



NAPMO

NATO AEW&C PROGRAMME MANAGEMENT ORGANISATION



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FOREWORD

On behalf of the allied Nations participating in the NATO Airborne Early Warning & Control (NAEW&C) Programme, the Chairman of the Board of Directors, NAEW&C Force Commander, and the General Manager extend their best wishes.

The Programme is often cited as one of the most successful collaborative ventures ever undertaken by the Alliance. The fleet of NATO E-3A Aircraft (NE-3A) represents the world's first multi-national, fully integrated Air Force – “NATO's Air Force”. As a result, an effective system has been deployed, which enhances the ability to counter today's ever-evolving threats. Additionally, the multi-national character of the NE-3A force provides a highly visible symbol of Alliance cohesion and solidarity.

This booklet provides an overview of the Programme, reviews its accomplishments to date, and looks to the future. We hope you will agree that through the Nations' collective determination, the NAEW&C Programme represents a very real NATO success story.

September 2012



NATO AIRBORNE EARLY WARNING AND CONTROL PROGRAMME

In the second half of the 1970s, the requirement to detect high speed combat aircraft, with low level penetration capability, made it necessary to augment NATO's system of ground-based radars with effective additional means. The NATO military authorities determined that an Airborne Early Warning (AEW) capability would provide the key to meeting the challenge.

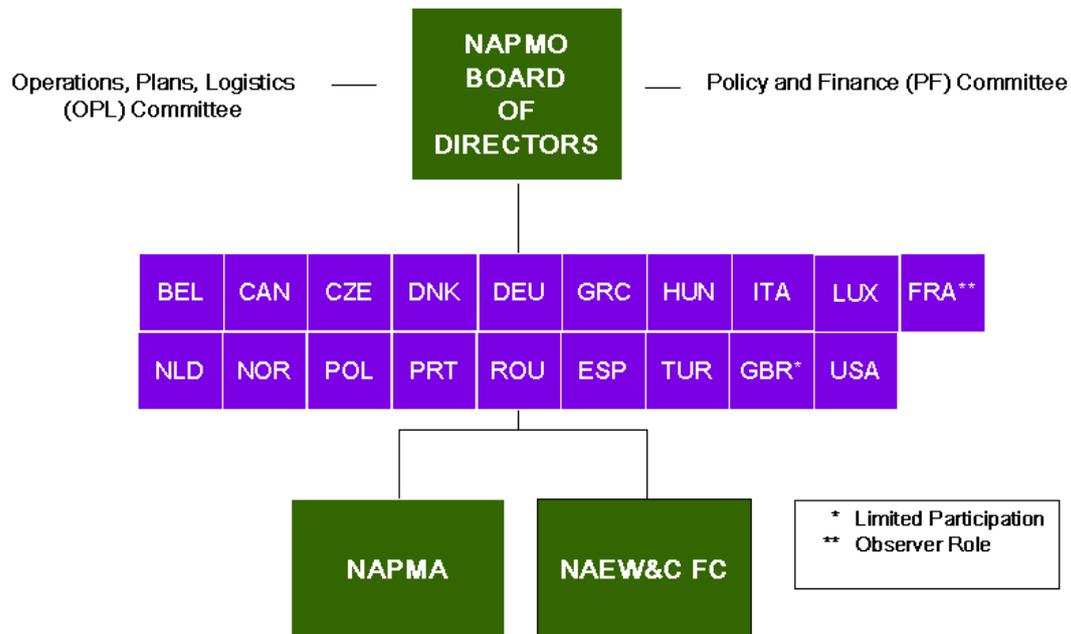
The operational requirement for the NATO AEW&C system stressed the need to detect small cross-section, high speed intruder aircraft at long range. The capability to detect maritime surface targets was also specified because of the geographical regions in which the AEW aircraft could be required to operate. The aircraft and mission systems selected to form the NAEW&C Force were based on the USAF Airborne Warning and Control System (AWACS). The inherent mobility and flexibility of such a system, especially in the control function, were also foreseen by NATO planners as providing air, maritime, and land force commanders with valuable additional capabilities.

