



NPC

Insight



NATO Programming Centre

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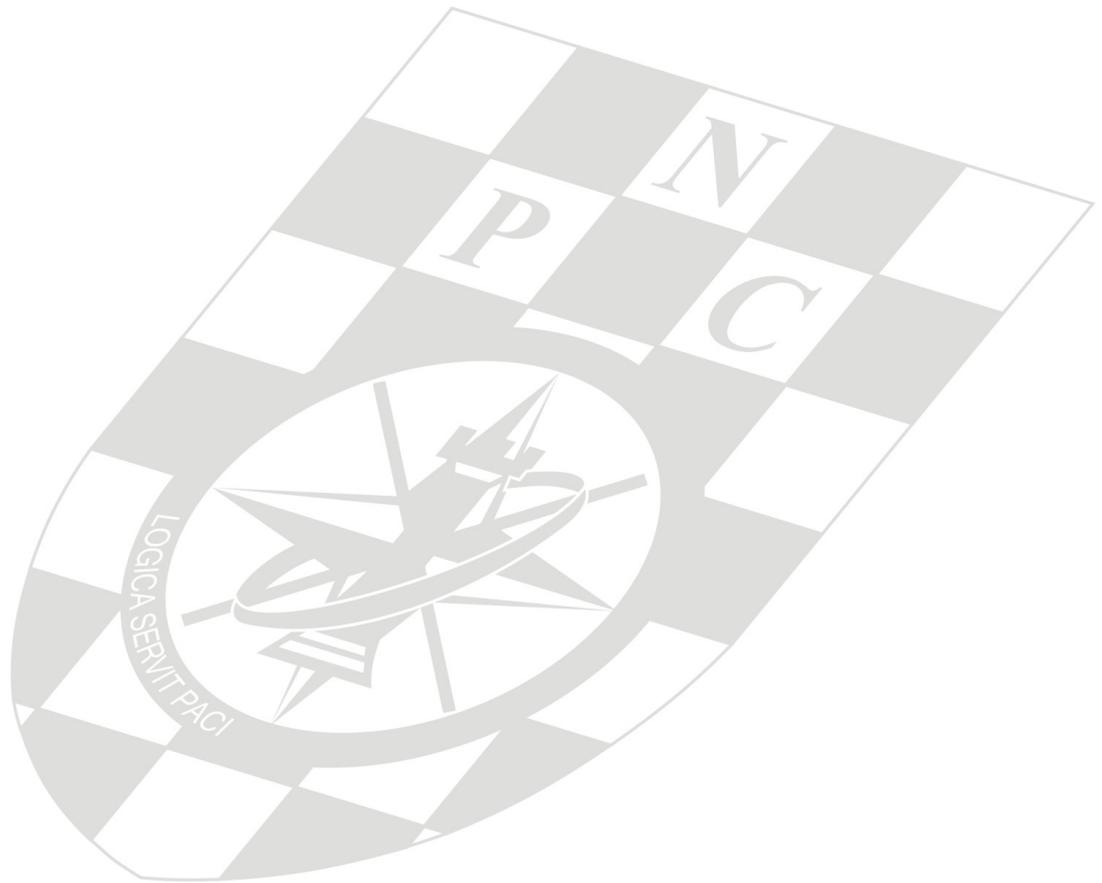
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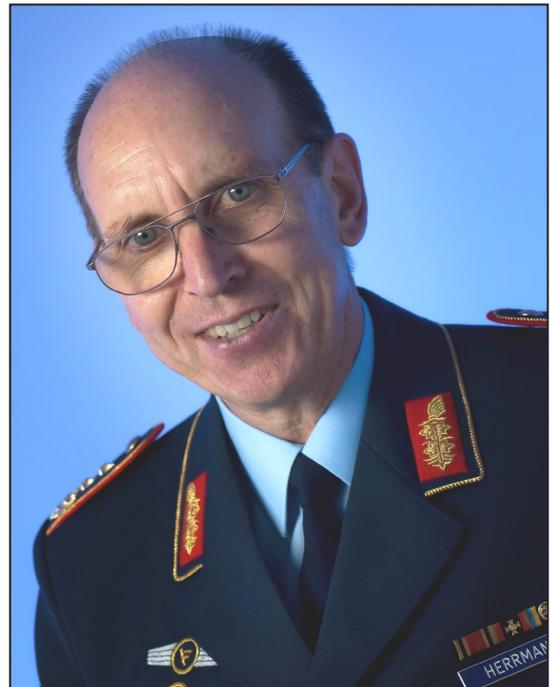


from Director NCSA



The addition of the NATO Programming Centre (NPC) into the NATO CIS Services Agency (NCSA) family has been completed successfully; through the so-called Adoption Phase of the three step approach for the transfer, NATO has taken a first step towards integrating Air Command and Control (C2) expertise into a consolidated Joint, Air, Land and Maritime CIS support environment.

