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**Report of the STACTIC Technical
Working Group on Communications
30 June 2000
Dartmouth, N.S., Canada**

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Report of the STACTIC Technical Working Group on Communications

(FC Doc. 00/5)

30 June 2000

Dartmouth, N.S., Canada

1. Opening of the Meeting

The meeting was opened by the Executive Secretary at 1010 on 30 June. The Contracting Parties represented were Canada, Denmark (In respect of Greenland and the Faroe Islands), Estonia, the European Union (EU), Iceland, Japan and Russia. (Annex 1)

2. Election of Chairman

Mr. F. Wieland (EU) was elected by consensus as Chairman

3. Appointment of Rapporteur

Dr. K. Patterson (EU) was appointed Rapporteur

4. Adoption of the Agenda

After discussion the Agenda at Annex 2 was adopted.

5. Consideration of a More Effective Hail System

5.1 Background

The Executive Secretary briefly reviewed the history of the NAFO hail system noting that after an extended consultation process, the existing hail report format had been agreed on in 1991 and incorporated in the Conservation and Enforcement Measures. In 1998 standardized formats for the electronic transmission of hails and satellite tracking reports for reporting from satellite systems were agreed for implementation in the NAFO Regulatory Area. At present, however, few Contracting Parties provide information in this latter format: principally Iceland and Norway. Other Contracting Parties still use previous hail system format.

The hail system was reported to be working effectively, but is a manual system based on old-fashioned technology which is causing an excessive workload for the NAFO Secretariat. An automated, internet-based system would be preferred, and a proposal was prepared (Annex 3). The Secretariat was aware that other projects and proposals from European users exist. Overall however, the Secretariat stresses its desire to move to a modern automated system to ensure accuracy of transmission, appropriate data storage and good handling of the data.

Responding to this review, the Chair asked for comments as to whether the Working Group could make a decision on this issue. The Danish representative was of the opinion that it could only prepare a proposal for the NAFO annual meeting. The EU representative thought that there was sufficient technical expertise present at the Working Group to make firm, well-founded proposals, and pointed out that an appropriate technology and associated systems already exist and thought that there was no need to develop new systems.

5.2. Presentation of Working Documents

Following a procedural discussion it was concluded that issues of communication, security, and compliance could be presented together and then discussed together, as the issues were so interdependent. The Working Group proceeded to presentations of working papers.

Working Paper 00/1 (Annex 3) was presented by a representative of the company "Software Kinetics" This proposal involves communication of encrypted data (using a Pretty Good Privacy (PGP) protocol) over the internet, protecting the content and origin of hail messages. A firewall would also be used for the Secretariat site. An MS-Access database would be designed to store and access the data.

The claimed advantages of this system were :

- The general availability of Internet access
- The low cost of communication
- The minimal dependence upon particular technologies as no proprietary protocols are used.

The representative from Denmark asked whether X25 and X400 communication protocols were considered. The representative answered that X25 was not in common use in North America and has higher costs, and SMTP was thought to provide all the necessary facilities for the proposal.

The EU representative asked whether the analysis of requirements was based on user requirements or on current practices. The representative answered that the starting point for the proposal was the existing system at the NAFO Secretariat, although it was understood that a variety of systems are in current use. None of the systems proposed required more than a properly-configured PC. The PGP programme is freely available. The generation of originating messages is possible from any modern hardware platform.

The EU representative further asked whether existing fishing fleet has many vessels using systems based on X25 and North Atlantic Format, questioned the need to use an internet based system, and asked how control of information into and out of the Secretariat would be managed.

A response was made by Canada to the effect that the internet is now a very common, widely used communication medium which is still suitable for secure communications (and is currently used by banks).

The Chair also questioned whether security considerations were adequately addressed, considering that the internet is a public communications medium. The Software Kinetics representative considered that PGP systems based on public and private keys provides sufficient and appropriate security. The concept of secure protocols based on public and private keys was explained, which affords:

- Privacy of transmission
- Security of origin
- Security of access (message originators cannot read each others' messages, whilst the authorised message recipients alone can read messages).

Denmark accepted that secure communications are possible in the internet environment. However, it was stressed that that a Vessel Monitoring System (VMS) already exists, based on X25 and X400 protocols, and that the system works already. There was no wish to introduce a third protocol, and the X25 could be retained for NAFO use. VMS provides close monitoring of

fishermen, and so confidentiality is an extremely sensitive issue. Denmark stressed its preference for a system based on already-existing protocols on secured lines. The Icelandic and EU representatives concurred.

