the aircraft through use of its radar. The ESM also functions as a component of the aircraft's defense system providing enemy threat warning.

Another feature of the ESM is its link to the new Electronic Counter Measures system, the ALR-39. In defense of the aircraft, the system dispenses chaff, flares or RF Jammers independently, simultaneously, manually (by the crew) or automatically (by the ESM link).

Chaff, small strips of foil, provide multiple targets to counter radar guided missiles. Chaff clouds can also confuse fire control radars or block missile command signals.

Flares produce a very hot heat-signature to counter passive infrared guided missiles. RF Jammers interfere with active radar homing missiles by producing a similar noise signature which saturates the missile's receivers.

The S-3B carries the largest chaff, flare and jammer package in the air wing.

AGM-84D Harpoon Missile System is a specially updated version of the Harpoon missile modified to integrate with the Viking's targeting system, giving the S-3B a new flexible offensive capability with a high degree of lethality.

The Harpoon itself is a high-subsonic, low-level cruise trajectory anti-ship missile with active radar guidance and countermeasure (survivability) systems onboard, that include way-point targeting, sea skimming, pop-up provisions and other programmable options.

The Viking at war

As in the past, it often takes a war to demonstrate the usefulness of a weapon system in combat. For the S-3 Viking, the Gulf War with Iraq served as an excellent forum in which to demonstrate its versatility to the maximum. No other Gulf War aircraft had more taskings or performed as many different missions as the S-3.

Operating from both Red Sea and Persian Gulf battle groups, S-3s conducted ASW missions, provided inflight refueling, and flew Maritime Patrol interdiction missions. The Vikings ESM suite was used to passively locate Iraqi radar and command, control, communication C^3 sites.

Once Desert Shield gave way to Desert Storm and the air campaign began, the S-3s were tasked for the first time in their history with the strike-attack missions to destroy enemy naval bases, naval base support facilities, naval C^3 headquarters and coastal Silkworm Missile sites that had a potential for threatening the battle group. The missions included targeting for the elimination of any hostile naval surface combatants. On one mission the S-3 Vikings scored their first naval combat kill.

As Desert Storm continued, the

7 July 1975
First S-3's deploy aboard USS Kennedy with VS-21 DET (until 22 January 1976)

15 December 1975
Navy awards contract to Lockheed for US-3A COD aircraft

2 March 1975
First operational drop of MK46 torpedo from an S-3 is conducted

2 July 1976
US-3A COD prototype flies maiden flight

31 July 1976
First full squadron S-3 (VS-29) deployment aboard USS Enterprise (WESTPAC 76-77 cruise)

23 June 1977
Fleet S-3 Viking's log 100,000 flight hours

25 October 1977
First US-3A deployment aboard USS Kitty Hawk (until 15 May 1978)

7 August 1978
S-3 production ends, Navy takes delivery of last S-3A from a total production of 187

26 September 1978
First S-3 Indian Ocean deployment aboard USS Constellation with VS-37 DET (until 17 May 1979)

7 April 1981
US-3A "Miss Piggy" surpasses one million miles supporting Indian Ocean battle group operations

25 January 1984
US-3A prototype logs 10,000 flight hours

13 September 1984
S-3B Demonstrator flies maiden flight

September 1988
S-3B with VS-37/VX-1 DETs deploy aboard USS Forrestal for TEAMWORK 88

16 April 1989
First Harpoon fired from an S-3 (VS-30)

September 1989
NS-3A is modified as ES-3A aerodynamic prototype

8 March 1990
First full complement S-3Bs deploy aboard USS Eisenhower with VS-31

11 January 1991
First operational launch of TALD (Tactical Air Launched Decoys) by an S-3 (VS-24)

Outlaw Viking

scope of S-3 missions grew to include strikes against enemy airfields, railroad yards, ammo dumps and SAM sites. They were used to guide fast attack strike aircraft into the strike zone. These were the first overland missions for the S-3 Viking. ESM was used to locate anti-air radar installations; ISAR was used to locate mobile SCUD Missile Launchers.

Unique tasking for the S-3 included launching, TALD, (Tactical Air Launched Decoys that simulate cruise missiles) and dispensing chaff and flares during Iraqi air defence suppression raids. Other taskings included anti-mine warfare, infrared surveillance of burning Kuwaiti oil wells and maritime monitoring of the Persian Gulf Oil Slicks. The Navy battle groups would send S-3s as logistical assets to ferry the Air Tasking Order from Riyadh to the carriers. As hostilities ceased the Vikings continued conducting treaty verification flights over Iraq as part of operation "Provide Comfort".

Since the Gulf War, the Vikings have participated in various operations like "Southern Watch" to enact no-fly zones over southern Iraq and the recent U.N. action in Solmalia. In fact, it was in Solmalia that S-3s (from VS-37) demonstrated a new capability to the overland surveillance mission, "PSYOP Leaflet Drops", providing information to the populace in support of U.S. ground operations.

In January of this year, S-3 Vikings were giving support to Navy and Air Force strikes into Iraq in retaliation for violations of the coalition established no-fly zones. Currently S-3s of VS-32 aboard the USS America are engaged in U.N. sanctioned operations in the Adriatic providing imaging surveillance in the littoral environment.