In short, the creation of a NAEW&C Force was designed to make a significant contribution to the Alliance's deterrent posture. Implementation of the concept would require a NATO-endorsed Programme and the establishment of a Programme Management Organisation.



NATO AEW&C PROGRAMME MANAGEMENT ORGANISATION

In December 1978, a number of NATO Nations joined together to establish the NATO Airborne Early Warning & Control (NAEW&C) Programme. As a result of the international agreements formally ratified at that time, the NAPMO was created as a NATO Production and Logistics Organisation to implement the Programme. NAPMO is a NATO civil organisation established under the provisions of the 1951 Ottawa Agreement, and is directly responsible the North Atlantic Council for all aspects of the NAEW&C Programme. The structure of the NAPMO is as shown below.



NAPMO BOARD OF DIRECTORS

In its Charter, the NAPMO Board of Directors (BOD) has been granted far-reaching authority and independence in the management of the Programme, particularly in the technical, initial system support, financial and contractual areas. The NAPMO Board consists of one member from each participating Nation. The United Kingdom exercises limited participation as a NAPMO member, based on her participation in the Air Defence Ground Sites Integration Project; but her fleet of E-3D aircraft is an integral part of the NAEW&C Force. France has an observer role, but also maintains continual coordination regarding her national fleet of E-3F aircraft to ensure interoperability. The BOD meets a minimum of two times per year to review the Programme, resolve major issues, and to provide policy guidance and strategic direction. Two Committees - the Operations, Plans, and Logistics and the Policy and Finance Committees, whose composition are similar to that of the BOD, meet a few weeks before each BOD meeting to review items within their respective spheres of expertise and to provide recommendations to the Board.



Operations, Plans, and Logistics (OPL) Committee

- ✦ The OPL Committee considers and makes recommendations to the BOD on those matters referred to in the areas of operations, interoperability, technical, logistics, sustainment, configuration, requirements, and Industrial Benefits / Industrial Participation.
- ✦ As a matter of routine, the OPL Committee, within the operations, interoperability, technical, sustainment, configuration and requirement matters of the NATO AEW&C Programme, considers proposals and statements prepared by NAPMA prior to the consideration by the BOD. This process ensures that the BOD, when considering its decisions, will have the benefit of OPL Committee recommendations.
- ✦ In its role as a body of national experts created to advise and assist the BOD, the OPL Committee draws to the attention of the Board such matters as the OPL Committee feels require action by the BOD.

Policy and Finance (PF) Committee

- ✦ The Policy and Finance (PF) Committee considers and makes recommendations to the BOD on those matters referred to it in the areas of legal, financial, contracting, strategic planning, and administration of NAPMA, including international agreements, budgets, financial procedures, acquisition strategies, Industrial Participation, business processes, NAPMA personnel establishment and recruitment, and corporate governance.
- ✦ As a matter of routine, the PF Committee, within the legal, financial, contracting, strategic planning, and administration of NAPMA, considers proposals and statements prepared by NAPMA prior to their consideration by the BOD. This process ensures that the BOD, when considering its decisions, will have the benefit of PF Committee recommendations.
- ✦ In its role as a body of national experts created to advise and assist the BOD, the PF Committee draws to the attention of the Board such matters as the PF Committee feels require action by the BOD.

NAEW&C PROGRAMME MANAGEMENT AGENCY

The NAEW&C Programme Management Agency (NAPMA) is the executive agency of the organisation. It is manned by approximately 120 seconded military officers and civilian personnel drawn from all of the Nations participating in the NAEW&C Programme. While most are located in Brunssum, The Netherlands, a small number perform their duties in Brussels (NATO HQ), Mons, Belgium (Allied Commander Operations HQ), Manching, Germany (a retrofit facility), and the United States (Boston). Within the responsibilities and guidance given to NAPMA by the NAPMO BOD, NAPMA manages all aspects of the Programme from acquisition through delivery and on through Life Cycle Sustainment.