Canada also expressed concern about asking vessels to provide messages in different formats. It was noted that the NAFO/Software Kinetics proposal involves separation of formatting issues from the issues of communication. One possibility was that flexibility of transmission methods between fishing vessel and Contracting Party could be maintained, while maintaining standardisation of transmission of reports between Contracting Parties and the NAFO Secretariat, based on internet protocols. This proposal would not affect the transmission of data from vessels to Contracting Parties. The format of the records of data transmitted to NAFO would be standardised in text format, regardless of mode of transmission between the vessels and the Contracting Parties' administrations. This would require no change to current vessel procedures.

The Executive Secretary briefly presented a general overview of the current NAFO procedures of receiving reports (by facs., e-mail, and new file transfer protocol from EU) at the NAFO Secretariat. Incoming reports are processed manually. Once daily, the NAFO secretariat compiles and circulates reports to parties with inspection presence (by e-mail to Canada, by CUTE FTP to EU (lately, temporary arrangements due to Y2K problems with X25)). Most vessels in NAFO area are EU vessels and so most data is presently sent by internet. It was stressed that was an important decision that the hail system (used for enforcement purposes) should be managed by an impartial party: the NAFO Secretariat. NAFO system is however old fashioned, too labour intensive and should be updated to use modern systems.

The EU presented Working Paper 00/3 (Annex 4). The EU paper indicates changes necessary to update regulations once the Vessel Management System becomes fully operational, and includes a list of changes to part III.E of NAFO Conservation and Enforcement Measures which will be required on replacing the present hail system with a satellite-based system. The system proposed is based on the existing North Atlantic VMS. A 6hr reporting frequency is proposed, as used in East Atlantic, and includes conditions for the security and storage of data. The transition would be simple, as is based on introducing technology now already used by the fleets. Fisheries Monitoring Centres (FMCs) of Contracting Parties are already established to use this system. This format is also being introduced in the South Atlantic, and the EU is very keen to have a unified system for the whole Atlantic for simplicity. EU stated its intention that Working Paper 00/3 will form the basis of a formal proposal at the Annual Meeting.

The representative of Denmark (in respect of Faroe Islands and Greenland) thought the EU paper was a very good starting point for discussions as it reflects Denmark's position. The NAFO system should be identical to the NEAFC system.

For the record, the Norwegian Representative noted (in comments to the draft report) that the Norwegian position concurs with the views expressed by EU and also by Denmark (on behalf of Greenland and the Faroe Islands), i.e. as EU points out according to the last paragraph on page 3 "... that an appropriate technology and associated systems already exist and thought there was no need to develop new systems".

Canada considered that the EU paper was comprehensive and had no substantive objections; however concerns were raised about some requirements. It was thought that the EU paper is not consistent with present hail system. Item 1c presently required hails to be transmitted prior to movement. Canada was concerned at the proposed change to real-time reporting to anticipatory reporting (where an intention to move is reported) in the present hail systems. Canada requires time (to clarify its position on this topic). Further concerns were:

- a) The length of time during which the vessel may fish without the satellite tracking operating
- b) The extension to "not later than 24-hr" in reporting requirement.
- c) Referring to vessels fishing in 3L, it is asked whether the specific hail requirement (Part I.K.10 of Conservation and Enforcement Measures) would be maintained.

The Japanese representative questioned why the EU proposal was to delete the whole of paragraph 4 of Part III E from the Conservation and Enforcement Measures. The EU representative responded that when VMS is in operation, certain hail messages and parts of hail messages will become redundant, however, there will still remain a need for the hail system in the context of entry and exit messages.

The Japanese representative asked for clarification of the "real-time" concept, in the context of the 24hr maximum reporting requirement. Also, the difficulty of providing data within 24hrs over a weekend was pointed out. The EU representative responded that under normal circumstances a vessel would provide its location automatically every 6hrs. If a breakdown occurred, a manual response would be required by the Fisheries Monitoring Centre (FMC) of the Contracting Party. The 24hr limit should be viewed in that context and not in the context of normal operations. The Icelandic representative stated that in the NEAFC automated VMS system, position reports are transmitted immediately (within about 2 mins.). However, a longer (e.g. 24hr) period is allowed in *the event of mechanical failure and the case that data need to be sent manually*. "Real-time" reports are reports sent with delay incurred only due to the communications link (ie no significant delay).

Canada agreed with EU focus on automating data transmission, but urged care in defining minimum delays to avoid deterioration of the timeliness of the hail reports. Excessive delays in reporting rendered the hail information nearly useless for control purposes. The Icelandic representative stressed that the NEAFC fully automatic system was already operative and asked NAFO to review this system attentively. A brief presentation of the protocols used in the system was made.

The EU representative noted that the Secretariat could develop a facility to receive reports in several different protocol. Denmark concurred, and urged the Secretariat to explore more widely the availability of commercial communications software. It was questioned whether the Secretariat has appropriate finances. The Chair noted that about CAN \$ 35 000 has been allocated to this topic. Denmark considered a much higher budget would be required, possibly up to CAN \$150 000. A trained computer expert such as a database administrator working part time for the Secretariat could be required to maintain the system at the NAFO Secretariat.