Future missions and capabilities are now being defined through a proposed upgrade to the S-3B labeled "WSIP II". WSIP II encompasses initiatives of the Navy's "Health of Naval Aviation" or HONA. The HONA are a series of criteria initiated to keep out-of-production aircraft in service longer. For the S-3, HONA is broken down into three specific categories: (a) "Safety of Flight" includes such items as a new computer and a Service Life Assessment program to extend the operational service life of the aircraft pass the year 2015. (b) "Obsolescent Avionics" replaces aircraft components that can no longer be supported or repaired. The older inertial and dopler navigation systems would be replaced with new state-of-the-art CAINS II and GPS navigational aids. New VHF radios and SATCOM would update the communications suite. (c) "Mission Enhancements" encompasses provisions for new roles and missions to improve on current capabilities. Enhancements would be: ISAR+, ISAR/SAR dual mode radar, Link network (OTCIXS, TRE or TRAP and TADIXS-B), Improved Infrared optics, aircraft survivability features, laser designators and provisions for future missiles systems (SLAM, HARM, ARM and Maverick).

Special Operations S-3 Vikings

In the mid-1980s, at the apex of advanced Soviet submarine technology and heightened tensions in the cold war, the U.S. Navy established requirements for a future enhanced Carrier based multi-mission aircraft. The project, dubbed "AMSS" for Advanced Multi-Mission Sensor System, delineated specifications for a universal aircraft with a common core of avionics to facilitate quick installation of special mission sensor components. A single aircraft could be configured to conduct anti-surface warfare, over-the-horizon targeting/command, control, communications and intelligence (OTH-T/C^{3}I), undersea warfare as well as airborne early warning and control missions while maintaining capabilities for utility logistics and airborne refueling tasks. With the drawdown, the value of the AMSS concept became questionable and was cancelled.

During the Gulf War, the S-3's versatility gave Navy planners a new vision for future joint operations. The lesson of Desert Storm indicated that the Navy needed to make certain changes in conducting combat operations. The Navy has now established special operations divisions at each Sea Control Wing to develop enhanced Vikings. These special-ops S-3s utilize the S-3B's multi-mission avionics suite as a systems core. The planes are integrated with off-the-shelf sensors designed for specific mission needs.

Outlaw Viking

"Outlaw Viking" is an organic battle group Over-The-Horizon Targeting/Command, Control, Communication and Intelligence capability equipped S-3. It is a prototype OTH-T/C^{3}I system that is actually the third generation of the OASIS (Over-The-Horizon Airborne Sensor Information System) developed for the P-3C Orion. Outlaw Viking includes the OASIS III system, specially modified for the S-3 and built into the aircraft's TACCO station with no degration to the existing S-3B mission capabilities. The OTH-T system integrates the aircrafts radar, GPS, SATCOM and Datalink networks. A tactical plot of the operational theater is created, providing realtime standoff surveillance and targeting information that is transmitted by way of secure tactical link networks to the battle group command.

Gray Wolf

Another special operations Viking modified as an advanced imagery, surveillance and targeting platform is called "Gray Wolf". Gray Wolf is primarily a littoral surveillance aircraft with an

inherent air-to-air capability for anti-ship missile detection. Its principle sensor is an advanced Multi-Mode Radar System (MMRS) comprised of an enhanced ISAR with a Synthetic Aperture Radar mode.

A new stand-off camera system termed TADCS (Tactical Airborne Digital Camera System) has been added. A laser ranger (LADAR) is on-board. The communication system used by Gray Wolf is termed "MATTS" short for Mobile Airborne TRAP-TRE, an acronym explaining link networks.

The crew will have a laptop trans

mission system at his side to send imaging data to home base.

One item on the wish list during Desert Storm was a SCUD "detector" closer than a satellite. IRST or Infrared Search and Track system was developed from existing systems. Its use is in-the-water warning of ballistic missiles where the sensor can detect the heat plumes of a launching tactical ballistic missile (SCUD) and track the hot body in flight, providing a faster reaction time.

Orca

Emerging undersea warfare systems and tactics are demonstrated by an S-3 designated as Orca. Orca's need was stimulated by the threat of new diesel and quiet nuclear submarines operating in shallow water. Two of Orca's systems are the Intrum Extended Echo Ranger (IEER), an improved sonobuoy receiver set and the ASW laser ranger for detection of submerged contacts. A few of Gray Wolf's systems are included in Orca, some with modifications, such as the radar which is separated into ISAR+ and a wing-mounted SAR pod giving Orca the overland mine-field detection capability.

Calypso

Many S-3s are currently involved in counter-narcotics missions in support of Commander Joint Task Force Four in Keywest, Florida. The S-3Bs use a combination of roll-on/roll-off avionics and hand held devices such as TADCS, camcorders and night visionware for long range detection, tracking and interdiction of suspected drug smuggling aircraft.

A concept has been developed for a dedicated counter-narcotics Viking with permanently installed systems similar to Gray Wolf but funding will have to be approved. Tagged "Calypso", the equipment list includes ISAR+, SAR, Infrared sensors and cluster ranger.

