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AUTOMATED DATA PROCESSING (ADP) SYSTEMS USED BY NCAGS ORGANISATION (NCAGSORG)

ABSTRACT

The NCAGSORG supports two very important 'sea-goers', merchant shipping and naval forces. Support and deconfliction is achievable through identification of potential threat from the one hand and monitoring of the shipping traffic on Sea Lines of Communications (SLOCs) from the other. SO, it becomes crucial to gain and sustain a situational (operational) shipping picture within the Area of Interest (AOI). To achieve this goal the NCAGSORG is to use the most recently developed computer aided automated data processing systems (ADP) such as: NAMESIS, NSCIMA and BRITE. This article provides a short overview of the structure and capabilities of NCAGS ADP systems.

INTRODUCTION

The main task of Naval Cooperation and Guidance for Shipping (NCAGS) is to minimise interference between military operations and merchant ships movements. Deconfliction should aim to keep merchant ships clear of military operations by persuading masters to comply with NCAGS guidance and recommendations. It should be done by identification of potential interference between military and merchant ships such as separation zones, traffic lanes, fishing areas, chokepoints, main shipping routes etc. It means that NCAGS is, like most sea-going businesses or naval operations, a decision-making process¹ based on the recognised shipping

¹ See: ATP 2(B), Vol. I, *Naval Co-operation and Guidance for Shipping Manual (NCAGS)*, May 2004, Chap. 1.

information and a traffic picture. Nowadays, due to shipping data complexity and its commercial sensitivity the only way of managing such important information is use of Automated Data Processing (ADP) software.

There are three available systems:

- NAMESIS (Naval Merchant Shipping Information System);
- NSCIMA (NATO Shipping Centre Information Management Application);
- BRITE (Baseline for Rapid Iterative Transformational Experimentation).

NAMESIS

NAMESIS is a computer information management program designed to run on a standard commercially available equipment, using commercially available software, to help Command, manage the substantial volume of information generated in any level of NCAGS Operations. It enables NCAGSORG personnel to collate, audit and present the information gained from signal messages, electronic sources, briefing officers' reports, and conversations with Merchant Ships' masters². This information can then be disseminated to all elements of NCAGSORG. It is designed to be flexible enough to be used in a whole range of situations. This might be a two man team reporting shipping movements back to NATO Shipping Centre (NSC)³ at Northwood HQ from a hotel room or a full blown deployment during a major NATO exercise. It is designed to be rapidly deployed to any theatre, at any level. All NATO laptops are deployed with the same software installed. All that has to be done is to tell NAMESIS if it is to be used as a SCP, NU, or in a HQ. It is then very easy to switch location as the situation demands. If the headquarters computer fails for any reason, it takes a matter of seconds to reconfigure a laptop in a SCP to take on the HQ role⁴. This is a simple task because all locations see the whole picture (Figure 1).

As this system is designed to provide a database management, reporting and communications tool at all levels of NCAGS activity, it has the ability to process and store unlimited number of ships, routes, areas, ports, NCAGS locations and incidents data cards.

² See: NAMESIS User Manual.

³ A permanent element of NCAGSORG established by Military Decision 376/1.

⁴ www.mcom.mod.uk/maritime/NAMESIS/index.cfm – 14.12.2006.