5.3. Conclusions

A consensus was reached that an automation of the hail system would be required. A distinction was made between data flows:

- from vessel to Contracting Party
- from Contracting Party to NAFO Secretariat
- from NAFO Secretariat to Contracting Parties with inspection presence:

It remained open whether all three data streams required automating.

There were different views, focussing on the relative desirability of X-25 based systems or of internet SMTP. The group concluded that further reflection on the issues was needed, but it was agreed that:

- Confidential treatment of data is an issue of main importance. In particular, Japan noted that 6hr reporting is more detailed than existing requirements and may involve greater confidentiality requirements. Japan also required further discussion of the issue of confidentiality of fishing positions, both with respect of fishing vessels and of the NAFO Secretariat. Denmark noted further concern about security and confidentiality and will make a proposal on this topic in due course.
- The NAFO Secretariat is to be asked to review the existing NEAFC communications and data distribution system with a view to its possible applicability in the NAFO regulatory area. This could be aided by a visit by the NAFO Secretariat to the NEAFC Secretariat to review the operation of the existing NEAFC system.
- A cost-benefit evaluation of the various systems might be necessary and should be raised in STACTIC at the 2000 NAFO Annual Meeting, where operational recommendations could be made to the Fisheries Commission.

Further proposals and contributions on this issue could be made at the Annual meeting.

6. Other Matters

No other matters were raised.

7. Adjournment of the Meeting

The Meeting was adjourned at 1255 on 30 June 2000.

Annex 1. List of Participants

CANADA

Head of Delegation

T. Blanchard, Chief, NAFO Unit, Fisheries Management, Dept. of Fisheries and Oceans, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709 772 0928 - Fax: +709 772 5983 - E-mail: blanchardt@dfo-mpo.gc.ca

Advisers

R. Cosh, Dept. of Fisheries and Oceans, Stn. 13W099, 200 Kent Street, Ottawa, Ontario K1A 0E6
Phone: +613 993 2055 - Fax +613 990- ; E-mail: coshb@dfo-mpo.gc.ca

L. Penney, Fishery Officer, Fisheries Management, Dept. of Fisheries and Oceans, P. O. Box 5667, St. John's, Newfoundland A1C 5X1

Phone: +709 772 3630 - Fax: +709 772 5983 - E-mail: penneyl@dfo-mpo.gc.ca

P-A. Richer, Senior Program Officer, Enforcement Br., Conservation & Protection Directorate, 13th Floor -13W111, 200 Kent St., Ottawa, Ontario K1A 0E6

Phone: +613 990 0094 - Fax: +613 941 2718 - E-mail: richerp@dfo-mpo.gc.ca

DENMARK (IN RESPECT OF THE FAROE ISLANDS & GREENLAND)

Head of Delegation

M. T. Nedergaard, Fiskerilicensinspektor, Head of Unit, Gronlands Fiskerilicenskontrol, Postbox 501, DK-3900 Nuuk, Greenland

Phone: +299 345377 - Fax +299 323235 - E-mail: GFLK@gh.gl

ESTONIA

Head of Delegation

A. Soome, Ministry of the Environment, Fisheries Department, Marja Str. 4d, 10617 Tallinn

Phone: +372 6112987 Fax: +372 6567599 E-mail: ains@klab.envir.ee

EUROPEAN UNION

Head of Delegation

F. Wieland, Deputy Head of Unit, International Fisheries Organizations and Fisheries Agreements; Baltic, North Atlantic and North Pacific, European Commission, Directorate General for Fisheries, Rue de-la Loi Wetstraat 200, B-1049 Brussels, Belgium

Phone: +32 2 296 3205 - Fax: +32 2 299 4802 -E-mail: Friedrich.Wieland@cec.eu.int

Advisers

K. Patterson, European Commission, Directorate General for Fisheries, Rue de la Loi 200, B-1049 Brussels, Belgium

Phone: + 32 2 299 2179 - Fax: +32 2 295 5621 - E-mail: kenneth.patterson@cec.eu.int

B. O'Shea, European Commission, Directorate General for Fisheries, 200 Rue Joseph II 99, Rm 1/27, B-1049, Brussels, Belgium

Phone: +32 2 296 6748 - Fax: +32 2 296 2338 - E-mail: Brendan.O'Shea@DG14.be

Y. Auffret, Ministere de l'Agriculture et de la Peche, Direction des Peches Maritimes, 3 Place de Fontenoy, 75007 Paris, France

Phone: +33 1 49558245 - Fax: +33 1 49558200 - E-mail: yves.auffret@agriculture.gouv.fr