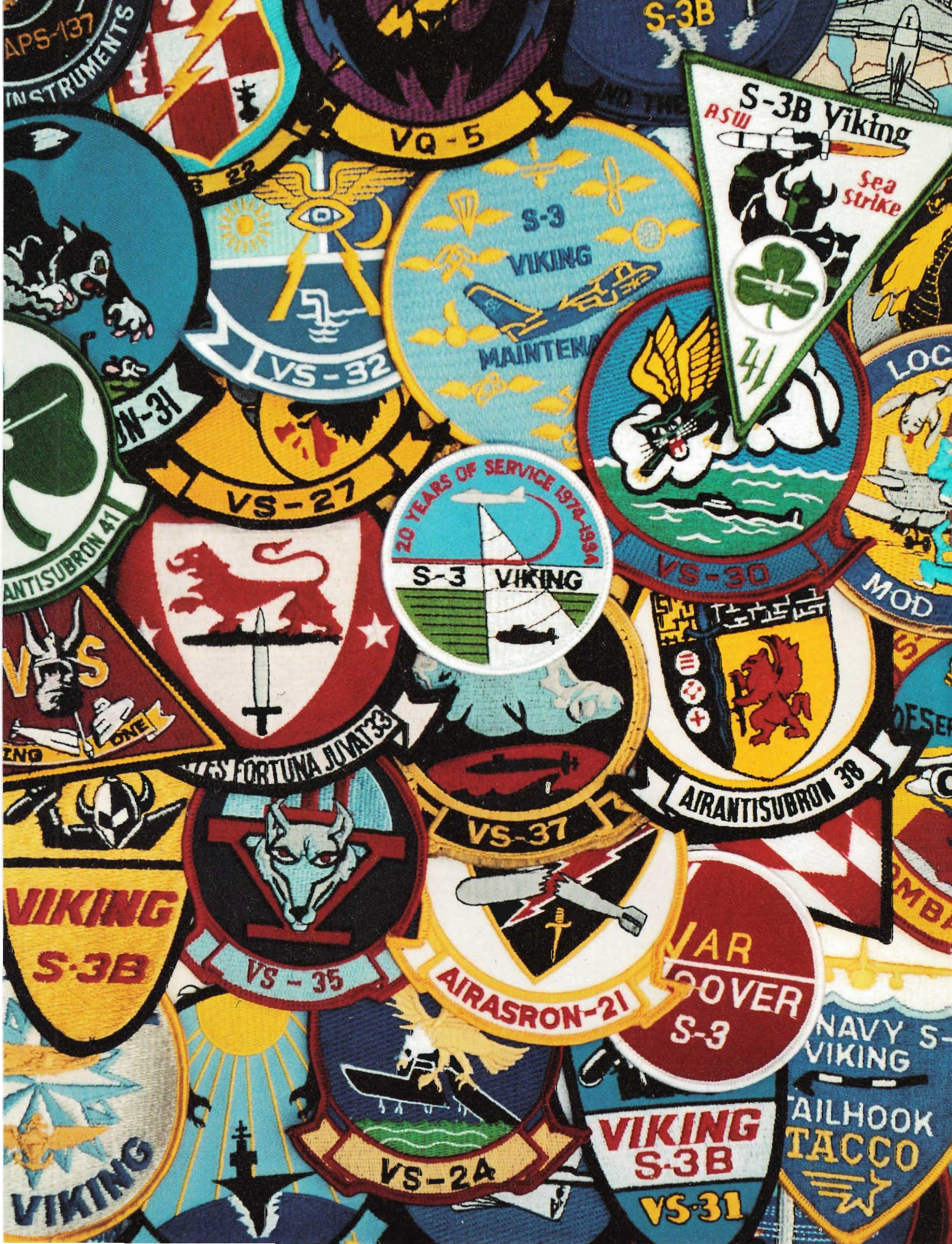
Viking Beartrap

Viking Beartrap is another one of those programs that has previously been deployed on P-3 Orions. Beartrap is a unique airborne intelligence gathering and processing system and has been installed on a small number of P-3s since the 1970s with several upgrades. Viking Beartrap is currently being deployed on carriers.

A Force Multiplier

For the Navy the S-3 Viking has become the premier sea control platform, revolutionizing carrier operation in these times of budget cuts and down sizing force structure. The Viking is now the keystone to future carrier operations with its multi-mission capabilities and flexibility initiating new tasks that include Overland Surveillance (strike support), ASUW, OTH-T / C^{3}I, Anti-Mine Warfare, EW, littoral undersea warfare, tanking and counter-narcotics. The Vikings are also involved in new dedicated special mission operations that incorporate the latest state-of-the-art avionics and sensors. The S-3 has truly become a force multiplier. ★

