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# NEW DEVELOPMENTS

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## Worldwide P-3 Status Report

By David Reade

*This P-3 Status Report compiled by David Reade is based on multiple interviews and conversations with the US Navy's FMS Office, USN Squadron VAQ-33, COMPATWING's ATLANTIC and PACIFIC, NAS Jacksonville NADEP, TRACOR Applied Sciences (Air Systems Dept), USN VP-30, Lockheed's International Programmes Office (IOSC Conference), Boeing Defense and Space Group, IMP (Halifax), US Customs Service, US Forest Service, Aero Union, Blackhills Aviation, Hawkins and Powers Aviation, NASA, and International Orion Operators: Australia (RAAF), Spain, Japan (MSO-JMSDF), Canadian Armed Forces, Norway (RNoAF) and the Netherlands. Additional documents provided by most of these sources were also utilized. - The Editor*

Thirty years ago, Lockheed's Burbank facility rolled out what would later become the premier ASW "Sub-Hunting" Maritime Patrol aircraft: **the P-3 Orion!** Though production of the Orion at Burbank was halted in early 1991, this action has not diminished the amount of activity surrounding the P-3, nor its future.

Immediately following the end of production, the follow-on, next-generation Maritime Patrol aircraft was to have been developed. The **P-7A LRAACA** (Long-Range Air Anti-Submarine Capable Aircraft) was derived from the P-3 Orion. The somewhat larger aircraft was to include increased sonobuoy and harpoon capacity; next-generation turboprop (6000 HP) engines with six-bladed, composite props and new defensive chaff-flare dispenser pods. Avionics would have encompassed the Boeing update IV package with new ESM, radar, navigation and the Collins "EFIS" (Electronic Flight Instrumentation System) "Glass Cockpit".

The P-7A design allowed for more weapons, greater range and longer on-station loitering, while using less fuel than current P-3's. Many countries (Australia, Japan, England and Germany) were interested in co-

developing the aircraft in exchange for obtaining production models. Germany hoped to get twelve of the advanced airframes, but development problems arose, and the P-7A was cancelled by the US Navy.

Both Lockheed and the Navy began to study the continuation of an advanced Orion, after the announcement that Lockheed would resume production of the P-3 for the Republic of Korea. Later designated "P-3C Orion II", the new Orion would be an extension of the Korean production base-line airframe, with Orion II improvements incorporated into production.

The Orion II included most of the planned features scheduled for the P-7A such as advanced turboprop engines with six-bladed, composite

props, the Boeing Update IV package with improved MAD, new ESM and OTHT (Over the Horizon Target) systems. The aircraft will be laid out with the side-by-side sensor stations (like the old Alphas and Bravos) and a 3-2 adjustable cockpit. With 24 ditching stations, later provisions for the "EFIS" Glass Cockpit and an in-flight refuelling probe are planned.

Both the US Navy and Lockheed have made it clear that Orion II would only be available with the Update IV package.

### Update IV Avionics Upgrade Programme

The first functional flight test of the Update IV Avionics Upgrade Programme, developed by Boeing Defense and Space Group, took place on



The Universal Display and Control System (UDACS) workstations are a key element in the US Navy's P-3 Update IV system. The first functional flight test of the Update IV system, developed by Boeing Defense and Space Group, took place on 16 December 1991.

(Boeing)

December 16, 1991.

The first series of flights studied the non-acoustic systems associated with the Update IV, while later flight testing (in early 1992) put emphasis on evaluating the "UYS-2" acoustic processor, with the dropping of numerous sonobuoys off the Washington (State) Coast.

The heart of the Boeing Update IV Programme is the advanced technology "Distribution Processor/Display Generator Unit" (DP/DGU) system. This is an integrated, information-management and planning system, which accepts all incoming sensor data, processes it and distributes it to crew-station displays. The DP/DGU utilizes new high-resolution, full-colour displays that replace old P-3 monochromatic screens and central processors. This update system provides for easier task operations. Coupled with the redistribution of operators' workload, the crew's ability to identify, locate and prosecute contact targets is increased.