H. Pott, Bundesministerium für Ernährung, Landwirtschaft und Forsten, Rochusstr. 1, D-53125 Bonn, Germany
Phone: +49 228 529 4124 - Fax: +49 228 529 4410 - E-mail: hermann.pott@bml.bund.de
J. Del Hierro, Subdirección General de Inspección Pesquera, Secretaría General de Pesca Marítima,
c/ Castellana 112, Madrid, Spain
Phone: +34 91 3471847 - Fax: +34 91 3471512

ICELAND

Head of Delegation

G. Geirsson, Icelandic Coast Guard, P. O. Box 7120, 127 Reykjavik
Phone: +354 511 2222 - Fax: +354 511 2244 - E-mail: gylfi@lhg.is

Adviser

G. Hannesson, Directorate of Fisheries, Ingilfsstraeti 1, 101 Reykjavik
Phone: +354 569 7900 - Fax: +354 569 7991 - E-mail: greta@hafro.is

JAPAN

Head of Delegation

Y. Sakamoto, Deputy Director, Far Seas Fisheries Div., Resources Management Dept., Fisheries Agency,
Government of Japan, 1-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100-8907
Phone: +81 33 591 6582 - Fax: +81 33 591 5824

Adviser

N. Takagi, Director Executive Secretary, Japan Deep Sea Trawlers Association, Ogawacho-Yasuda Bldg.,
6 Kanda-Ogawacho, 3-Chome, Chiyoda-ku, Tokyo 101-0052
Phone: +81 33 291 8508 - Fax: +81 33 233 3267 - E-mail: nittoro@mx3.mesh.ne.jp

RUSSIA

Head of Delegation

A. Okhanov, Representative of the Russian Federation in Canada on Fisheries, 47 Oceanview Dr., Bedford,
Nova Scotia, Canada B4A 4C4
Phone: +902 832 9225 - Fax: +902 832 9608

NAFO SECRETARIAT

L. I. Chepel, Executive Secretary
G. M. Moulton, Statistical /Conservation Measures Officer
B. Cruikshank, Senior Secretary
F. E. Perry, Desktop Publishing/Documents Clerk

Annex 2. Agenda

1. Opening of Meeting
2. Election of Chairman
3. Appointment of Rapporteur
4. Adoption of Agenda
5. Consideration of a more effective hail system or a satellite-based vessel monitoring system
 - (a) Background Summary
 - (b) appropriate means on communication of reports
 - (c) security and confidentiality of reports
 - (d) means to ensure compliance with applicable measures
6. Other matters
7. Adjournment

**Annex 3. Presentation for an automated NAFO hail message processing
system as proposed by Software Kinetics for use in providing a
fully automated hail system**
(Technical W.G. Working Paper 00/1)

1. OVERVIEW

The Northwest Atlantic Fisheries Organization (NAFO) Secretariat receives reports (Hail Messages) on fishing vessel activities within the NAFO Convention Area from the NAFO Member Nations. The Hail Messages follow a well-defined and documented standard. The received Hail Messages are checked and collated by the NAFO Secretariat and entered into a database. Newly received Hail Messages are passed onto third party organizations that are contracted to perform inspection duties following the NAFO Convention.

1.1 Current practice

The current practice for handling the Hail Messages is largely manual. The Hail Messages are received primarily by FAX, with some sent in the clear by e-mail, or file transfer over X.25. The Hail Messages are processed and entered into a Hail Message database manually. Once the messages are processed and saved the new position data is transmitted to the contracted inspection organizations. Periodically reports are generated by the database based upon the saved data.

2. DESIRED FUTURE PRACTICE

The intent is to automate the entire Hail message handling process in order to remove operator intervention and to provide the required level of security for the data. In order to meet this intent and achieve the desired goals the following processing steps would need to be performed by the Automated NAFO Hail message Processing System:

1. The NAFO Member Nations would send their Hail Messages to the NAFO Secretariat using e-mail with the Hail Message e-mails being digitally signed and encrypted for security reasons.
2. A computer system located at the NAFO Secretariat in Dartmouth, Nova Scotia, would receive the Hail Message e-mail and automatically verify the digital signature and decrypt accepted messages.
3. Verified Hail Message e-mails would then be checked for validity and completeness as per the defined Hail Message standard.
4. Hail Messages that are complete and free of errors would then be stored in the Hail Message database.
5. Once a Hail Message is saved in the database, a Forward Hail Message e-mail will be generated (based on the original hail message, but with the fields put in a normalized order), digitally signed, encrypted and made available to the third party inspection organizations.
6. A Return Hail Message would automatically be generated and sent to the original hail message e-mail sender when an error in format or content is detected (including an appropriate error code as applicable).

3. AUTOMATED PROCESSING SYSTEM CAPABILITIES

In order to address automated hail Message processing, a system is required with the capability to:

- provide appropriate security protection,
- receive Hail messages via e-mail,
- parse the received e-mail to verify Hail message validity and completeness,
- store the Hail message in a database,
- forward necessary details to inspection agencies, and
- generate error notifications for Hail Messages that do not meet format and content standards.