As such, NAPMA is responsible for planning and coordinating acquisition strategies and for managing contracts associated with modernisation of the NE-3A fleet. The NAPMA General Manager is responsible to the BOD for the day-to-day management of the Programme. He is aided in this task by a Deputy General Manager, a Legal advisor and an Internal Auditor. The Agency is then organised around the following Divisions or Offices:

- ✦ The *Plans and Evaluation Division* is responsible for planning and definition of new programmes, liaison with outside organisations, and system test activities and quality assurance.
- ✦ The *Programme Management Division* is responsible for implementing projects from the development phase, through production and retrofit, and for ensuring the harmonisation of modernisation projects with the NATO Military Authorities.
- ✦ The *Programme Support Division* is responsible for contracting, industrial benefits and industrial participation, logistics and configuration management.
- ✦ The *Financial Controller's Office* is responsible for the treasury, financial planning budgeting, accounting and cost analysis functions necessary for the effective execution of the Programme.
- ✦ The *Human Resources and General Services Office* is responsible for all personnel matters, security, and general administrative support services, including travel and registry functions.
- ✦ The *NAEW&C Engineer's Office* is responsible for advising the General Manager, as the Technical Airworthiness Authority, on engineering matters and ensuring that NAEW&C programme adequately address Operational, Safety, Suitability, and Effectiveness (OSS&E).
- ✦ The *Information Management Office* is responsible for support to the NAPMO meetings, management of NAPMA's business processes and information, and provision and maintenance of IT services.

NAEW&C FORCE COMMAND

The NAEW&C Force was created to provide a multinational and immediately available airborne surveillance, warning and control capability in support of Alliance objectives. Force Command takes its operational directions from and reports directly to the NATO military command structure, while depending upon NAPMO for NE-3A fleet maintenance, sustainability, and other requirements to support the NATO mission. The post of NAEW&C Force Commander (Major General) alternates between Germany and the United States, while the United Kingdom fills the Deputy Force Commander appointment.

The creation from scratch of what was effectively a new air force meant it was necessary to replicate all the constituents that support a national air force – including a command structure and operating bases. To this end, the NAEW&C Force Command Headquarters (HQ) was established in 1980 and co-located with the Supreme Headquarters Allied Powers Europe (SHAPE) in Mons, Belgium. Operationally, Force Command has two Components. The Main Operating Base (MOB) for the NATO E-3A Component was established and located at Geilenkirchen, Germany, along with three Forward Operating Bases (FOBs) at Trapani, Italy; Konya, Turkey; Aktion, Greece, and a Forward Operating Location (FOL) at Oerland, Norway. The other component of the NAEW&C Force is the Royal Air Force E-3D Component at Waddington, England.



France's E-3F fleet operates from Avord Airbase. While France is not part of the NAEW&C Force, it often assists in coordinated operations with Force Command.

Over the years, the NAEW&C Force has been called on to support a wide range of operations. During the 1990s the NAEW&C Force was involved in continuous operations in support of UN Security Council Resolutions around the Former Republic of Yugoslavia. The NE-3A aircraft provided a continuous presence and contributed to combined operations with French, British, and American fleets. After the terror attacks of 11 September 2001, for the first time in its history, NATO invoked the "mutual defence" clause spelled out in Article 5 of the North Atlantic Treaty. Called Operation Eagle Assist, NATO deployed NE-3As to the USA to fly a variety of security support missions. Since then the NAEW&C Force has been supporting NATO's counter-terrorism activities in the Mediterranean Sea, has deployed in January 2011 to support Commander ISAF; providing air surveillance cover Afghanistan, and recently played a pivotal role in NATO air operations over Libya.

Both Components of the NAEW&C Force also provide support to assist with the security of major public occasions. These high visibility events included the 2004 Summer Olympic Games in Athens, the 2006 World Cup Football Championship, and the 2012 European Football Championship in Poland as well as other important meetings held by international organizations such as the Nobel Prize ceremony in 2010. Further, the NAEW&C fleets have consistently provided air support to Alliance Heads-of-State meetings, as well as governmental and non-governmental meetings and NATO summits.



NE-3A

E-3A COMPONENT – GEILENKIRCHEN, GERMANY

The E-3A Component is one of the two operational elements of the NAEW&C Force. It is NATO's only operational unit, making it unique in military history. The Component's mission is to provide aircraft and trained aircrews to deliver a surveillance and/or control platform whenever directed by the NAEW&C Force Commander on behalf of the NATO operational commander, the Supreme Allied Commander, Europe (SACEUR).