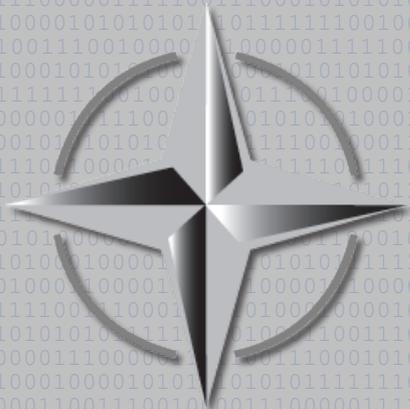
Based on this, NCSA has started to exploit the opportunities for enhanced employment of the NPC in the new environment for improved knowledge sharing in the upcoming harmonization and integration phases. The aim is to make the most efficient use of available resources in the overall NCSA structure and provide an added value in supporting CIS services to our customers. Of course, the achievements and experiences gained so far will also be considered in the ongoing discussions on a new NATO Command Structure and the NATO Agency Reform.



The NPC has proven to be a most valuable asset in the NCSA structure. Therefore, for the foreseeable future, NPC will continue to stand as the cornerstone for maintaining the integrity, interoperability and tailor-made support of the Air C2 assets and applications under its responsibility, using its professional, dedicated staff of engineering and technical experts to produce high quality results for NATO and ISAF. In order to meet the requirements of the operational user community it is paramount to provide the required resources for the mission through the filling of the recently implemented new structures. My staff and I are making all efforts to enable NPC to recruit personnel for established civilian posts and to make sure that Nations are filling their military posts in due time.

I am proud to call the NPC part of the NCSA family. I look forward to a continued increase in synergy and proficiency in the future, particularly as NPC will play a pivotal role in supporting NATO C2 systems in its role as the System Support Centre (SSC) for the NATO Air Command and Control System (ACCS) LOC1.

Kurt Herrmann
Lieutenant General, DEU AF
Director NCSA



The NATO Programming Centre (NPC) has been part of the NATO CIS Services Agency (NCSA) family for nearly two years now. With the transfer of the chain of command to NCSA our mission and tasking did not change and, therefore, remains in the purview of the ACCS Software Committee. Our experience so far proves that this arrangement is working and we are able to cope with short-term requirements when the established procedures are acknowledged.



The NPC continues to provide system and advisory support for the NATO Air Command and Control (C2) assets entrusted to us. On the one hand these are the continued support for the maintenance of the Legacy and Interim Air C2 Systems in service in NATO and the Nations. On the other hand we provide expertise and manpower in support of the procurement of ACCS, and prepare for the system support for ACCS, acknowledging that the first element, the Voice Communications Equipment at Nieuw Milligen (NLD), is in service and supported.

In March 2010, the NPC adopted the new Peacetime Establishment (PE) as an Interim Working Structure; the considerable increase in civilian posts provides the organizational basis to meet the requirements ahead of us. After the official implementation of the new PE in August 2010, it is very important for the NPC to get the newly established posts filled through recruitment of suitable personnel; only then will we be in a position to meet the growing demands for support placed upon us.

When you are flipping through this booklet you will find that the NPC has gained success in many areas. I am very confident that the NPC will continue to provide the required support to the Air C2 community based on the dedication and professional skills of our military and civilian staff. I am proud to lead this unique NATO organization, and invite you to read more about the NPC and the products we support throughout the following pages.

Horst Stuetzgen
Colonel, DEU AF
Commander NPC



Mission, Reporting and Tasking



The NATO Programming Centre is based at Glons, Belgium, co-located with the Belgian Air Force Air Defence radar station. It is an independent, self-governing military unit under the authority of the NATO CIS Services Agency. The role of NPC within the NATO structure and framework is defined by the Director NCSA, who also provides the NPC's responsibilities and mission.