18 January 1991 First combat launch of TALD by S-3 (VS-38) since Gulf War air campaign began 17 January
21 January 1991 Second combat launch of TALD by VS-38 S-3
2 February 1991 First S-3 to drop bombs in combat - against an Iraqi coastal AAA battery (VS-24)
19 February 1991 First Iraqi patrol boat sunk by S-3 (VS-32)
27 February 1991 Second Iraqi patrol boat sunk by S-3 (VS-24)
15 April 1991 First flight of ES-3A prototype and first ES-3A squadron established (VQ-5)
17 September 1991 VX-1 DET deploys aboard USS Saratoga with ES-3A's for operational test and evaluations
21 January 1992 First production ES-3A flies maiden flight
22 May 1992 VQ-5 receives first ES-3A
19 August 1992 VQ-6 receives first ES-3A
3 November 1992 VS-37 deploys S-3B on first WESTPAC detachment
December 1992 S-3 operations begin in Somalia
January 1993 Last S-3A deployment commences aboard USS Constellation with VS-38
April 1993 First ES-3A deploys aboard USS Independence with VQ-5
13 April 1993 ES-3A DET for workups aboard USS America with VQ-6 (until 18 May 1993)
30 September 1993 Last of 16 ES-3As are delivered to the Navy
October 1993 Outlaw Viking flies maiden flight


APS-137
INSTRUMENTS
S-3B
VQ-5
S-3B Viking
ASW
Sea Strike
S-3
VIKING
MAINTENA
VS-32
VS-27
VS-30
20 YEARS OF SERVICE 1974-1994
S-3 VIKING
ANTISUBRON 41
VS
ONE
FORTUNA JUVAT 33
VS-37
AIRANTISUBRON 38
VIKING
S-3B
VS-35
AIRASRON-21
JAR
COVER
S-3
NAVY S-
VIKING
VS-24
VIKING
S-3B
VS-31
AILHOOK
TACCO
VIKING

BUREAU LIST

LASC No BuNo TYPE LOCATION COMMENT

S-3 VIKING BuNo LIST

2999 None S-3 DRMO Drop test vehicle
This was actually the 1st pre-production airframe produced. It was completed over 1000 simulated seven carrier landings and a lifetime of wear on the Viking's landing gear - as the LTV drop test vehicle. After static testing, the S-3 was kept in the LTV (Vought) boneyard until 1990, when it was shipped to Lockheed Ontario. The aircraft was then parted out with components utilized for S-3 "FRAMP" Maintenance trainers (now at Cecil Field) and the remaining fuselage turned over to the local DMRO for disposal.

3000 None S-3 LASC Ga. S-3 SLAP project
This airframe logged over 2 service lifetimes worth of fatigue as the Lockheed "Lifetime Stress Simulation airframe" and was the 2nd pre-production S-3 built. Later stored in a giant plastic bag until it was brought out and modified as the ES-3A static mockup aircraft. The airframe was then moved to the LASC Marietta facility where it is now involved in a Navy S-3 Service Life Assessment Program (SLAP) in an initial effort to extend the service life of S-3.

3001 157992 YS-3A DRMO YS-3A Prototype
First YS-3A Prototype aircraft that spearheaded the exstensive Lockheed flight test program to evaluate flying qualities and power plant performances of the S-3 and was later damaged during emergency Barrier Arrested Test conducted at Lakehurst, NJ Ship 3001 was then stripped of useful parts and stored at NADEP Alameda's "bone yard" until 1991, when the wingless airframe was shipped to the Naval Avionics Center (Indianapolis) for modification, but was eventually scrapped and transferred to the local DMRO for disposal.

3002 157993 NS-3A NAS CECIL FLD Display
Second YS-3A pre-production flight test aircraft, used to test structural build up, flight envelope expansion and basic AFCS. Also used for stores separation test aircraft and for Lockheed "Skunkworks" classified project. Redesignated NS-3A, the aircraft was assigned to NATC (FWATD) as a range test aircraft (84-91) returning briefly to LASC (in 1988) to be modified as an ES-3A aerodynamic prototype. Later retired, it was now restored to the S-3A configuration and displayed at NAS Cecil field.

3003 157994 US-3A VRC-50 COD aircraft
First of the last 6 pre-production flight test aircraft to be equipped with full ASW mission avionics - used to conduct avionics evaluations and demonstrations. Later modified as a US-3A.

3004 157995 US-3A VRC-50 COD aircraft
Fourth pre-production flight test aircraft used to conduct carrier suitability tests, later modified as a US-3A.

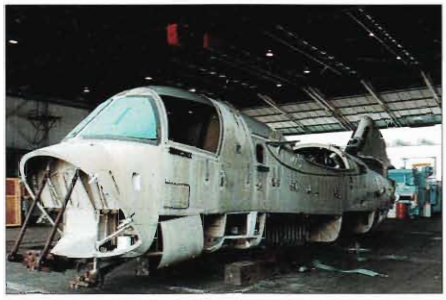
3005 157996 US-3A STRIKE water collision, VRC-50,1989
Fifth pre-production flight test aircraft used for hydraulic, fuel, air conditioning and avionics evaluations. later re-designed as KS-3A flight test demonstrator aircraft by Lockheed, later used for training by VS-41, deploying several times until it was converted again into a US-3A. On 20 JAN 89 the US-3A stalled on approach to Cubi Pt. and went into the water.

3006 157997 US-3A VRC-50 COD aircraft
Sixth pre-production flight test aircraft used for armament, weapons and avionics integration, later modified as a US-3A.