The following figure provides a graphical representation of the system.

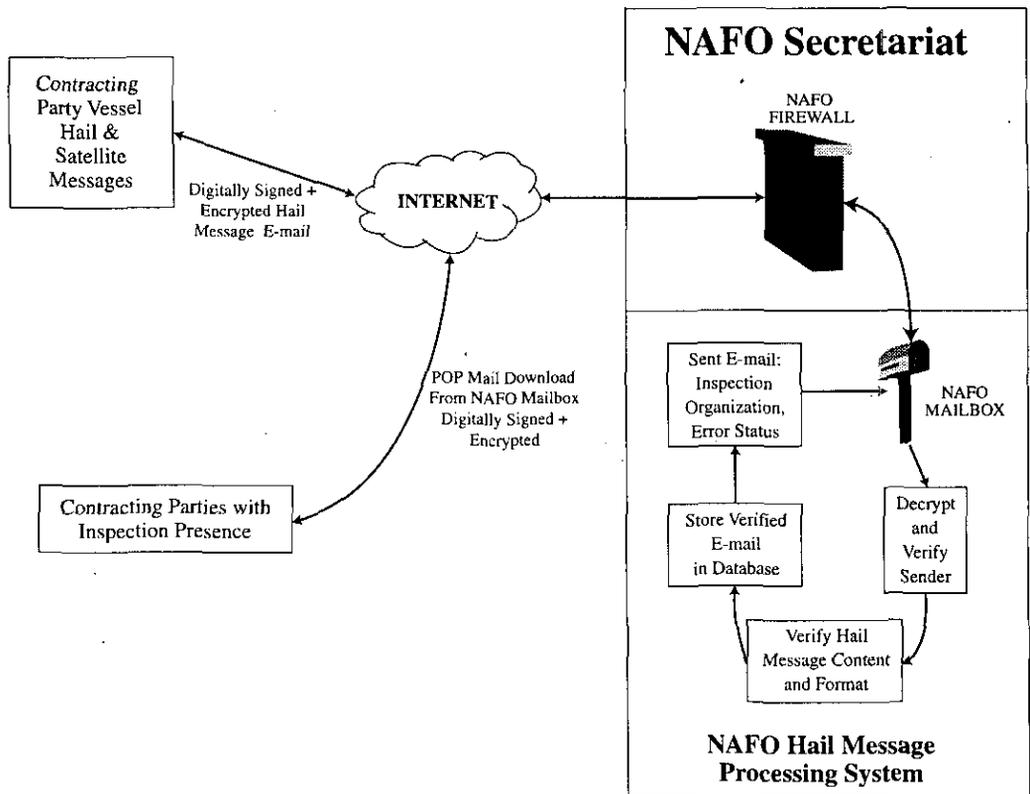


Figure 3-1. Graphical Representation of the Proposed System

In addition to the capabilities noted above, the automated system would also have to satisfy the following requirements:

1. All Hail Message e-mails shall be protected against unauthorized modification or access.
2. Hail Messages transmitted via a public medium (e.g. the Internet) shall be encrypted to ensure confidentiality and authenticity.
3. Only Hail Messages that are complete and have validated data shall be entered into the Hail Message database.
4. Only Hail Messages that are complete and have validated data shall be transmitted to the appropriate inspection organizations.
5. Hail message sending parties shall be notified via e-mail regarding invalid Hail Messages.
6. The system hosting the database and processing the Hail messages shall aim to meet the criteria of a C-2-level trusted system.
7. The Hail message database shall be capable of producing reports from the collected data (the three reports currently being produced by the NAFO Secretariat shall be continued).
8. Hail Messages electronically received shall be processed automatically by the system.
9. Forward Hail Messages generated for the third party inspection organizations shall be accumulated on the system for later retrieval by those third party inspection organizations.
10. Return Hail Messages for electronically received Hail Messages shall be sent to the appropriate return address.

3.1 C2-Level Trusted System

C2 refers to a set of security policies that define how a secure system operates. The C2 evaluation process is separate from the C2 certification process. Certification applies to a particular installation, including hardware, software, and the environment that the system is in. It is up to an individual site to become C2 certified.

The security policy in C2 is known as Discretionary Access Control (DAC). C2 classification does not define a substantive security system in the sense of classified or unclassified data. In a C2 (DAC) system, owners have absolute discretion about whether or not others have access to their objects. In the Windows NT implementation, the basic idea is that users of the system own objects, have control over the protection of the objects they own, and are accountable for all their access-related actions. For example, in Windows NT, every object (file, Clipboard, window, and so on) has an owner; any owner can give or not give other users access to its objects. The system tracks (audits) your actions for the administrators (that is, the system administrator can track the objects you accessed, both successes and failures).