Scheduled delivery of the programme testbed Orion aircraft (and Block 2 software) to the Navy is planned for August 1993.

The Navy will then conduct its own series of flight testing for a year. Boeing, once approved, will retro-fit the Update IV into approximately 109 Navy P-3C Update I and II airframes. The Update IV production system, scheduled for the Orion II, differs from that of the retro-fit package to be installed on the older Orions. This is mostly because of the new interior arrangement planned for the Orion II.

Update IV is the largest avionics upgrade ever undertaken by the Navy for its P-3 Orions.

Although these programmes continue to progress, military budget cuts are being announced. It's uncertain what extent these cuts will have on the Update IV and Orion II projects.

### **USN MPA Force Level 3**

US Navy budget cuts have taken their toll on its Maritime Patrol community in the last year. Under the "Force Reduction Plan" developed by



The Canadian Armed Forces have acquired three new P-3 designated CP140A "ARCTURUS" aircraft from Lockheed. This photo depicts the CP140A in its green primer before delivery to IMP Halifax for installation of its sensor systems.

(Lockheed)

the Secretary of Defense, Maritime Patrol Force levels are to be drawn down from 24 active/13 Reserve Squadrons to 18 active/9 Reserve. Several Squadrons were dis-established in 1991.

The new FY 1993 budget provides for two more active and four Reserve Squadrons to be deactivated before the end of 1993.

This plan also includes the phasing out of VP-31 Fleet Replacement (Training) Squadron at Moffett Field. The Squadron's last classes will be combined with those of VP-30 at NAS Jacksonville by December 1992.

This reduction plan is also in line with the military-base closings directed by the Pentagon. NAS Moffett Field has been targeted to close, with VP-40 transferring to NAS Brunswick and VP-46 moving to NAS Jacksonville. Remaining West Coast (active) Squadrons: VP-47 and VP-9, will be relocated to NAS Barbers Point, Hawaii.

These reductions will also affect the number of P-3 Orions in service with the US Navy. Approximately 300 P-3 Alpha and Bravo models will retire from operational service. The Alphas were directed to be out of service by October 1991, with the exception of special-purpose, research-development, test-and-evaluation organizations such as: NAWC-AD (NADC), PMTC and NASC. Bravos will continue to be flown in support roles in many areas of the community.

This leaves the US Navy with about 264 Charlie models in operation, hence the Navy's decision to extend the service life of these aircraft by implementing a "SLAP"-Service Life Assessment Programme. The Programme will study fleet Orions to determine their fatigue-life condition, and use the generated data to create preventative measures to extend their service life. This will be conducted through a "SLEP"-Service Life Extension Programme. SLEP, coupled with potential new aircraft procurement (Orion II), will provide the Navy with the force levels to meet its requirements well into the next century.

### **Foreign Military Sales**

Foreign military make up the bulk of new Orion operators. The Republic of Korea ordered eight P-3C Update III Orions in 1989, prompting the re-opening of the P-3 production line at Marietta, GA. Designated P-3C Update III's, the Korean Orions differ from standard Update III configuration in the areas of computer processing, ESM and Radar systems. The Korean purchase is a direct, commercial sale with major mission-systems and logistical support via a Navy FMS (Foreign Military Sales) CASE. The production schedule is currently on track with the first delivery in 1995.

### **Pakistan**

In 1991, Pakistan was to receive three P-3C (Update II.75) Orions it ordered several years before. Lockheed

built the aircraft, but delivery was frozen by the US Government, due to the enactment of the Pressler Sanctions. Passed by Congress in October 1990, the Pressler Amendment states that before any FMS sale to Pakistan takes place, it must be accompanied by a certificate from the (Bush) Administration, that Pakistan "Does not possess a nuclear explosive device." To date, no certification has come forth.

As a result, on January 22, 1992, the US Navy's VP-30 (Guardians of the aircraft) flew the three Pakistan Orions to AMARC (The Desert Aircraft Storage Facility) at Davis - Monthan AFB in Arizona. They will be preserved there, in the desert, for long-term storage pending resolution of the Pressler Sanctions.