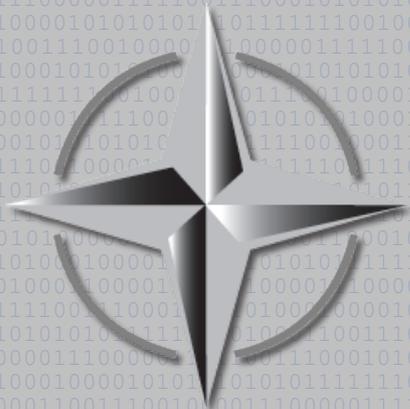
The NPC PE shows 234 posts of which 55% are military from 15 NATO nations, 45% NATO International Civilians and Local Wage Rate personnel. The NPC is commanded by a German Air Force Colonel and organized into 2 divisions (Operations and Support), and the Mission Assurance Office. In addition to the core personnel, NPC hosts tenant units such as the ACCS Preliminary Core Team, NACMA and NAMSA personnel.

The NPC is funded by all 28 NATO nations; however, activities dedicated to individual nations might be performed on direct cost reimbursement. NPC hosts two multi-nationally funded NATO system/software maintenance cells which are managed by the NATO Maintenance and Supply Agency (NAMSA).



Mission

The NPC's mission is to provide efficient and effective system and advisory support to ensure the maximum operational capability of the Air Command and Control (C2) systems entrusted to the NPC. Whilst in the past the NPC mission was limited to software maintenance of in-service NATO Air C2 systems, it was expanded in 2006 to permit provision of all activities required to support these systems. This includes areas as system engineering, obsolescence management,



commercial-off-the-shelf (COTS) software management and technical training.

The mission entrusted to the NPC places considerable emphasis on efficient and effective performance and, furthermore, demands the implementation of a recognized quality, safety and security management system.

Reporting

The Commander NPC is responsible to Director NCSA, to whom he reports directly, for the overall effectiveness of the NPC.

Tasking

During peacetime, the ACCS Software Committee (ASC) is the tasking authority for the NPC and acts as the configuration control board for the Air C2 systems entrusted to the NPC. Additionally, the ASC is the decision-making authority for all changes to in-service Air C2 systems, using the NPC's Programme of Work as the basis for performance reporting and meeting the operational requirements of SACEUR.

During crisis, the Commander NPC will receive tasking directly from SACEUR in order to react in a timely and coordinated manner to operational needs arising from current NATO operations.



Competencies



The NPC specializes in providing system support to in-service NATO Air C2 systems and technical support to procurement organizations. To expand this capability, NATO has decided to establish the NPC, supported by NAMSA and other partners, as the System Support Centre (SSC) for the new generation of Air Command and Control Systems (ACCS) to combine traditional system support functions with logistic support.

At the NPC, military personnel and civilians work together in project teams providing efficient and effective system support for Air C2 systems including software maintenance and training.



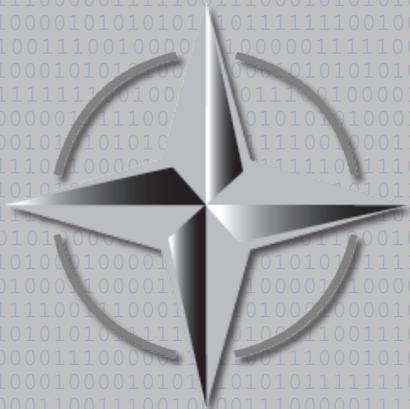
Technical Expertise

The NPC possesses a high level of technical expertise which is maintained through an effective mixture of dedicated long-serving civilian engineering staff, coupled with military experts - the latter being replaced every 3-4 years. In daily cooperation with the NPC's operational experts, NPC's engineers implement solutions to meet operational and technical challenges.



Operational Expertise

Through the rotation of military personnel, the NPC maintains a unique level of currency and deep operational experience in Air C2 matters including air planning and air tasking. This expertise is used to anticipate operational trends, and specify and design the most appropriate solutions to meet operational challenges.



Quality Management Expertise

Through the establishment of a Quality Assurance Office, the NPC maintains a professional expertise in quality management to the level required to support the constant change of personnel and the high reliability requirements of the maintained products. NPC's engineers and quality assurance experts work together to provide high quality system support in an efficient and effective manner using, where appropriate, industry best practice.

Since 2003, the NPC's Quality Management System has been certified to meet the ISO 9001 standard for system support, advisory services, training and exercise production - proving positively that the NPC has reached industry standards in fulfilling SACEUR's mission.