The requirements for A-, B-, C- and D-level secure products are outlined in the Trusted Computer System Evaluation Criteria (TCSEC) published by the National Computer Security Center (NCSC). This publication is commonly referred to as the "Orange Book", and is part of NSA's security "rainbow series". Security level requirements are open to interpretations that change over time. When undergoing evaluation, each vendor negotiates with the NSA about whether or not the details of its particular system implementation conform with the abstract security policy concepts in the NSA's books. The vendor must provide evidence that the requirements are being met.

4. PROPOSED SOLUTION

4.1. Hail Message Processing System

A PC workstation/server is the proposed hardware platform. This hardware platform would be a typical name brand Pentium PC (including 17" monitor, keyboard, mouse, graphics card, and 200W power supply, CD-ROM) with a 3 year warranty and include:

- 2 hard drives (at least 2 Gb each) to allow mirroring of data,
- Tape backup device
- Uninterruptable Power Supply (UPS), and
- Appropriate hardware for Internet connectivity (this may be supplied by the ISP depending upon the type of Internet access selected).
 - A permanent Internet connection is preferred to allow real-time handling of Hail Messages and to ensure the availability of Forward Hail Messages to the inspection organizations. A high speed Internet connection is not required, as the actual amounts of data being transferred are very small.

The software needed to run on the proposed hardware platform would include:

- Microsoft NT Server
- Microsoft Office Pro (includes Microsoft Word, PowerPoint, Excel, Access)
- InterMail Post Office (mail server software)
- PGP (e-mail encryption and digital signature software)

Custom application software would be developed for the following processing tasks:

- Decrypting and verifying digital signatures using PGP
- Validating received Hail Messages
- Generating Forward and Return Hail Messages
- Entering validated Hail Message information into the database
- Encrypting and digitally signing outgoing e-mail messages
- Porting existing Access database to new Access database

4.2 Security Recommendation – Firewall

Additionally, the use of a firewall would improve security. Software Kinetics recommends that the NAFO Secretariat consider including a firewall as part of the solution. The firewall would be a commercially available software application that would run on a dedicated PC host running Unix or NT. The advantages of using a commercially available firewall are that the product is technically supported and easy to set-up and maintain.

A packet filtering firewall should be sufficient for the NAFO Secretariat's needs. The packet filtering firewall is the easiest and least expensive implementation of a commercially available firewall. The amount and type of traffic to be checked is minimal and thus the packet filtering firewall is preferred over a proxy filter firewall.

4.2.1 Additional Firewall Considerations

A low-end solution would be to use a router and implement a router control list. The Internet Service Provider typically controls the routers. This most likely mean that the NAFO Secretariat would have little or no control of or access to the router configuration. In addition, routers provide little or no customization capabilities.

A medium-end solution would be to procure a PC running Linux with a free-ware packet filter software application. This would allow the NAFO Secretariat to implement a cost effective method to implement a firewall but this solution adds additional manual maintenance support requirements over the long term.

5. COST ESTIMATES

All prices noted in this section are estimates and are not to be considered as a quote. These cost estimates are provided for discussion purposes only. A firm fixed price will be quoted at a later date following discussions with the NAFO Directorate regarding their preferences. These cost estimates do not include applicable taxes.

The following table provides cost estimates for the hardware and software components of the system.

ITEM	ESTIMATED COST
Basic Pentium PC (including Windows NT Server OS and 3 year warranty)	\$4000
UPS	\$500
Printer	\$500
Microsoft Office Professional	\$800
InterMail Post Office	\$1500 (see NOTE 1)
PGP software (encryption, digital signatures)	\$200
Internet conection (on-demand 28.8 communication line)	\$1000 (See NOTE 2)
Firewall Hardware (basic Pentium PC)	\$2500
Firewall Software (Linux - Red Hat)	\$80 (see NOTE 3)
TOTAL:	\$11,080.00

NOTE 1: This includes a license for > 10 mail accounts and software support and maintenance.

NOTE 2: Unlimited on-demand access to the Internet through an Internet Service Provider (ISP) requires the use of a normal business phone line (supplied by the phone company) and a router (supplied by the ISP). The cost of the router and its setup are included in the estimated cost noted in the table. The business phone line charges are not included in the cost estimate noted in the table. There is an ongoing service charge paid on a monthly basis for the unlimited access connection. Other communication options exist including ISDN and ASDL. This solution assumes that e-mail sent to the Inspection Organizations does not need to be stored locally on the NAFO mail server for pickup - the e-mail will be immediately delivered to the Inspection Organizations mailbox (wherever they chose to host their mail server). **Refer to section 6 of this document for additional connectivity discussions details.**

NOTE 3: Linux is a Unix like operating system that includes firewall software suitable for this application.