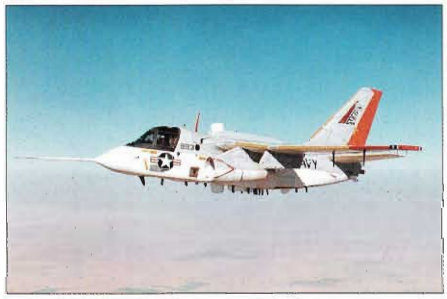
3007 157998 US-3A VRC-50 COD aircraft
Seventh pre-production flight test aircraft used for evaluating weapon systems, bombs, rockets, mines and missiles - later converted by Lockheed as the US-3A prototype Demonstrator.

3008 157999 YS-3A STRIKE 1973
Eighth pre-production flight test aircraft that was lost at sea during Lockheed flight testing 3 AUG 73.

3009 158861 S-3B VS-32 1st full production S-3A

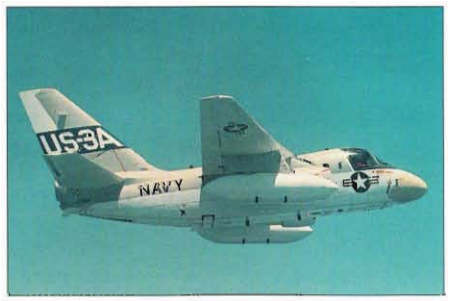


LASC No. 3000 S-3 SLAP PROJECT



BuNo 157993 AS ES-3A Aerodynamic prototype

BuNo 157995



BuNo 157998 was the US-3A prototype.

BuNo 159410 and 415 on early tour with VS-22

LASC No BuNo TYPE LOCATION COMMENT

3010 158862 ES-3A VQ-5
A S-3A, while conducting navigation tests off the coast of California, responded to a distress call from a ship and performed the 1st Emergency operational S-3 SAR mission.

3011 158863 S-3B VS-41
3012 158864 S-3B VS-27
3013 158865 S-3B VS-31 TOP GUN S-3
3014 158866 S-3B VS-30
3015 158867 S-3B VS-41
3016 158868 US-3A VRC-50 COD aircraft
It was once used as the climatic test aircraft. Later it was selected to be modified as the TASES EW (ELINT/COMINT) demonstrator. The S-3 sat in storage untill 1981 when Lockheed converted it into the 2nd US-3A.

3017 158869 S-3A AMARC in reserve storage
3018 158870 S-3B VS-29
3019 158871 S-3A VS-41
3020 158872 S-3B VS-38
3021 158873 S-3B VS-24
3022 159386 S-3A STRIKE lost, VS-29, 1992
Aircraft was lost south of San Clemente, 19 FEB 92 causes unknown.

3023 159387 S-3B VS-33
3024 159388 S-3B VS-41
3025 159389 S-3B VS-31 1st S-3 to drop MK46 torpedo
First S-3 aircraft to operationally deploy a MK46 torpedo on 2 MAR 76.

3026 159390 S-3B VS-27
3027 159391 ES-3A VX-1 undergoing testing at PAX RIVER
3028 159392 S-3B VS-33
3029 159393 ES-3A VQ-5
3030 159394 ES-3A VQ-6
3031 159395 S-3A AMARC in reserve storage
3032 159396 S-3B AMARC in reserve storage
3033 159397 ES-3A CECIL LWEC field mod group
3034 159398 S-3A STRIKE loss of control, VS-41,1974
Mishap during landing at NAF El Centro, 8 NOV 74

3035 159399 S-3B VS-37
3036 159400 ES-3A VQ-6
3037 159401 ES-3A VQ-6 ES-3A Prototype aircraft
3038 159402 S-3B VS-27
3039 159403 ES-3A VQ-5
3040 159404 ES-3A VX-1 1st ES-3A production mod aircraft
3041 159405 ES-3A VQ-5
3042 159406 S-3A VQ-5 squadron training aircraft
3043 159407 S-3B VS-29
3044 159408 S-3A STRIKE explosion, VS-41, 1978
Lost due to in-flight explosion, 27 MAR 78 , cause unknown

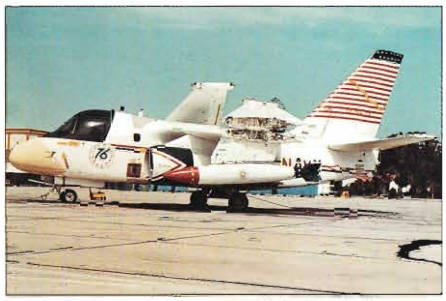
3045 159409 S-3B VS-38
3046 150410 S-3A AMARC in reserve storage
3047 150411 S-3A STRIKE wing lock fail, VS-24, 1983
Mishap after cat launch off USS Nimitz, 26 JAN 83 due to wing lock failure.

3048 159412 S-3A NORTH IS display aircraft
3049 159413 S-3B VS-21
3050 159414 ES-3A CECIL LWEC field mod group
3051 159415 ES-3A VQ-5
3052 159416 S-3B NATC FWATD range aircraft
3053 159417 S-3A AMARC in reserve storage
3054 159418 S-3A STRIKE grd collision, VS-22, 1991
Left roll during landing, 11 DEC 91, Cecil Fld.