Safety and Security Management Expertise

The NPC's security and safety experts have built up a highly developed level of expertise in Information Security (INFOSEC) and software safety. The NPC is applying this expertise on all system support activities, thereby ensuring that NPC products and services fulfil international and NATO safety and security requirements. This is vital to fulfil the safety critical requirements of NPC products working in conjunction with civil air traffic control. Furthermore, these NPC safety and security experts act as advisors to national or NATO entities helping to develop respective standards and guidelines.

Application Software Maintenance

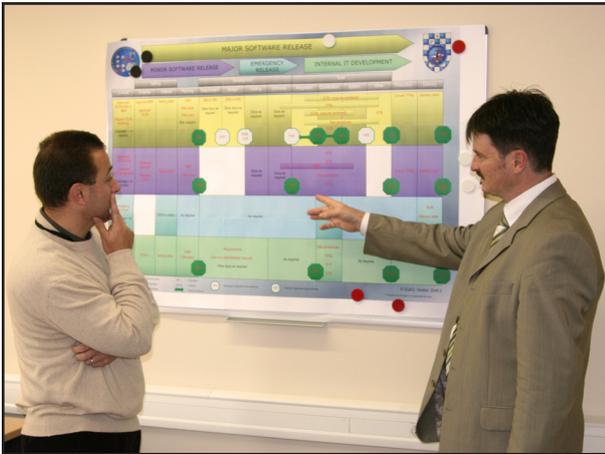
As one of its main activities, NPC performs application software maintenance for a variety of systems with different architecture, programming languages and complexity. The NPC applies industry best practice toward maintenance, and guarantees high quality of output that fully meets NATO and International safety and security standards.

COTS Software Maintenance

Application software maintained by NPC is often integrated with COTS or open source software products such as operating systems or database management systems. The NPC performs maintenance from a system perspective, thus providing the user (who will also be running the COTS applications) with the appropriate installation and user instructions.



Competencies



Hardware Engineering

NPC is also required to perform hardware engineering in order to cover all aspects of system maintenance. These activities include development of special interfaces, as well as lifecycle planning for hardware platforms for the maintained systems. NPC engineers examine and test the behaviour of Air C2 software on various hardware platforms and recommend suitable combinations to the user community.

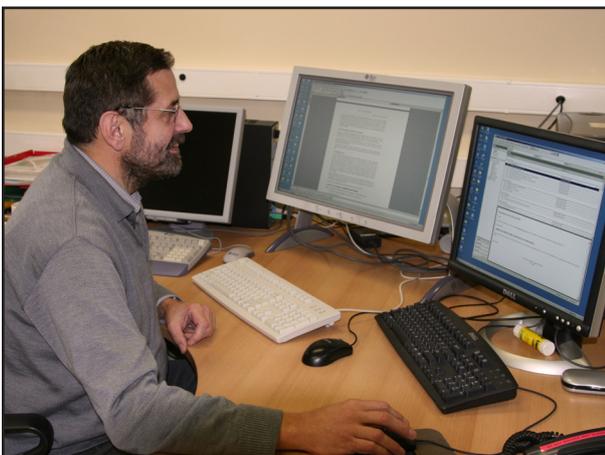
Obsolescence Management

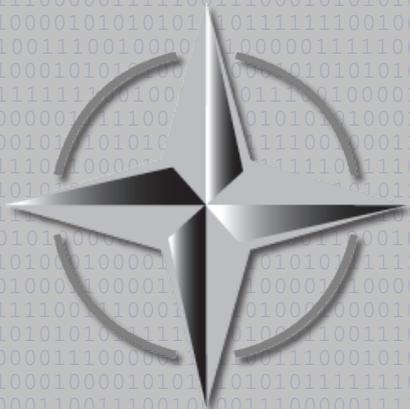
The ever-changing nature of COTS hardware and software requires the NPC to constantly evaluate the market for new releases and products. NPC evaluates these products for compatibility with the maintained systems and recommends or provides upgrades to the users.



Interoperability Engineering

One of the most complex tasks in maintaining military Air C2 systems is guaranteeing the technical and operational interoperability with other systems in the NATO Network. Hence, the NPC has established a sophisticated Interoperability Test Facility that allows testing of a variety of interfaces through a NATO-wide connectivity network. Furthermore, NPC is actively participating in all major interoperability testing thus guaranteeing a high level of operational interoperability.





User Support

The NPC provides direct user support for all of its products through its Customer Service Desk. This support is currently limited to normal daytime operations with an out-of-hours e-mail repository, but can be increased in times of crisis to provide a 24/7 capability.