On-going charges will apply for such items as the business phone line (approximately \$60/month) and ISP unlimited on-demand service charges (approximately \$200/month). These on-going charges have not been included in the cost estimates noted in the table above. These on-going costs must be considered for future expenditure considerations.

Software Kinetics has assumed that the proposed system hardware and operating system software will be ordered by the NAFO Directorate and delivered to Software Kinetics. The installation, development and configuration of application software will occur at Software Kinetics using the procured system as a development platform. Once the complete system has been built and fully tested (i.e., a Factory Acceptance Test), it will then be installed and configured for use at the NAFO Directorate.

The following tasks will be performed:

- System configuration (system assembled at Software Kinetics site for testing and development purposes),
- Security Implementation (NT, mail accounts, user accounts, etc.)
- Design, develop and test the Hail Message handling application software,
- Perform Factory Acceptance Test, Site Acceptance Test (including development of test procedures),
- Port existing Access database to new platform,
- Create System User Manual,
- System installation at NAFO Directorate,
- Project management,
- Firewall configuration, set up and installation, and
- User training.

Software Kinetics estimates that these tasks will involve a Project Manager, up to 2 Software Specialists and a Systems Management specialist. The Project Manager would be responsible for managing the entire effort and ensuring Customer satisfaction. The Software Specialists would design, develop and test the application, port the existing Access database to the new platform, and create the user documentation. The Systems Management Specialist would setup and configure the computer hardware, the operating systems and the firewall. One of the Software Specialists would provide the user training.

User training will be a day in duration and will be performed on the NAFO site.

The estimated labour cost to perform the work noted above is **\$35,000.00**.

The estimated schedule to complete this work would be 3 months after receipt of order.

6. SUPPORTING INFORMATION AND COMMENTS

6.1 Internet Connectivity Issues

Software Kinetics believes that the NAFO Directorate needs to consider the use of a dedicated Internet connection to provide a complete and fully secure service (i.e., a permanent ISDN connection, an ASDL connection, or cable access). The on-demand approach included in the cost estimates can provide appropriate Internet connectivity but:

- requires software intervention to automatically connect to the ISP for sending and receiving e-mail, and
- potentially poses some e-mail security concerns (e-mail residing on ISP mail servers).

Alternative methods do exist based upon the service provided by Dartmouth/Halifax area ISP's, MT&T and Shaw Cablevision. The Internet services provided by these organizations have advantages and disadvantages given the NAFO Secretariat requirements. These possibilities require further investigation and discussion. Costs for the various alternatives have not been fully determined.

For on-demand service comparison purposes, a 64Kbps on-demand ISDN connection would cost approximately \$1300 to setup and configure with a monthly charge of \$300. A 128 Kbps on-demand ISDN connection would cost approximately \$1200 to setup and configure with a monthly charge of \$450.

The ISP provides complete access to Internet services including e-mail accounts, newsgroups, file transfer and the WWW as part of their basic service. The ISP will also register your unique domain name, supply both primary and secondary domain name resolution, and unlimited telephone and e-mail customer support.

ISP's recommend that a firewall be used to provide increased security.

Should additional PC's within the NAFO Secretariat need to be connected to Internet communications line then a hub would need to be purchased and configured. The hub would reside behind the firewall (on the NAFO side) and allow for multiple LAN's or PC's to be connected to it.

In addition, some ISP's will provide and support Firewalls. This aspect of their service provision capabilities is still under investigation.

6.2 Microsoft Access

The current database is implemented using Microsoft Access. Continuing to use Access allows the NAFO Secretariat staff to make use of their existing skills.

The reports currently required by the NAFO Directorate are already implemented using Access. The effort required to re-implement these reports on the new system is minimal.

6.3 Operating Systems and Security

Microsoft NT is not C2 rated but still is a logical choice for the operating system even though the aim is to be C2 rated. Currently there are no interactive operating systems that are C2 rated while connected to a network.

6.4 Mail Server Software

InterMail Post.Office allows incoming mail to be sent to a running application and allows for the creation of e-mail accounts that are independent of NT login accounts. This e-mail package includes a POP server and an integrated mail list manager. Consideration needs to be given to purchasing a 100 user license in order to receive software maintenance and support privileges.

6.5 Encryption Software

PGP is a logical choice for the encryption application since it is well tested, readily available on a variety of platforms, and compatible versions are available from sources not subject to US encryption software export restrictions.

6.6 UPS

The UPS, the multiple disk drives (for database replication) and the backup tape drive are included to increase system reliability and data integrity. A mid-range UPS allowing for the graceful shutdown of the Computer system was used for cost estimation purposes. A variety of UPS models are available with varying costs and features.