The actual build-up of the E-3A Component started in January 1980; in October 1980 it was granted the status of a NATO International Military Headquarters by the NATO Defence Planning Committee (DPC). Flying operations began in February 1982 after delivery of the first NE-3A aircraft. The Component was officially activated on 28 June 1982 and reached "Full Operational Capability" by the end of 1988.

The Component consists of five main functional areas: the Operations Wing, Logistics Wing, Training Wing, Information Technology Wing and its Headquarters. Each of these major units is commanded by a colonel from a variety of NATO Nations. The position of E-3A Component Commander alternates between a German and American Brigadier General. The overall integrated manning of the Component consists of about 2,900 multinational military and civilian personnel. This figure includes military and civilian personnel in support functions such as base civil engineering, national support units and morale and welfare activities.

Seventeen NE-3A Aircraft are assigned to the Component. Normally, only a number of the NE-3A aircrafts are at NATO Air Base Geilenkirchen at any given time. The remainder deploys to the Component's Forward Operating Bases and its Forward Operating Location or other allied airfields. Each of the forward facilities is located on a national installation, although the Component has approximately 20 personnel at each site. They are NATO personnel assigned to the Component, but all of them are from the respective host nations.

Thirty multinational aircrews from 16 of NATO's 28 Nations are assigned to the Component's three operational squadrons and one Trainer and Cargo Aircraft squadron. The Training Wing also has a flying squadron, the Aircrew Training Squadron.

E-3D COMPONENT – RAF WADDINGTON, UK

Since attaining Initial Operating Capability in July 1992, the NAEW&C Forces E-3D Component has shared the NATO airborne surveillance, warning, and control mission with its sister Component at Geilenkirchen. From its Main Operating Base at Royal Air Force Waddington, the E-3D Component's fleet of seven E-3D aircraft supports NATO missions and provides the United Kingdom with a national capability when necessary.

Under the day-to-day operational control of the NAEW&C Force Commander, the E-3D Component has made a major contribution to every National, NATO and Coalition Military Campaign since its formation and contributes 25% of the Force's annual operational output. In controlling air combat assets in coordination with NE-3A aircraft, the E-3Ds have engaged in the conflicts in Bosnia, Kosovo, Afghanistan and Iraq.

The Component comprises seven E-3D aircraft and appropriate mission support, training, and engineering elements. It maintains an expeditionary capability to respond from a state of high readiness to any operation around the world either as a NAEW&C Force asset, including as an element of the NATO Response Force, or as a national contribution to any coalition.

The E-3D variant of the AWACS is operated by a crew of 18, drawn from RAF and exchange personnel; it is configured to meet United Kingdom's operational requirements, to maintain interoperability with Allied E-3 fleets and to maximise interchange ability with the NE-3A. The most notable differences from the NE-3A are its engine design and a refuelling probe (in addition to the standard receptacle), as depicted below.



E-3D

MAJOR PROGRAMMES

The present NE-3A fleet and its capabilities may be viewed from the perspective of three major inclusive programmes:

- ✦ The Initial NAEW&C Acquisition Programme (1978-1988)
- ✦ The Near-Term Programme (1990-2000)
- ✦ The Mid-Term Programme (1997-2008)

The Initial NAEW&C Acquisition Programme (1978-1988)