Training

Training of user personnel is one of the key elements of integrated system support. The NPC provides technical training, including system administrator training, for NATO and national user communities on the Air C2 systems maintained by the NPC.

Since 2008, the NPC has hosted a significant number of training courses conducted by industry in support of the ACCS LOC1 contract. After completion of the initial training, NPC personnel will then replicate the training and provide courses to technical personnel as part of the in-service support arrangements.

Advice and Consultancy

In addition to the normal system maintenance related support, the NPC is providing additional services to NATO and the nations in order to make best use of the expertise assembled at NPC.

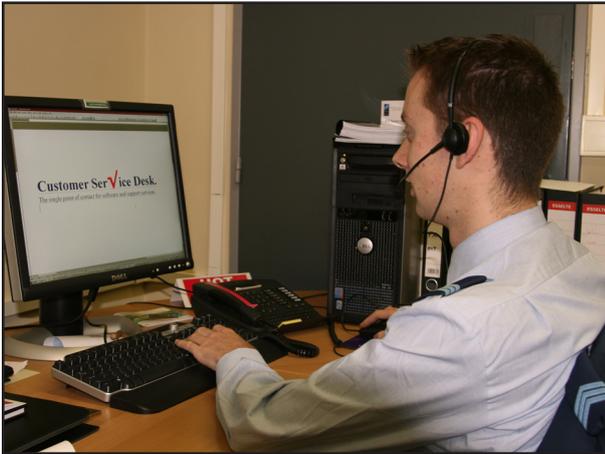
The NPC provides technical expertise to a variety of NATO working groups including Working Group 28 (WG 28) and the Allied Committee 322 (AC 322). In these and other committees NPC's maintenance experience and expertise contribute to the definition of NATO policies and regulations. The NPC's experts support nations and NATO agencies and headquarters in the procurement of Air C2 systems or other systems that interface with Air C2 systems.

Interoperability Assessment

The NPC performs independent interoperability assessment of military (national Air C2 or weapon systems) and civilian (Air Traffic Control) systems to determine the level of interoperability with the NATO Integrated Air Defence System (NATINADS) network.



Products



The NPC directly supports a variety of Air C2 systems, including systems for planning, tasking and task execution. For some of the systems, NPC executes full system maintenance; for others, NPC contributes to a shared effort with its parent organization or other organizations such as the NATO Consultation, Command and Control Agency (NC3A), NATO Maintenance and Supply Agency (NAMSA), or even national authorities.

Planning and Tasking Systems

NIRIS



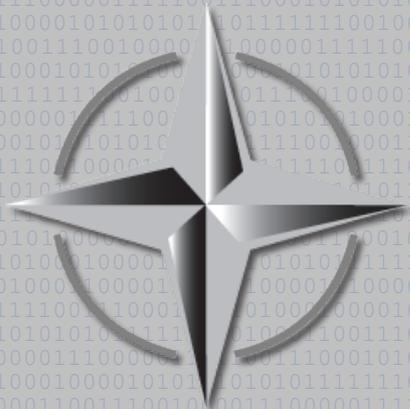
The NC3A and the NPC have developed together an information system to exploit Internet technologies for the transmission and dissemination of a Recognized Air Picture (RAP) on a NATO classified network in near real-time. This system, called Networked Interoperable Real-time Information Services (NIRIS), is mainly used to provide the NATO Combined Air Operations Centres (CAOCs) with air track data from the CRCs to compare planned and actual air operations.

This system is being further developed and maintained in a cooperative manner by the NC3A and the NPC. The NC3A is responsible for the requirement analysis, design and development, with the NPC responsible for the testing, validation, delivery, configuration management and help desk support.

ICC



The NATO-wide Integrated Command and Control Software for Air Operations (ICC) is an Integrated Command, Control,



Communications and Intelligence/Information (C3I2) environment that provides information management and decision support to NATO air operation activities during peacetime, exercise and war.

The ICC provides functional support for the most critical Air C2 functions at the Air Component Commander and CAOC levels.

The supported functionalities include planning and tasking, generation of Air Operations Directives, generation of Airspace Control Orders, joint target nomination, generation of Air Tasking Orders/Air Tasking Messages and a complete current operations capability (both offensive and defensive). The ICC provides the regional recognized air picture (RAP) to NATO Headquarters, and supports the dissemination and display of Shared Early Warning (SEW) information. Furthermore, the ICC is capable of displaying a Common Operational Picture (COP).