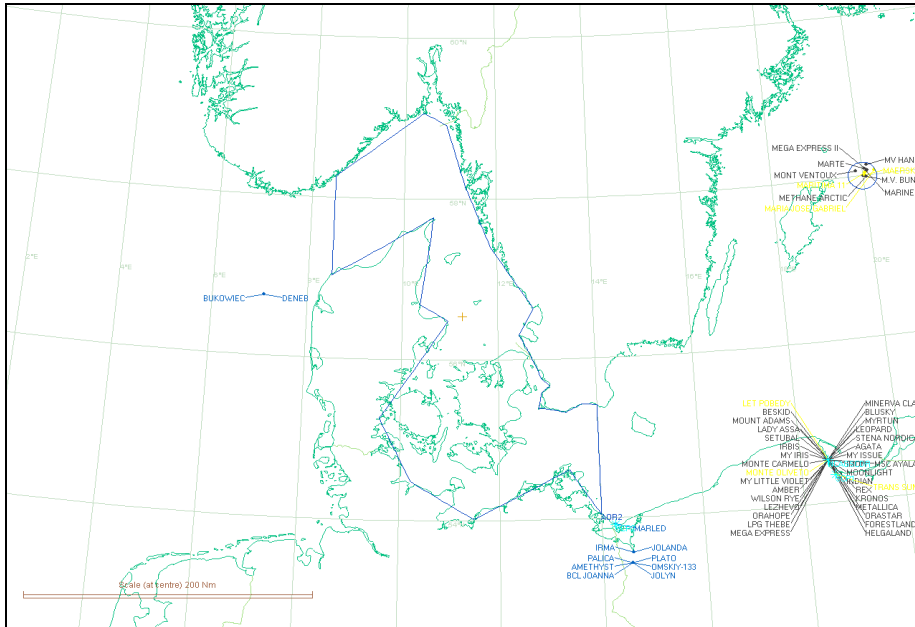


Fig. 1. A snapshot from NAMESIS

Source: NCAGS Cell at the Naval Operations Centre.

There are three main functional areas within the system:

- Database;
- Reporting;
- Communication.

The database is compatible with Microsoft (MS) Access, but is not required to run NAMESIS, since its drivers are installed with the operating system as part of Open Data Base Connectivity (ODBC). There are three elements corresponding to the three database files to which NAMESIS connects:

- Fixed (Official) Information – ports, countries and ship types;
- Operation Specific Information – NCAGS Commander (NCAGSCDR) title and exercise or operation identifier, areas (Area Of Operations – AOO, Shipping Risk Area – SRA, Mine Danger Areas – MDAs, User Defined Areas – UDAs, NCAGS Units – NUs, SCPs, and HQs Data Cards), routes (generic, standard, and Q routes);
- Incidents – collisions, harassments, acts of piracy;
- Ships – data relating to voyages occurring during the operations.

The data cards stored in the database can be accessed as individual item at any time. Data can also be used to generate a series of reports, either directly from NAMESIS, or using MS Access report formats. This information is presented in a format that is more useful for the NCAGS staff and NAMESIS management than the raw data. The reports include:

- list of all ships on the database;
- list of ships at sea at any time, based on Dead Reckoning (DR) positions;
- list of ships in all or specific ports;
- list of ships in a given area;
- list of ships entering a given area;
- list of ships leaving a given area.

NAMESIS offers a number of communications options to allow the rapid dissemination of data to all parties requiring that information. These are currently:

- by email attachment;
- by fax attachment;
- by direct dial;
- by posting to, and downloading from, a website.

Email attachment is the preferred option at present, but there are times when this option is not available, in which case the NAMESIS manager must decide upon the appropriate alternative. It may happen that HQ will communicate with each SCP using a different method. The important thing is that data is passed rapidly in both directions, as command requires current and accurate information upon which to base informed decisions. Moreover, it needs to be synchronized to have the same data by all parties involved. To do so, they have to update all copies of the database by sending data-sync file to each other and uploading these files in all systems used. This process will be done by overwriting records to more recent one or deleting old one.

NSCIMA

NSC using NAMESIS has recognized that a significant source of information regarding the requisite merchant ships information may be available from commercial sources, particularly from shipping industry. It is, therefore, the next intent of

the NSC to work with the commercial sector, on a quid-pro-quo basis, to exchange shipping related information of mutual interest⁵.

NSCIMA has been implemented as a specialization of the BRITE capabilities. It uses updated versions of a number of the existing Maritime Command, Communication and Information System' Web Information System Environment (MCCIS WISE) based objects plus new ones.

The new objects are:

- Routes – used to create and store reference information predefined routes;
- Places – used to create and store data of the location of otherwise unknown places;
- Lloyds – provides access to a read-only local copy of information purchased from Lloyds;
- Merchant ships – provides access to merchant ship's data.