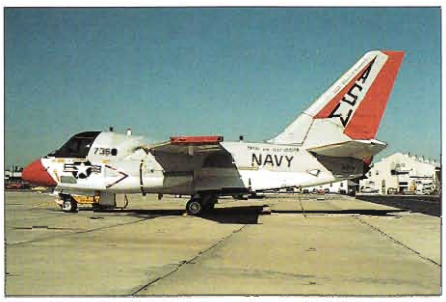
3055 159419 ES-3A VQ-6
3056 159420 ES-3A VQ-5

BUREAU LIST

LASC No	BuNo	TYPE	LOCATION	COMMENT
3057	159728	S-3A	ALAMEDA	in NADEP Alameda bone yard
	Aircraft was stripped of useful parts and retired to the NADEP's bone yard. Later the aircraft provided a center wing section, which was converted into a ground development test stand for simulating fuel transferring to test parameters of even balance flight characteristics for testing of the S-3 "ARS" Airborne Refueling System developed by NADEP Alameda.			
3058	159729	S-3B	VS-35	
3059	159730	S-3A	STRIKE	lost, VS-28, 1983
	Lost during night GCA approach to CV-62 in the Caribbean, 1 NOV 83 , cause unknown			
3060	159731	S-3B	VS-37	
3061	159732	S-3B	VS-31	
3062	159733	S-3B	VS-30	
3063	159734	S-3B	VS-24	
3064	159735	S-3A	STRIKE	in-flight accident, VS-21, 1984
	Mishap occurred during training flight east of San Clemente 9 JAN 84 , cause unknown			
3065	159736	S-3A	STRIKE	disintegrated, NATC, 1992
	NAWC-AD Pax River- FWATD range test aircraft, that was specially instrumented to test improved and advanced weapon systems, disintegrated during range flight test and crashed into the Chesapeake Bay 29 APR 92 , cause unknown			
3066	159737	S-3B	VS-41	
3067	159738	ES-3A	VQ-6	
3068	159739	S-3A	VQ-5	squadron training aircraft
3069	159740	S-3B	VS-33	
3070	159741	S-3B	VS-24	
3071	159742	S-3B	AMARC - HOLD SARDIP	
	S-3B prototype and full-scale engineering/development flight test aircraft.			
3072	159743	S-3B	VX-1	1st S-3 to drop bombs in combat
	First S-3 to operationally drop bombs in combat against an Iraqi coastal AAA artillery battery on 2 FEB 91. (This was the just one of five bombing missions assigned to VS-24).			
3073	159744	S-3B	VS-27	1st S-3 with SDRS installed
3074	159745	S-3B	VS-35	
3075	159746	S-3B	VS-41	
3076	159747	S-3B	VS-22	
3077	159748	S-3A	VS-41	
3078	159749	S-3A	AMARC	in reserve storage
	was prototype flight test aircraft for the Airborne Refueling System program			
3079	159750	S-3B	VS-35	
3080	159751	S-3B	VS-27	
3081	159752	ES-3A	VQ-6	
3082	159753	S-3B	VS-24	
3083	159754	S-3A	STRIKE	cat shot mishap, VS-28, 1982
	Aircraft launched on cold cat shot with insufficient airspeed, 15 OCT 82			
3084	159755	S-3B	VS-24	
3085	159756	S-3B	VS-27	
3086	159757	S-3A	STRIKE	lost , VS-32, 1983
	Aircraft lost off Cecil field, 6 JULY 83 ***			
3087	159758	S-3B	VS-27	Secret Mission S-3
	This is the S-3 that Capt. Voss flew while CO of VS-30, to transport a notorious middle east terrorist to justice in the U.S. from an aircraft carrier in the MED, setting two all time records for the longest non-stop flight in time (13.2 hrs) and distance (4002 miles) for a single - piloted carrier based aircraft.			
3088	159759	S-3A	STRIKE	water collision, VS-22, 1989
	Rolled into the sea during clearing right turn after a normal cat launch from CV-67, rolled into the sea, 7 OCT 89 , cause unknown			
3089	159760	S-3B	VS-22	
3090	159761	S-3B	VS-24	
3091	159762	S-3B	VS-32	
3092	159763	S-3B	VS-41	
3093	159764	S-3B	VS-31	



BuNo 160120 ready for the Bicentennial celebration.



BuNo 159736

BuNo 159742 S-3B full scale engineering flight test aircraft.