#### **Canada**

1992 also saw Canada receive three new, long-awaited CP-140A Arcturus long-range surveillance aircraft based on the Aurora/Orion airframe.

The aircraft will be delivered to CFB Greenwood by Lockheed from the IMP facility in Halifax, where they have been undergoing avionics installation, interior outfitting and an all-over grey paint job.

The CP-140As will take over sovereignty and northern territory patrols, currently straining the Maritime Auroras. The Arcturus will also be utilized for SAR, coastal surveillance and fisheries-protection missions.

The new CP-140A's are more

than capable of providing Aurora logistics support, ferrying spare parts, sonobuoys (stored in the aircraft's 48 non-functional sonobuoy cutes) and personnel to deployed bases.

#### **Potential Customers**

Numerous other nations have recently expressed interest in obtaining P-3 Orions.

Potential new Orion operators include Germany and the UK (RAF) which have both been desperately seeking Maritime Patrol aircraft replacements since the cancellation of the P-7A programme.

#### **Germany**

Germany has continued discussions since the P-7 programme, and is interested in acquiring the US Navy's current Orion configuration. Even though that would be the P-3C Update III, an Update IV package like the Orion II is more desired. Any German Orion programme would be either a direct, commercial sale with an FMS CASE for mission avionics and logistic support or a full FMS sale. This would depend upon which configuration is approved for the sale. An Update III programme could have an initial delivery schedule before the German Navy's deadline of FY 97.

#### **United Kingdom**

The United Kingdom is another refugee of the P-7A programme. The RAF Nimrod MR.2 Maritime Patrol aircraft that was expected to last into the next century, will not - suffering premature fatigue and corrosion. (UK budget cuts have also reduced the fleet

to approximately 30 aircraft, with # 42 Squadron planning to stand down in 1992).

In January 1992, the Ministry of Defense issued an Air Staff Requirement for the Nimrod to be replaced. Since the cancellation of the P-7A, of which the UK had requested 25, the RAF has been conducting preliminary talks regarding the P-3 as their next Maritime Patrol aircraft.

The RAF would prefer Orion IIs, but would consider the P-3C Update III if the Orion II was not approved.

#### **Saudi Arabia - Italy**

Other new product customers are Saudi Arabia and Italy. Both are interested in the P-3C Update III or the advanced upgrade package of the Orion II. Any preliminary programmes are currently being developed through Lockheed's International Programmes Office.

#### **Greece**

Greece, as part of a military defence agreement (signed in July 1990), will receive upwards of thirteen P-3 Orions. The Greek Government will exchange retention of US bases, for ships and aircraft, of which the P-3 acquisition is part.

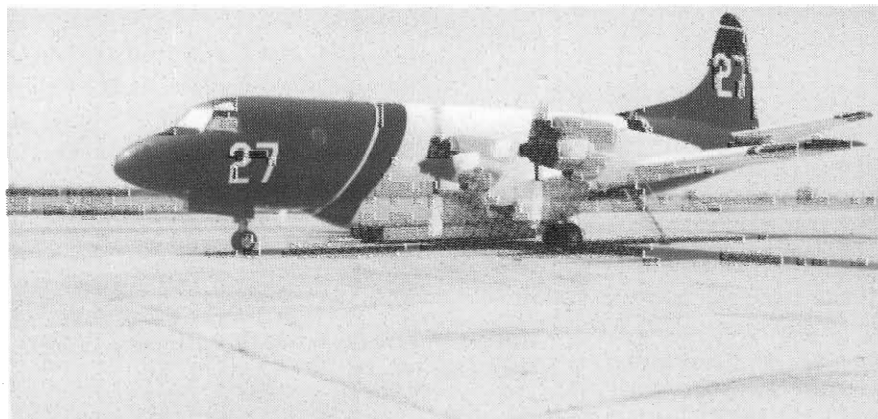
The Orions will be modified with TACNAVMOD packages as well as the TP-3 Orion (P-3C Update II.5) cockpit.