The ICC system was developed by NC3A and is maintained in a cooperative venture by the NC3A and the NPC. The support provided includes application software development, COTS software maintenance, hardware/software obsolescence engineering and help desk activities.

Command and Control Systems

MASE

The Multi-AEGIS Site Emulator (MASE) is a flexible, low cost, modern solution to support the execution of air operations.

To assist the MASE user in gaining and maintaining air superiority, three major functional areas are supported:

- Production of a real-time RAP based on input from active/passive sensors and civilian air traffic control.
- Identification and exchange of the RAP with other military units in a NATO-wide, real-time network.
- Battlespace Management and provision of weapons guidance solutions.

Both military and civilian radars can be connected using nearly all relevant protocols on dedicated lines or packet switched networks. The sensor data from these sources are processed using a multi radar tracker, which provides the real-time air picture.

Flight plan data from civilian or military Air Traffic Control (ATC) centres are received, correlated with the real-time air picture and displayed to the operational user to support identification



Products



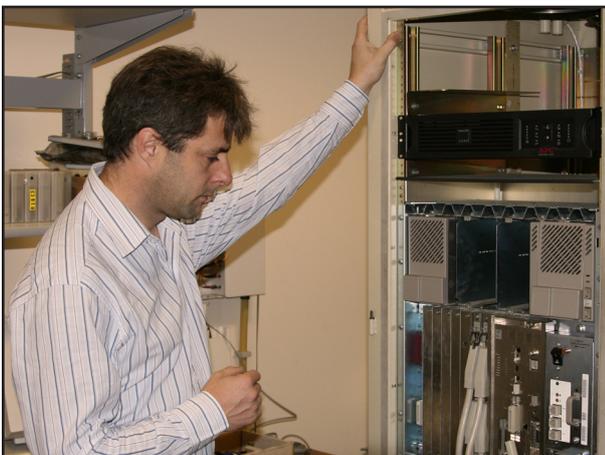
of the RAP. The Battlespace Management function assists the operational users in threat assessment and allocation of weapon resources. Threats can be engaged with either fighters or surface-to-air missile (SAM) units. When engaging with fighters, the assigned intercept controller can select between various types of guidance solutions depending on the fighters' capabilities and the prevailing tactical situation.

The NPC performs full system support for the MASE system, which is an in-house development started in 1996. For years, MASE has been recognized as the standard NATO solution for real-time C2. Today more than 60 installations in 20 NATO countries use MASE to execute Air C2 on national territory.



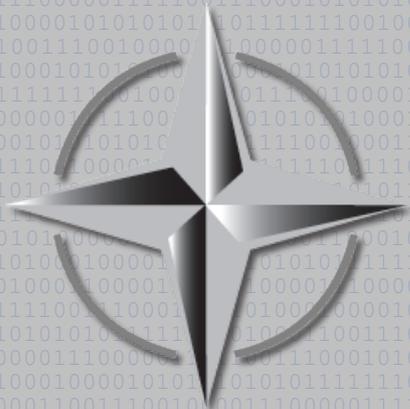
CSI

The CRC System Interface (CSI) is NATO's most comprehensive and complete data-link buffer. The CSI supports real-time data exchange between various Command and Control elements including navy vessels, NATO Airborne Early Warning (NAEW) aircrafts, headquarters and even fighter aircraft using standardized NATO data links, including ATDL1, Link 1, Link 11A, Link 11B and Link 16. In addition to its data exchange capability, CSI provides a full control capability for air defence and interceptors in making use of the tactical data links implemented.



The CSI functionality includes:

- Data transmission and forwarding on a multitude of national and NATO data links.
- Generation of a real-time recognized COP including air, surface and ground elements coupled with intelligence



information received from data links.

- GBAD control functionality on various data links including Link 16.
- Interceptor control capability on Link 16.
- Surface connectivity on Link 11A.

The CSI can be used as a stand-alone system, in combination with any CRC host system, or as an extension to the MASE system. When being used with MASE, it seamlessly integrates into the MASE Integrated Console thus allowing a CRC operator to work on a COP consisting of air, surface and ground entities reported on the various NATO data links.

The NAMSA CSI Cell, located at the NPC, provides full system support for the CSI in cooperation with NPC and other NAMSA specialists.

ASDE

The NATO requirement for a bi-directional exchange of a RAP between NATO nations and partner nations resulted in the development of the Air Situation Data Exchange (ASDE) system. This system manages the controlled exchange of air picture data by filtering the NATO air picture in such a way that it is releasable to partner nations.