BuNo 160139

BuNo 159752 early career as sub hunter in Med over Foxtrot

LASC No	BuNo	TYPE	LOCATION	COMMENT
3094	159765	S-3B	VS-32	
	First S-3 to sink Iraqi Patrol Boat			
3095	159766	S-3B	VS-37	
3096	159767	S-3B	VS-30	
3097	159768	S-3B	VS-32	
3098	159769	S-3B	VS-31	
3099	159770	S-3B	NATC	NAWC-AD Pax River, FWATD aircraft
	First S-3B kit installed engineering aircraft			
3100	159771	S-3B	VS-30	100th S-3A produced and delivered
3101	159772	S-3A	STRIKE	lost overboard, VS-41, 1978
	Aircraft was lost overboard during an arrested landing onboard CV-66 , 7 OCT 78 ***			
3102	160120	S-3A	STRIKE	lost, VS-41, 1980
	Lost at sea during decent off California coast, 10 MAR 80 , cause unknown			
3103	160121	S-3B	VS-27	
3104	160122	S-3B	VS-32	
3105	160123	S-3B	VS-29	
3106	160124	S-3B	VS-37	OUTLAW VIKING
	S-3 Viking modified with the OASIS III OTH-T/C3I System for proof-of-concept and operational flight testing			
3107	160125	S-3B	NATC NAWC-AD Pax River, FWATD	aircraft
	Second S-3 to sink an Iraqi patrol boat with bombs 27 FEB 91, by VS-24 during Gulf War			
3108	160126	S-3A	VS-38	
3109	160127	S-3B	VS-37	
3110	160128	S-3B	VS-41	
3111	160129	S-3B	VS-41	
3112	160130	S-3B	VS-21	
3113	160131	S-3B	VS-21	
3114	160132	S-3B	VS-29	
3115	160133	S-3B	VS-21	
3116	160134	S-3A	VS-41	
3117	160135	S-3B	VS-33	
3118	160136	S-3B	VS-29	
3119	160137	S-3A	STRIKE	disappeared, VS-22, 1986
	Aircraft disappeared in the MED. 21 OCT 86, cause unknown			
3120	160138	S-3B	VS-31	
3121	160139	S-3B	VS-37	undergoing MK 50 MOD
3122	160140	S-3B	VS-22	
3123	160141	S-3B	VS-30	
3124	160142	S-3B	VS-24	
3125	160143	S-3B	VS-31	
3126	160144	S-3B	VS-30	
3127	160145	S-3B	VS-32	
3128	160146	S-3A	STRIKE	VS-24, 1983
	Aircraft was struck crossing duty runway at Cecil Field by an A-7 taking off, 8 NOV 83			
3129	160147	S-3B	VS-30	
3130	160148	S-3B	VX-1	
3131	160149	S-3B	VS-22	
3132	160150	S-3A	STRIKE	water collision, VS-24, 1981
	Crashed in to the MED during ship flyby, 17 NOV 81			
3133	160151	S-3B	VS-22	
3134	160152	S-3B	VS-27	
3135	160153	S-3B	VS-24	
3136	160154	S-3A	STRIKE	VS-30, 1979
	Aircraft was observed impacting the water while conducting a special interest reconnaissance pattern, 9 DEC 79, cause unknown			
3137	160155	S-3B	VX-1	
3138	160156	S-3B	VS-32	
3139	160157	S-3B	VS-33	
3140	160158	S-3A	VS-35	
3141	160159	S-3B	VS-21	
3142	160160	S-3B	VS-21	
3143	160161	S-3A	VS-35	
3144	160162	S-3B	VS-21	
3145	160163	S-3A	VS-35	

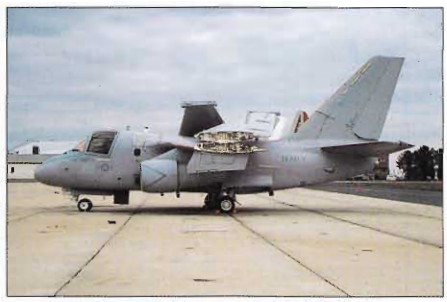
LASC No	BuNo	TYPE	LOCATION	COMMENT
3146	160164	S-3A	STRIKE	water impact, VS-21, 1988
	Aircraft commenced clearing turn after launch from the Enterprise and uncontrollably rolled over into the south China Sea, 5 JUN 88			
3147	160567	S-3A	VS-38	
3148	160568	S-3A	AMARC	in reserve storage
3149	160569	S-3A	VS-41	
3150	160570	S-3A	AMARC	in reserve storage
3151	160571	S-3B	VS-35	
3152	160572	S-3A	VS-41	
3153	160573	S-3B	VS-38	
3154	160574	S-3A	AMARC	in reserve storage
3155	160575	S-3A	VS-41	
3156	160576	S-3B	VS-38	
3157	160577	S-3B	VS-33	
3158	160578	S-3B	VS-33	
3159	160579	S-3A	STRIKE	water collision, VS-38, 1987
	Aircraft went into the east China Sea off Kyushu coast, 21 MAR 87.			
3160	160580	S-3B	VS-35	1st S-3 to launch a TALD
	First S-3 to operationally launch a Tactical Air Launch Decoy (TALD) with VS-38 (11 JAN 91) - a week later it was the 1st to launch a TALD in combat during the Gulf War (18 JAN 91).			
3161	160581	S-3B	VS-27	
3162	160582	S-3B	VS-29	
3163	160583	S-3B	VS-38	
3164	160584	S-3B	VS-41	
3165	160585	S-3A	AMARC	in reserve storage
	Second S-3 to launch a TALD in combat during Gulf War with VS-38 21 JAN 91			
3166	160586	S-3A	AMARC	in reserve storage
3167	160587	S-3A	AMARC	in reserve storage
3168	160588	S-3B	VS-27	2nd S-3B installed kit
3169	160589	S-3A	VS-41	
3170	160590	S-3A	STRIKE	struck mountain, VS-37, 1978
	Aircraft flew into Philippines mountain, NOV 1978, cause unknown.			
3171	160591	S-3B	AMARC	in reserve storage
	Second S-3B full scale-engineering development aircraft with NATC			
3172	160592	S-3B	VX-1	
3173	160593	S-3A	AMARC	in reserve storage
3174	160594	S-3A	AMARC	in reserve storage
3175	160595	S-3A	AMARC	in reserve storage
3176	160596	S-3B	VS-38	
3177	160597	S-3A	AMARC	in reserve storage
3178	160598	S-3A	AMARC	in reserve storage
3179	160599	S-3A	VS-41	
3180	160600	S-3B	VS-22	
3181	160601	S-3B	VS-37	
3182	160602	S-3B	VS-27	
3183	160603	S-3B	VS-27	
3184	160604	S-3B	VS-31	
3185	160605	S-3B	VS-37	
3186	160606	S-3B	VS-27	
3187	160607	S-3B	VS-27	last production S-3 delivered to the Navy