Eight mission P-3A's, one Utility and four additional airframes (for ground training and spare parts sources) are planned, with a delivery scheduled for the 1994-95 time frame.

There is also a current plan (pending result of a study and approval) to lease four P-3B TACNAVMOD Orions to Greece as an interim measure until the delivery of the P-3As.

#### **Turkey**

In a similar programme to Greece, the Turkish Navy has also been offered P-3 Orions. Representatives from Turkey were in the US for visual inspections and meetings during February 1992. The pending programme calls for ten P-3A TACNAVMOD Orions, eight mission aircraft and two spare airframes. A similar



Aero Union has modified most of their P-3 Orion "Aerostars" with 3000-gallon water/chemical retardant tanks for wild fire suppression.

(Aero Union)

modification package to Greece is expected. A site-survey inspection is planned for the Fall 1992.

#### **Thailand**

Thailand has ordered five ex-Navy Alphas for use with the Royal Thai Navy. Two of the aircraft will be designated "**P-3T**" Orions and flown on Maritime Patrol/ocean-surveillance missions. A third Orion, designated "**UP-3T**" will be used for training and logistics, while the remaining airframes will be cut up and delivered as "spare-parts" birds.

The Thai Orions were scheduled to receive extensive modifications including the **TP-3** Orion (P-3C Update II.5) cockpit, a new NAVCOM station and standard TACNAVMOD sensor package. The UP-3T is to be equipped with the "**SEN/TEC**" (Combined Acoustic Sensor and Tacco System) station developed by NADEP Jacksonville. This compact sensor package is part of a plan to re-modify the aircraft as a "**VP-3T**" VIP transport aircraft at a later date.

However, due to budget concerns, the Thai Orions are now to receive a smaller MOD package than planned, relying on most of the USN Bravo's original equipment. Royal Thai Navy # 2 Squadron will fly the Orions from Thai Naval Air Station Utopao.

#### **US Navy Foreign Military Sales of Surplus Orions**

Several potential Orion customers are interested in ex-Navy surplus Orions. The US Navy FMS office has negotiated with many of these countries requesting used P-3 Orion airframes.

#### **Australia**

Australia is currently planning to acquire three to four P-3 Bravos for logistics and pilot training tasks. This is part of an effort to increase the fatigue life of their 19 P-3C (Update II.5) Orions.

Since the crash of an RAAF P-3C in May 1990, the RAAF has been evaluating their Orions' fatigue status and concluded that the P-3C's operational life could be extended by relegating logistics/crew transport to

other aircraft. Hence the Bravos!

The proposed surplus Orions would be stripped of all sensor stations. Modifications would include seating-tracks from just behind the cockpit to all the way aft, the TP-3 Orion (Update II.5) cockpit and engine conversion to T56-A-14 Turboprops via retro-fit kits. There is even a proposal for a cargo door modification accommodating light equipment transport, (mods to be performed by NADEP Jacksonville as early as Fall 1992).

#### **Argentina**

Argentina has recently expressed interest in P-3's. Although still preliminary, it seems likely they are looking for a possible replacement for their Lockheed Electras. Procured soon after the Falklands War, the Electras were utilized for Maritime reconnaissance and SIGINT missions.

#### **Brazil**

Brazil is another South American customer interested in Orions. Brazil has requested eight P-3 TACNAVMOD Orion aircraft. A price and availability estimate was forwarded to Brazil in early 1992 and a response is expected soon.

#### **Chile**

The Chilean Navy has recently shown a strong interest in used P-3 Orions. Representatives from Chile have visited the US several times for visual inspections, and meetings, with a plan to submit a formal request in late 1992. Though still a preliminary programme, Chile is interested in eight UP-3 Orions with no ASW capabilities. The Orions would be used for SAR, drug and coastal, fisheries - surveillance operations.

#### **Non-Military Operators**

Besides the US Navy, Orion activity has increased with the addition of many new Orion operators.