The initial ASDE system was developed in cooperation with the NC3A and the NPC. Since 2007, the NPC has provided full system support for the ASDE including system installations.

ISP

The Interactive Simulation Package (ISP) is a low cost software package supporting real-time simulation for Air C2 units. The ISP is primarily CRC-oriented and integrates a modern simulation system for air exercises into a CRC system, preferably MASE equipped.

The functionality of the ISP includes scenario preparation and execution, as well as on-line, real-time scenario modification.

Normally, the ISP is used in single-site mode, supporting simulation within one CRC. However, when using Distributed Interactive Simulation (DIS) on a WAN, ISP can be operated in a multi-site mode, thus supporting exercises spanning multiple CRCs.

The system was developed and is maintained by NPC. The NPC



Products



provides system support, including application software maintenance, COTS management, technical training and help desk support.

SSSB

The Ship-Shore-Ship Buffer (SSSB) is a real-time data link buffer system supporting data exchange between naval forces, including airborne assets, and their associated air defence ground environment units. The SSSB functionality includes:

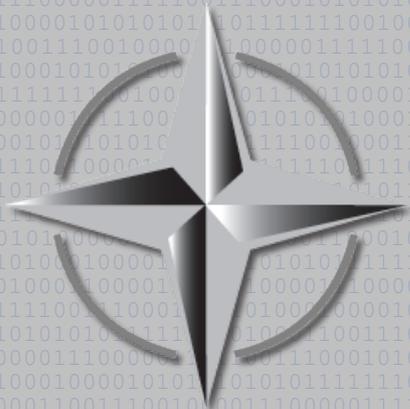
- Data transmission and forwarding on a multitude of national and NATO data links, including Link 1, Link 11, Link 11B and Link 14.
- Generation of a real-time recognized common operational picture including air, surface and sub-surface element information based on data received from links.



The SSSB has recently been modified to also provide flexible, low cost, state-of-the-art data link test environments for various data links. The NAMSA Cells located at the NPC, together with NAMSA Luxembourg, provide full system support for the SSSB.



The NPC provides administrative support to the NAMSA SSSB Cells and coordinates testing between NPC products and the SSSB.



IT Infrastructure Product

NISP

The NPC Integrated Solaris™ Platform (NISP) is the NATO solution for a secure Sun Solaris™ installation on military systems. It provides a large variety of functionalities including:

- Tailoring and adaptation of the Solaris operating system to minimize system vulnerability and implement a high level of security.
- Provision of a standardized operating system platform for a variety of military applications, including ICC, MASE and ISP.
- Provision of a simplified, standardized user interface for server and workstation installation and maintenance.
- Standardized installation of application software and common sharing of user and application data.

NISP was developed and is maintained by the NPC. The support includes training for system administrators and help desk support.

Integrated Product

ACCS

The Air Command and Control System (ACCS), currently under procurement by NACMA, will be the first fully integrated system in NATO, enabling planning, automatic tasking, battlespace management and task execution for all types of air operations.

The system features a centralized command and a decentralized execution capability, able to satisfy the requirements set by NATO commanders for the planning and execution of air operations.

The ACCS entities can be built as static or deployable components, depending on the needs of the operational commanders. ACCS provides interfaces to a multitude of different NATO, national and civilian entities enabling the collection of data from many different sources and using that data for generating a recognized COP.

Furthermore, the ACCS supports operations in a networked environment guaranteeing full interoperability with other systems within an area of operations.

The ACCS is currently under procurement by the NATO Air Command and Control System Management Agency (NACMA)



Products



and the first sites will be delivered to NATO in 2012. From the outset of the ACCS programme, NPC experts have been actively involved in the ongoing acquisition process for ACCS and have provided technical support to the NACMA in all phases of the project thus far.

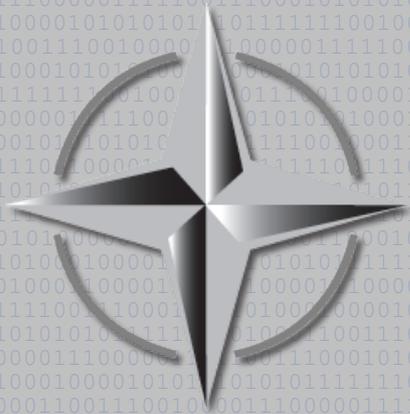
The ACCS System Test and Validation Facility (STVF) was installed at the NPC in 2005 and upgraded in 2010. The STVF consists of a high fidelity representation of the equipment, software, networks and interfaces that will be available at operational locations, coupled with an appropriate engineering environment to support future maintenance.