SEA CONTROL SQUADRONS

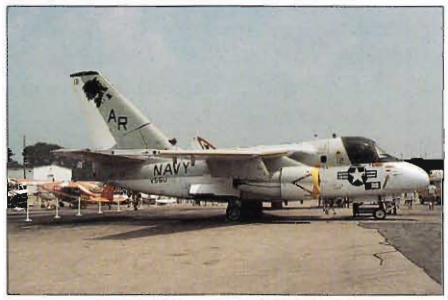
SQUAD	NAME	WING	LOCATION
VS-21	Fighting Redtails	Far East	Atsugi, Japan
VS-22	Checkmates	LANT	NAS Cecil Field, FL
VS-24	Scouts	LANT	NAS Cecil Field, FL
VS-27	Seawolves *	LANT	NAS Cecil Field, FL
VS-28	Hukkers		decommissioned at NAS Cecil Field 28 JULY 92
VS-29	Dragonfires	PAC	NAS North Island, CA
VS-30	Diamondcutters	LANT	NAS Cecil Field, FL
VS-31	Topcats	LANT	NAS Cecil Field, FL
VS-32	Maulers	LANT	NAS Cecil Field, FL
VS-33	Screwbirds	PAC	NAS North Island, CA
VS-35	Bluewolves	PAC	NAS North Island, CA
VS-37	Sawbucks	PAC	NAS North Island, CA

One of the first S-3Bs to deploy (with VS-31) 1990

BuNo 159729



BuNo 159770



BuNo 160607 last S-3 produced.

SQUAD	NAME	WING	LOCATION
VS-38	Red Griffins	PAC	NAS North Island, CA
VS-41	Shamrocks	PAC	NAS Cecil Field, FL
VS-0174	(Reserve Squadron) deactivated at Cecil Field -		
VS-0294	(Reserve Squadron) deactivated at North Island -		

OTHER UNITS

VRC-50	(Composite Squad)	Mid-Pac	Agana, Guam
VQ-5	Sea Shadows	Mid-Pac	Agana, Guam
VQ-6	Black Ravens	LANT	NAS Cecil Field, FL
VX-1	Pioneers (AIRTREVRON ONE)		NAS Patuxent River, MD
NATC	(FWATD) NAWC-AD		NAS Patuxent River, ND
SWATS	Sea-based Weapons and Advanced Training School		NAS North Island, CA

* formerly Air ASW Support Unit (VSSU) providing fleet replacement training for east coast VS squadrons , est JAN 1987

S-3 BuNo LIST TERMS

DRMO	-	Defense Re-utilization Material Office
AMARC	-	Aircraft Maintenance And Rejuvenation Center located at Davis-Monthan AFB, Tucson Az.
SARDIP	-	Striken Aircraft Reclamation and Disposal Program aircraft stripped of needed spare parts,cut up and sold as scrap metal at local sites
FRAMP	-	Fleet Readiness Aviation Maintenance Personnel the ground maintenance training division of VS-41 and VS-27 fleet replacement squadrons
OUTLAW VIKING	-	S-3 OTH-T/C3I prototype testbed for the OASIS III system
LASC	-	Lockheed Aeronautical Systems Co. Marietta Ga.
LASO	-	Lockheed Aeronautical systems co. Onterio Ca.
LWEC	-	Lockheed Western Export Co. (the Lockheed co. conducting the ES-3A conversions at NAS Cecil Field and S-3B MOD at NAS North Isl.)
NATC	-	Naval Air Test Center at NAS Pax River, Maryland (Now NAWC-AD Pax River)
FWATD	-	Force Warfare Air Test Directorate a division of NATC or NAWC-AD Pax River
CECIL	-	NAS Cecil Field located in Jacksonville FL.
NORTH ISLAND	-	NAS North Island located in San Diego CA.
ALAMEDA	-	Naval Aviation Depot (NADEP) located at NAS Alameda CA.
THE MED	-	Mediterranean Sea area
TALD	-	Tactical Air Launch Decoy
SDRS	-	Structural Data Recording Set
ARS	-	Airborne Refueling System

A row of Vikings await new fate at AMARC.

FALL 1993

Airborne LOG

THE MAGAZINE OF NAVAL SEA CONTROL AND MARITIME PATROL