The merchant ship is the central object of this system. Its capability allows users to route merchant ships. Routing merchant ships involves obtaining information about the planned route, current position and destination, and then assigning an estimated route to that vessel. The initial information is currently entered manually, but it is anticipated that it can be automated from Format ALFA⁶ messages and Automated Identification System (AIS)⁷ data feeds. The application allows the user to manipulate the route by assigning a predefined route, copying a previous route or by manually entering positions or clicking on a map.

The application then calculates the estimated time on each of the legs of the route, and estimated times of arrival and departure. The user will then have an idea of which vessels are expected in certain areas at critical times. The merchant ships application can also be used to store information on the vessels, for example comments, links, images. It is also possible to add actual position reports if available.

All of the geographic information is available to the map application as data layers so various views can be created, such as:

- Assigned routes;
- Position reports;
- Places;

⁵ <http://tide.act.nato.int/mediawiki/index.php/NSCIMA> – 19.03.2007.

⁶ See: ATP 2(B), Vol. I, Annex A, Appendix 1 to Tool 108.

⁷ All merchant ships should be fitted with AIS transponders in accordance with new IMO regulations.

- Predefined routes;
- Ports.

NSCIMA has been the basis used to develop Maritime Situational Awareness (MSA) tools.

BRITE

It is an experimentation framework which allows for the rapid implementation of new ideas and capabilities to support experimentation. It fits into the Technology for Information, Decision and Execution superiority (TIDE) concept. The purpose of this initiative is to rapidly improve the IT capabilities of the Alliance by reusing existing systems and by steering current and future projects towards greater openness and cooperation in a common framework⁸.

The experimentation capability development activity is built around a service Oriented Architecture (SOA) framework which separates information, presentation, interoperability and business logic. Each of these is implemented using a modular architecture which allows application components to be added to them.

The current BRITE Experimentation Base components are:

- WISE 2.0 used for visualization;
- SMART for business services;
- WISDOM for information;
- CLEVER for interoperability;
- OpenGis compliant Web Map Server (WMS) implementations;
- Optional boundary proxying service.

Some of mentioned above components of the BRITE system are shown on Figure 2.

BRITE can be used in isolation on a network as it provides a complete capability from the acquisition of information to the presentation and interaction with the user. But, the real benefit of BRITE comes when it is installed on a network with other TIDE compatible systems. TIDE compatible systems will discover each other

⁸ See: Allied Command Transformation (ACT) – TIDEPEDIA Webpage.

on the network and work together to provide a richer information environment. The ability to discover, acquire and exploit this information is the purpose of BRITE⁹.

The use cases are:

- Joint Situational Awareness Sharing Tool (JSAST);
- Maritime Situational Awareness (MSA);
- Common Operational Picture (COP).