In 2006, NATO authorities expanded NPC's role as software maintainer for ACCS to cover all aspects of system support.

In 2008, NATO authorities further tasked the NPC to establish a System Support Centre for ACCS LOC1 together with NAMSA and other partner organizations.





CWIX 2010

The Coalition Warrior Interoperability eXercise (CWIX) is an annual NATO interoperability event sponsored by the Allied Command Transformation (ACT), with the participation of several NATO Commands, Agencies and Nations. Its objectives are to validate and improve interoperability amongst NATO and national C4ISR systems and to investigate new and emerging technologies.

NPC participation in CWIX 2010 focused on showing ACCS as a “single, integrated and coherent” system, producing the “official” Air Scenario (ORBAT/ATO/ACO), providing a lead Air C2 system, producing and distributing the RAP, the ATO and the ACO on a daily basis, through different scenarios.

This was the first CWIX event for which NPC had the lead and, with very limited support from the Contractor (ACSI), was able to deploy an ACCS system to a NATO interoperability exercise.

NPC’s role in CWIX 2010 spanned from support to NACMA in planning, to full system and scenario preparation and technical and operational execution activities, and resulted in successful participation of an ACCS system in all CWIX activities.

Viking Discovery 2010

Operation Viking Discovery 2010 was conducted in April 2010, in Denmark, to evaluate the capability of the ACCS DARS in its current state to deploy and connect to mobile radars and data links in the area of operation. NPC supported the setup of the DARS and provided a specially developed capability (ACCS Sensor Integration Module (ASIM)) to allow interfacing of the Danish mobile radar TPS 77 with the DARS. The exercise was useful to determine the current DARS capabilities. The deployment of a first version of ASIM was a success as it allowed flawless integration of the TPS 77 into the DARS. Based on these results, ASIM is evaluated by NATO as the standard solution for integration of legacy sensors into ACCS.

Convoy Tracking Capability for ISAF

In 2010, NPC and NC3A, together with NCSA, fielded the urgently required convoy tracking capability as an upgrade to the NIRIS software. This new capability is successfully used in ISAF to plan, control and manage convoys and significantly contributes to situation awareness and battle management.



Recent Achievements and Future Plans

Based on good operational experience, it is planned to integrate this function into the core of all Air C2 systems.

Tactical Missile Defence

Within the scope of the Active Layered Theatre Missile Defence (TMD), NPC, in collaboration with NC3A, has released a TMD Planning Tool (PlaTo) as an additional module to ICC. While leveraging ICC capabilities, this constitutes an initial step towards an interim TMD capability, allowing ACT and ACO to refine the TMD standard operating procedures and to familiarize operational personnel with the subject.

Replacement of Portuguese Air C2 System

Portugal currently uses the POACCS system for air command and control, which experiences hardware obsolescence. A mitigation plan foresees the replacement in the very near future. As ACCS is not yet available, other interim solutions need to be investigated. NPC, jointly with NAMSA and SHAPE, supports Portugal in the evaluation of an interim solution by providing technical expertise and installation of a prototype system based on NATO standardized solutions (MASE, CSI).

Should Portugal decide on the use of the NATO standardized solution, NPC, together with NAMSA and SHAPE, will further perform a full site installation, training and testing as required to sustain the Portuguese air C2 capability.

Information Exchange Gateway

In 2004, NPC developed the first NATO Information Exchange Gateway (IEG) that allowed connecting NATO CRCs with North Atlantic Council approved Partnership Nations using the tactical data link format Link 1. In 2010, NPC started a project to upgrade this capability to allow support operations with IEG between NATO systems of different classification levels, thus providing full IEG functionality between systems of varying levels of security.

State of the Art Real-time C2 GUI

NPC is developing a new graphical user interface (GUI) for real-time Air C2 systems as a result of obsolescence of the MASE console. This system implements modern GUI concepts and prepares the operational user for the user interface fielded with the ACCS system. The architecture and design are based on open standards and allow reuse of this component for other systems. The solution makes use of existing COTS software and at the same time, minimizing license costs through a central NPC arrangement.



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This brochure has been designed to provide interested audiences with a concise introduction to the NPC.
Further information on the NPC can be found on the NPC web site at www.npc.nato.int