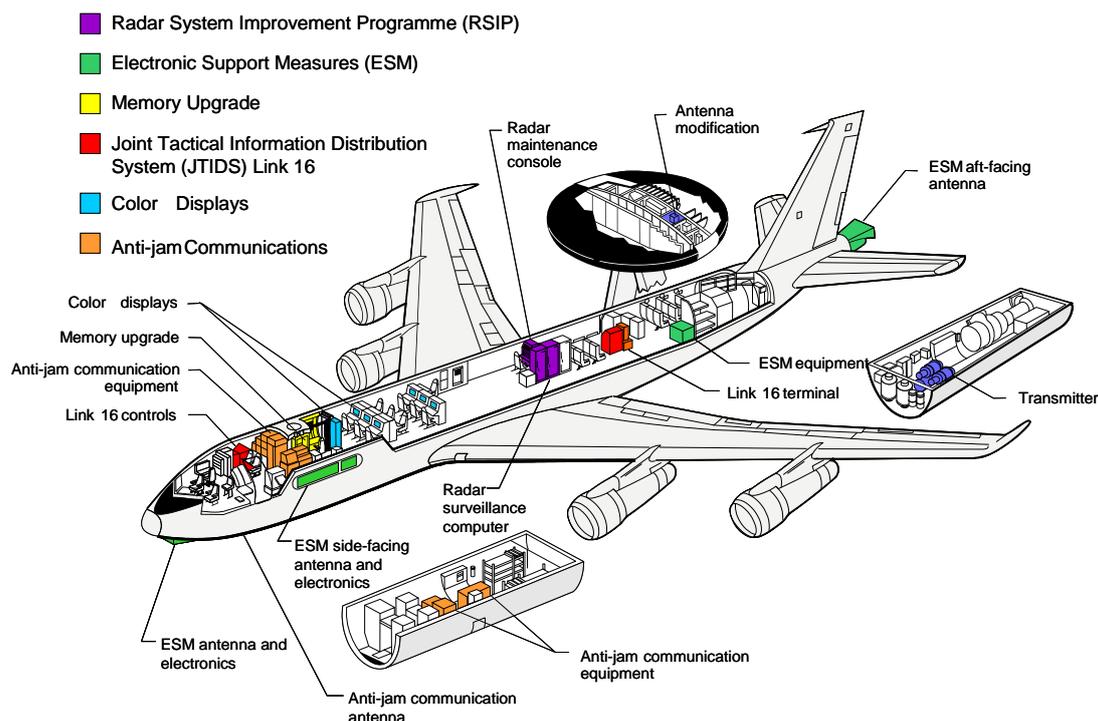


The Initial Programme approved by the Ministers of Defence of participating Nations in December 1978, consisted of:

- ✦ Acquiring 18 NE-3A aircraft and three modified commercial 707 aircraft, for use as Trainer Cargo Aircraft (TCA), as NAPMO assets;
- ✦ Upgrading 40 NATO Air Defence Ground Environment (NADGE) Radar Sites;
- ✦ Creating NAEW&C Force Command Headquarters;
- ✦ Activating a Main Operating Base in Geilenkirchen, Germany, three Forward Operating Bases (Greece, Italy, Turkey) and one Forward Operating Location (Norway); and
- ✦ Establishing initial logistics, training and personnel support, as required.

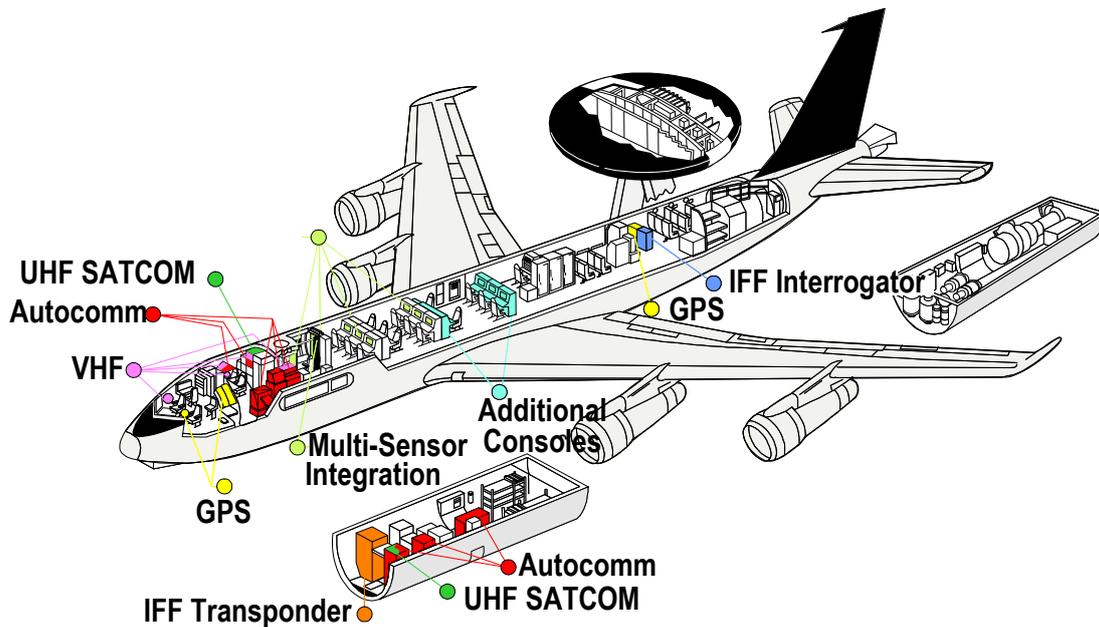
The total cost of this Initial Programme amounted to US\$ 4.1 Billion; prohibitively expensive for any single Nation, but realisable through the collective resolve of the 13 NAPMO Nations. This massive investment was met from special budgets funded and controlled by the participating Nations and administered by NAPMA.