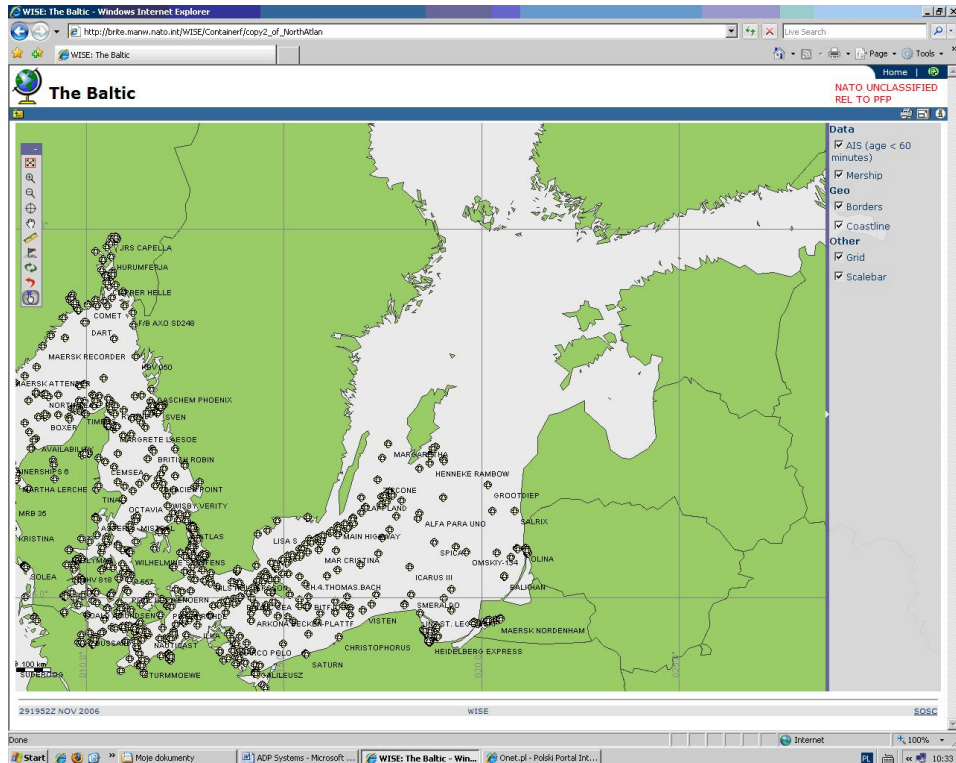


Fig. 2. A snapshot from BRITE

Source: NCAGS Cell at the Naval Operations Centre.

The JSATS is an enhanced BRITE capability, enabling increased Situational Awareness sharing between the Deployable Joint Task Force (DJTF) and Component Commands¹⁰.

⁹ <http://tide.act.nato.int/mediawiki/index.php/BRITE> – 22.03.2007.

¹⁰ Air, Land and Maritime.

The general requirements are:

- The tool should be able to display COP embedded in WISE;
- The tool should enable the users to display different operational pictures (different settings) in different WISE pages;
- The users should be able to select which tracks to show, what geographical features to show, the magnification etc.;
- The tool should have ability to group units according to the Order of Battle (ORBAT) and magnification chosen;
- The user should be able to apply a custom layer on top of the server-fed operational picture;
- There should be ability to create in this custom layer, similar to those in MS Office;
- The objects created with the above drawing tool should have associated data fields;
- The main resolution will be at the Operational level;
- The tool should have an option to display satellite imagery/air photos at the request of the user;
- The tool should provide simple and intuitive management tools for the users;
- Weather information display;
- Friendly Force Tracking;
- Possibility of manually inserting tracks into the track database;
- Ability to show specialised units/tracks and associated functional areas.

There are some detailed additional requirements for picture representation to be used in the near future to have a better situational overview, but currently not available, because of system trials and revisions.

CONCLUSION

In the post 09/11 world there is out of discussion that the NATO Naval Forces (especially NATO Response Force – NRF) should maintain a capacity of building and managing the recognised shipping picture. It automatically becomes one of the most important tasks for the NCAGSORG.

As far as computer aid and automatisisation of high volume data is concerned, the only way allows to manage it is ADP system. The NCAGSORG is getting more and more experinces in use of NCAGS ADP systems. NCAGS ADP system such as NAMESIS, NSCIMA and BRITE are being developed continously in order to produce more accurate and complex picture.

This way understood precise shipping picture is the best tool for the Naval Forces' Commanders in the decission making process, benefiting both, the shipping community and the Navy.

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STRESZCZENIE

Organizacja NCAGS wspiera dwóch najważniejszych użytkowników morza: żeglugę oraz siły morskie. Wsparcie i dekonfliktacja z jednej strony są osiągalne w drodze identyfikacji potencjalnych zagrożeń, z drugiej – dzięki monitoringowi ruchu żeglugowego na głównych szlakach komunikacyjnych. W związku z tym sprawą kluczowej wagi staje się pozyskanie i utrzymanie obrazu żeglugi w obszarze operacyjnego zainteresowania dowódcy sił morskich. Aby wykonać

to zadanie, organizacja NCAGS musi używać, wciąż rozwijanych, systemów komputerowego przetwarzania danych, takich jak NAMESIS, NSCIMA i BRITE. Artykuł przedstawia struktury i możliwości tych systemów.

Recenzent prof. dr hab. Andrzej Makowski