Domestic civilian companies like Aero Union Corporation, Blackhills Aviation and Hawkins & Powers Aviation airborne fire fighting businesses have received a combined total of twelve P-3A Orions via the US Forest Service. Aero Union has modified

most of their nine P-3 Orion "**AEROSTARS**" with 3000 gallon (water/chemical retardant) tanks for wildfire suppression. Hawkins & Powers and Blackhills Aviation are currently studying options for their Orions. Although operational P-3 air tankers are desirable, both are considering utilizing their P-3 Orion's power plants to re-engine P-2 Neptune fire fighters.

NASA, at Wallops Island Flight Facility, acquired two P-3B Orions during 1991. One Bravo was recently modified with the "**EFIS**" (Electronic Flight Instrumentation System) known as the Glass Cockpit. This P-3B will be utilized as an airborne, remote-sensing platform for scientific research and replaces the aging "**NP-3A**" Orion that retired in early 1992.

#### **Fleet Upgrades and Modifications**

Many older Orion operators are currently upgrading and updating their Orions.

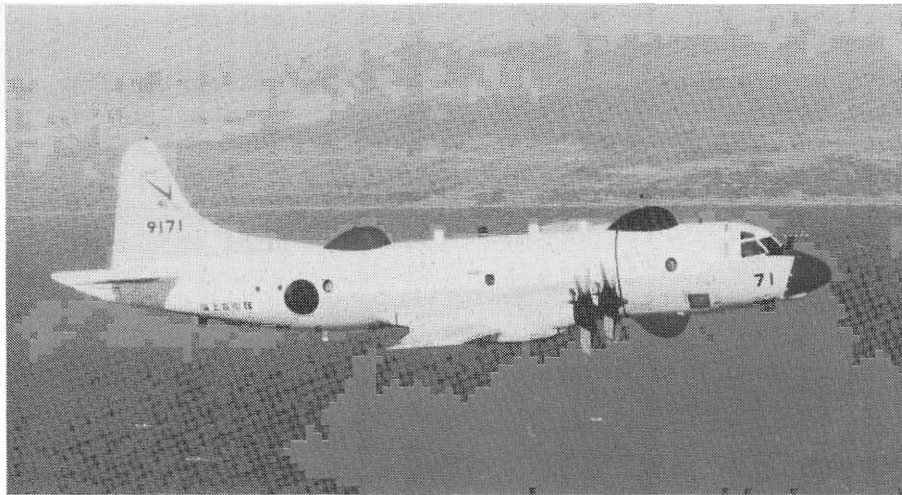
#### **Australia**

RAAF Orions have been involved in many improvement projects in the last year. The "**Low Vis**" (visual) markings recently displayed on RAAF Orions, and an experimental three-tone grey tactical paint scheme currently testing on one P-3C, resembles a greyer version of the Portuguese pattern.

RAAF Orions were the first to test the new ARL-T56 smoke-reduction system, developed by Defense Technologies of Australia (a proprietary limited company jointly owned by the Commonwealth of Australia and the Pacific Aviation). The T56 reduction system modification eliminates up to 80% of smoke emissions by the Allison T56 turboprop engines. Features of this smoke-reduction system include added fuel savings and less air-polluting emissions. The project has already won the company an environmental award.

The first engine flight-tested was on an RAAF P-3C Orion. As of early 1992, thirteen Orion and two C-130 Hercules engines have been modified with the smoke-reduction system.





**KAWASAKI** has produced three EP-3C Electronic/Signal Warfare Orion variant aircraft for the Japanese Maritime Self Defense Force. Though similar in mission to the US Navy's EP-3E, the JMSDF EP-3C differs in the utilization of blisters to house antennas and radars, instead of the American-type canoe pods.

(JMSDF)

Another Australian Orion improvement project involves a new "ESM System" for the RAAF.

The new ESM system (developed by AWA Defense Industries) is tasked with detecting submarine transmissions, assisting in missile launches (over-the-horizon-targeting) and alert warnings of potential hostile aircraft or weapons threats while creating and managing a surveillance, electromagnetic, tactical picture of the battle area.