THE NEAR-TERM PROGRAMME (1990-2000)



By 1988, the NATO Military Command had stated its operational requirements for enhanced communications, surveillance, and computer capabilities in order to update the NE-3A system so that it could retain its operational viability, including inter-operability with the AEW&C fleets of France, the United Kingdom, and the United States. The NAPMO Nations agreed on the need for such an update and the Near-Term Programme was commenced in 1990. The total cost of this upgrade was US\$ 1.1 Billion.

THE MID-TERM PROGRAMME (1997-2008)

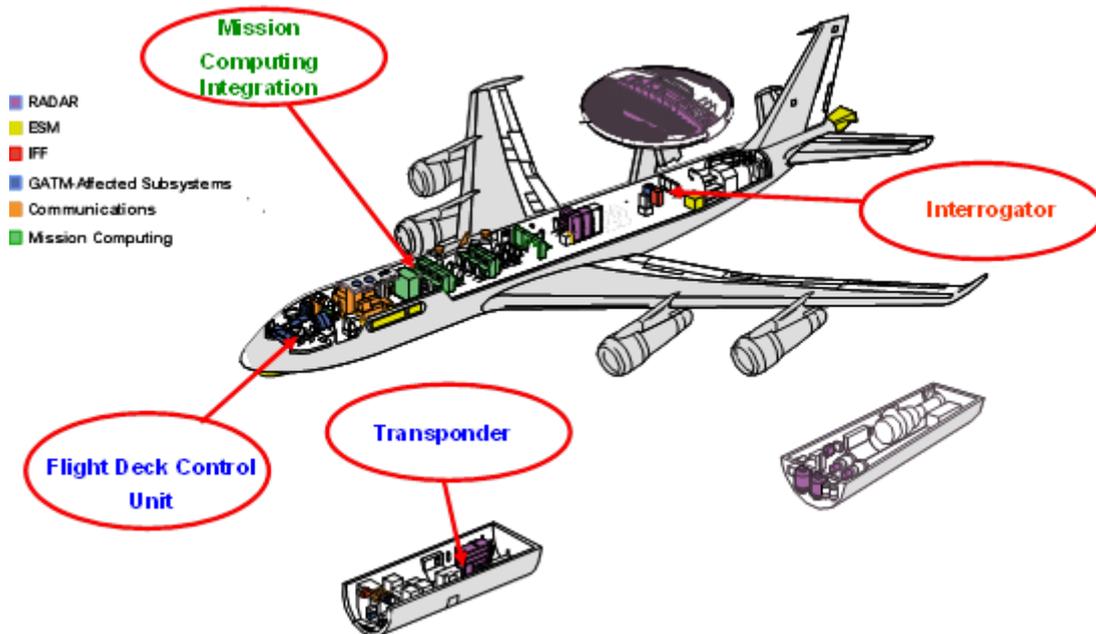


After three years of planning, the Mid-Term Programme commenced in 1997 to further improve the capabilities of the NE-3A fleet and put it into the conditions to manage the new challenges of the coming years – improving its overall combat capabilities. This US\$1.6 Billion Programme has been treated as a single-block upgrade that consists of nine integrated system enhancements including modern software architecture for future growth.

The Future Upgrade Programme (2010 – 2018)

Planning and project development for the latest modernization projects are underway and progressing. These Follow-Up Modernization project affect mandated enhancements of the Combat Identification system (Mode5/Enhanced Surveillance) and upgrades from a legacy analogue cockpit technology to a digital environment.

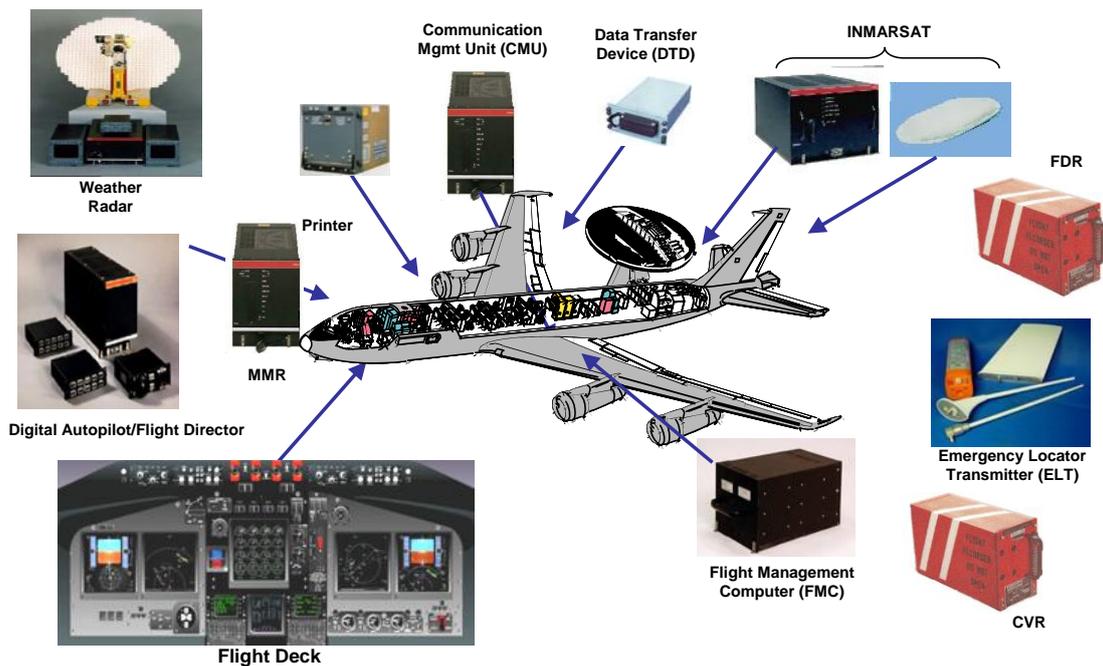
IFF Mode 5 / Enhance Mode S



Combat Identification (Combat ID) is recognized as an integral element of Force Protection and is essential in enhancing military effectiveness and preventing fratricide. Identification Friend or Foe (IFF) systems have been adopted for their ability to identify co-operating units and rapidly provide Situational Awareness (SA) of friendly air, maritime and ground platforms as part of the Combat ID process in warfare. Secondary Surveillance Radar (SSR) systems, the civil equivalent of IFF, are used by both military and civil organizations for the identification and control of air platforms by Air Traffic Service Providers and units responsible for compiling a Recognized Air Picture (RAP). Together, IFF and SSR are considered essential safety-critical systems for the provision of Air Traffic Control (ATC) services and the conduct of Air Command and Control.

- ✦ **Mode 5** is NATO's performance upgrade of the current IFF Mark XII System (Mode 4) and will provide the NE-3A aircraft with an improved NATO and friend/neutral identification capability.
- ✦ **Enhanced Mode S (EHS)** - Military exploitation of SSR systems is driven by the requirement to fulfill military tasks and the need for air platforms to carry SSR transponders in compliance with individual national flying regulations when operating in national and international airspace. A Mode S compliant transponders will therefore ensure that NE-3A aircraft will have continued unrestricted access to "Mode S airspace". The Mode S (EHS) interrogator capability will further assist in the compilation of a Recognized Air Picture, in order to safely control aircraft with real-time Mode S information processing.