The system includes a 19", colour, telegraphic (dynamic) display unit, and the installation of subsystems electronics into various racks with new under-fuselage and wingtip antennas and arrays. The main important feature is the adding of a new crew station dedicated to ESM management.

The "Section 4" ESM station will be located slightly across from Section 3 and behind the TACCO on a P-3C Orion. This trend, of a dedicated ESM operator, is catching on in the P-3 Orion user community. Portugal has had a two-man Section 3 station with a sole ESM operator for many years.

The RAAF ESM system was originally tested on a similar, baseline, test-bed aircraft in Israel. That service is currently stripping a P-3C Orion and will equip it with the prototype ESM

system. Test flights will commence in October 1992 and, later (June 1993), nine more Orions will be fitted with the production version of the ESM system. By December 1994, the prototype aircraft will be re-equipped with the production system. After approval of a continuation contract, all remaining P-3 Orions will be outfitted with the new ESM system.

The RAAF is also preparing to put out a bid for an entire avionics upgrade of their P-3C II.5 Orions. The project will include all-new sensors and processors: a totally new package, greater than the Update III's capabilities and equal, in some aspects, to the upcoming Boeing Orion "Update IV" programme.

Specifications will be announced by the RAAF and it will be up to the potential contractor to pick the systems that best fit the RAAF's specification requirements.

#### **Canada**

Besides the introduction of the Arcturus into the fleet, the Canadian Armed Forces have been improving the Aurora through a series of projects.

Current projects include, the WX-1000 "STORMSCOPE" weather-reconnaissance system, produced by 3M, and the upgrading of the AYK-10 computer with "CMOS," adding four

times the memory capacity of the existing system.

Future projects include the "OBSC" onboard structural computer. It will generate aircraft structural data as part of a fatigue-life management study, to extend operational service life of the Aurora.

Canadians will also adopt the T56 smokeless-engine mod, which reduces smoke trails and emissions, with increased fuel economy. Completion of this modification is scheduled for late 1992.

The CAF is also testing a GPS "Global Positioning System" currently installed on an Aurora testbed belonging to MP & EU Development Squadron. They are evaluating the feasibility of integration of the GPS system into the aircraft. Despite these improvements, the main Aurora "Mid-Life" update programme has been postponed for five years (until 1999) in an effort to consider the needs of the CAF Maritime Force.

#### **Japan**

The Japanese Maritime Self-Defense Force (JMSDF) continues to receive P-3C Orions from Kawasaki Heavy Industries, under license from Lockheed. By the end of 1992, the JMSDF will have received approximately 88 Orions. Though most are Update II.5 models, the last ten are of the new Update III configuration. The JMSDF "Maritime Staff Office" is now planning an Update IV programme for early 1999. In the meantime, the "MSO" is seeking approval for an interim upgrade project for an advanced, state-of-the-art avionics suite as a step towards any future update.

Kawasaki has also produced three EP-3C Electronic/Signal Warfare Orion variant aircraft. Though similar in mission to the US Navy's EP-3E, the Japanese EP-3C differs in the utilization of blisters to house antennas and radars, instead of the American-type canoe pods. The EP-3C's are currently operated by training support Squadron 81 with five more aircraft expected by the end of 1994. The Japanese are also preparing

another variant Orion for the near future. Designated "UP-3C," this utility Orion will be based on a new Charlie airframe. The aircraft will be utilized by VX-51 Air Development Squadron as an Airborne Systems Testbed.

### The Netherlands

The Netherlands has been developing a plan to update their thirteen P-3C Update II.5 Orions, by the end of the decade. This "CUP" (Capabilities Update Programme) will afford the Dutch a commonality of aircraft capabilities with those of other Orion operators. Depending on budgets, the Update Programme will be of a similar type to that of the Boeing Update IV. Improvements will include new avionics, the integrated Harpoon Missile System, Global Positioning (Navigation) System, and Aircraft Defense (Chaff flare) PODS.