Cockpit Modernization (CNS/ATM)



To cope with increasing civil air traffic, Civilian Aviation Authorities will progressively put in place new airspace structures, Air Traffic Management (ATM) procedures and Communication, Navigation and Surveillance (CNS) systems. The new CNS/ATM environment is to largely exploit digital technologies, satellite systems and various levels of automation to establish a seamless Global Air Traffic Management (GATM).

Military aircraft such as the NE-3A, which are not complying with emerging ATM standards will eventually be restricted to operate as General Air Traffic (GAT); thereby impeding flying operations. The cockpit modernization involves an extensive suite of sub-systems aimed at ensuring the aircraft can operate within and transit through any airspace without restriction. The new NE-3A CNS/ATM systems will also enhance information flow; extend surveillance capabilities; and improve navigational accuracy. It will help address existing supportability issues and consolidate the navigation functions into a three position flight crew concept (2 Pilots, 1 Engineer).

While the Engineering Manufacturing and Design (EMD) phase of the cockpit modernization project will be executed in cooperation with the US AWACS fleet, the Production and Retrofit (PAR) phase of each fleet will be done individually.

EVOLUTION

Originally designed as an elevated radar platform, the NE-3A is evolving to address the realities of geopolitical change and NATO's new mission. In emphasizing the Control aspect of AEW&C the NE-3A has become an essential part of Air Battle Management.

From the initial buy of 18 NE-3As and three TCAs, as well as upgrades to ground-based radar, through the various major programmes, NAPMO Nations will have spent / committed, for acquisition and follow-on modernisation, a total of US\$ 6.8 Billion.



THE FUTURE

Since the NAEW&C Programme was authorised in 1978, the strategic situation has changed and NATO's missions have evolved. Responding to changing environments and supporting future NATO operational capabilities will present continuous challenges. Today NATO is moving forward in describing a new and improved method of planning and conducting operations. To support the dynamic NATO transformation process, NAPMO will adopt new business approaches, such as streamlined acquisition, to allow operational capabilities / requirements for the NE-3A fleet to be fielded as soon as possible in supporting the overall operational needs of NATO.



CONCLUSION

As a result of the unique arrangements under which the NAPMO Nations have agreed to implement the Programme, NATO is the owner of a fleet of technically sophisticated aircraft. No single Nation acts as host to ensure that the NATO E-3A fleet maintains its operational credibility; the collective NATO responsibility in this regard continues to rest with the NAPMO.

NE-3A Aircraft Statistics

The NE-3A aircraft is a militarized version of the Boeing 707-320B commercial airliner airframe. It is distinguished by the addition of a large, rotating rotodome containing its radar antennae. Its mission system includes surveillance radar, navigation, communications, data-processing, identification, and display equipment. NE-3A fills the needs of both airborne surveillance and Command and Control (C2) functions for tactical and air defence forces. It provides a highly mobile, survivable surveillance and C2 platform. The NE-3A offers superior surveillance capabilities. Equipped with a "look-down" radar, the NE-3A can separate airborne targets from the ground and sea clutter returns that confuse other present-day radars. Its radar "eye" has a 360-degree view of the horizon, and at operating altitudes can "see" more than 400 kilometers (215 nautical miles). It also can detect and track both air and sea targets simultaneously.

MAIN DATA OF NE-3A

Maximum Take-off weight	151955 kg
Length, fuselage	46.62 m
Height, fuselage	12.50 m
Wingspan	44.43 m
Width, overall	4.52 m
Height rotodome above fuselage	3.35 m
Diameter rotodome	9.1 m
Thickness rotodome	1.8 m
Maximum rate of climb	8.7 m/s
Maximum range	9250 km
Speed	800 km/h
Maximum endurance (no refuelling)	More than 11:00 h:min
Aircraft ceiling	10670 m
Four TF-33-PW-100A	4 x 21000 lb
Crew	4 flight crew, 13 operators