There is a remote possibility that, in lieu of updating their Orions, the Dutch can sell or trade-in the thirteen aircraft towards a small number of more advanced P-3's like the Orion II. (It's a fact that the KON Marine's Orions have the lowest hours of any P-3s of the same type: a welcome feature to any potential Orion customer).

### Norway

In October 1991, Norway received the first of two "P-3N" Orions. P-3N's are re-engineered Norwegian Bravos with the acoustic-sensor station removed. Modifications include strengthened floors and seating tracks. New electronics encompass a new radar display and more modern ESM equipment added to the sensor 3 section, with new HF radios installed in the Bravo's Navigator station.

The P-3N's will be utilized for pilot training, Coast Guard fisheries patrols, special operations and VIP passenger transport.

The second P-3N was completed in May 1992.

Norway is also considering equipping their new P-3C IIIs with radar and processor upgrades.

### Spain

Spain has decided, after a four year study, to update its five P-3B Orions with an Update IV-type configuration. The update programme will utilize "domestic" Spanish industry, providing systems capabilities equal to the American Boeing Update IV package. But, due to limited funding, the programme is now uncertain.

### United States

Even in the US, several Orion operators have been conducting improvement programmes.

Key West-based (USN) VAQ-33 Fleet Electronic Warfare Training Squadron has modified two Navy P-3 Bravos as "EP-3J" Orions. The EP-3J is an upgrade of the EP-3A's VAQ-33 used for simulating hostile Maritime Patrol/reconnaissance aircraft. These aircraft project deceptive signals, and jam Fleet communication/countermeasures systems in mock attacks on Navy Battle Groups, for training purposes.

The new "J" designation comes from new jamming equipment, installed on a Bravo airframe, recently acquired by the Squadron.

The US Navy is also conducting a "Conversion-in-lieu-of-Procurement" modification programme of the EP-3E Electronic/Signal Warfare Orions. Designated ARIES II, the MOD is comprised of upgraded, advanced systems incorporated into a P-3C airframe.

Three of the advanced ARIES IIs are now in service with VQ-1 and VQ-2, with several more expected later in 1992. Originally modified at Lockheed's AEROMOD Facility in Greenville, South Carolina, continuation of the modification programme has been transferred to the Navy's Aircraft Repair Depot NADEP at NAS Alameda, California. The older EP-3E ARIES I Orions, modified on Alpha airframes, have been stripped and scrapped, as the newer EP-3s are introduced.

The US Custom Service, currently operating four modified P-3A

SLICK and two P-3 AEW&C Orions, acquired two surplus Navy P-3 Bravos during 1990-91.

The airframes will be re-engineered by Lockheed as the next third and fourth P-3 AEW&C Early Warning and Control aircraft for the drug interdiction Air Branch of the US Custom Service. The new **Dome** Orions will be painted all-over tactical grey, deviating from the usual striking Customs AEW&C paint scheme.

The third P-3 AEW&C was delivered to the US Customs Corpus Christi Facility in June 1992, with the fourth aircraft delivery expected in October 1993.

### Summary

The P-3 Orion has served the ASW community for three decades, through the height of the Cold War, with distinction. It guaranteed its role in the future, showing off its superior ASUW capabilities during the recent Gulf War.

With a marked increased utilization by other nations, the Orion has firmly established itself as the premier Maritime Patrol aircraft now and in the future! ➔



### ABOUT THE AUTHOR

David Reade is a full-time, free-lance aviation journalist who formed "P-3 Publications" in 1989 as a means to write about P-3 Orions, and has produced numerous, published articles on the subject. Mr. Reade has also researched, compiled and written an authoritative P-3 Bureau Number (buNo) list, noting current location of all foreign and domestic Orion aircraft. The list also includes miscellaneous information about particular airframes not normally found in aircraft listings. Updated quarterly, this list is utilized by several Navy departments and Navy contractors as "An Outstanding P-3 Reference" where no single Orion reference guide was available before.