**Annex 4. Draft amendment to the Conservation and
Enforcement Measures (NAFO/FC Doc. OO/1)**
(Technical W.G. Working Paper 00/3 presented by the European Union)

Introduction

Contracting Parties have agreed to require all vessels fishing in the Regulatory Area to be equipped with satellite tracking devices not later than January 1, 2001. The purpose of the amendment is to adopt detailed rules for satellite tracking and to adjust the Hail System requirements since certain report types become superfluous with satellite tracking. The proposed detailed measures for satellite tracking are identical to the ones contained in the Scheme of control and enforcement applicable in the NEAFC regulatory area. The amendment should be applicable as from January 1, 2001.

Draft amendment (enters into force as from January 1, 2001)

– **In Part III.E (- Vessel requirements / Hail System):**

- sub-paragraph 1(c) is deleted
- sub-paragraph 1(d) is deleted
- sub-paragraph 1(e) becomes sub-paragraph 1(c)
- sub-paragraph 4 is deleted

– **In Part III – Annex I – Hail System message format**

- sub-paragraph 1.2 is deleted
- sub-paragraph 1.3 is deleted
- sub-paragraph 1.4 becomes sub-paragraph 1.2
- sub-paragraph 1.5 becomes sub-paragraph 1.3
- in Example 1 point 1.2 is deleted
- in Example 1 point 1.3 is deleted
- in Example 1 point 1.4 becomes point 1.2
- in Example 1 point 1.5 becomes point 1.3
- Example 2 is deleted

– **At the end of Part III - Vessel requirements, a new section F. is added:**

F. Vessel monitoring system (VMS)

1. Each Contracting party shall ensure that each of its vessels operating in the Regulatory Area is equipped with a satellite tracking device allowing the continuous tracking of its position by the Contracting party.

To that end the satellite tracking device shall ensure the automatic communication at least once every six hours when operating in the Regulatory Area to a land-based fisheries monitoring centre (hereafter referred to as FMC) of data relating to:

- the vessel identification;
- the most recent geographical position of the vessel (longitude, latitude) with a position error which shall be less than 500 metres, with a confidence interval of 99%;
- the date and time of the fixing of the said position of the vessel.

Each Contracting Party shall take the necessary measures to ensure that its FMC receives these data.

2. The FMC of each Contracting Party shall be equipped with computer hardware and software enabling automatic data processing and electronic data transmission. Each Contracting Party shall provide for back-up and recovery procedures in case of system failures.

3. Each Contracting Party shall take the necessary measures to ensure that the VMS data received from its fishing vessels are recorded in computer readable form for a period of three years.

4. The masters of fishing vessels shall ensure that the satellite tracking devices are at all times fully operational and that the information in paragraph 1. is transmitted. In the event of a technical failure or non-operation of the satellite tracking device fitted on board a fishing vessel, the device shall be repaired or replaced within one month. After this period, the master of a fishing vessel shall not be authorised to commence a fishing trip with a defective satellite tracking device. Where a device stops functioning and a fishing trip lasts more than one month, the repair or the replacement has to take place as soon as the vessel enters a port, the fishing vessel shall not be authorised to continue or commence a fishing trip without the satellite tracking device having been repaired or replaced.

5. Each Contracting Party shall ensure that a fishing vessel with a defective satellite tracking device shall communicate, at least daily, reports containing the information in paragraph 1. to the FMC, by other means of communication (radio, facsimile or telex).

6. Each Contracting Party shall communicate reports and messages pursuant to paragraph 1. and paragraph 5. to the Secretary as soon as possible, but not later than 24 hours after receipt of those reports and messages. If the Contracting Party so desires, it shall ensure that each of its fishing vessels shall communicate reports (by satellite, radio, facsimile or telex) to the Secretary.

7. Each Contracting Party shall ensure that the reports and messages transmitted between the Contracting Party and the Secretary or if the Contracting Party so desires, between its fishing vessels and the Secretary, shall be in accordance with the data exchange format set out in Annex II.

8. The Secretary shall make available as soon as possible the information received under paragraph 7. to other Contracting Parties with an active inspection presence in the Regulatory Area. All reports and messages shall be treated in a confidential manner.

9. Each Contracting Party shall notify the name, address, telephone, telex and facsimile numbers as well as the addresses for electronic communication of their relevant authorities to the Secretary before 1 January 2001 and thereafter any changes without delay.

**After Part III Annex I Hail System Message Format, a new annex is added:
Part III Annex II VMS position report format**

Data Element:	Code:	Mandatory / Optional	Remarks:
Start record	SR	M	System detail; indicates start of record
Address	AD	M	Message detail; destination; XNS" for NAFO Secretariat
Sequence Number	SQ	O	Message detail; message serial number in current year
Type of Message	TM	M	Message detail; message type, "POS" as Position report/message to be communicated by VMS or other means by vessels with a defective satellite tracking device
Radio call sign	RC	M	Vessel registration detail; international radio call sign of the vessel
Trip Number	TN	O	Activity detail; fishing trip serial number in current year
Vessel Name	NA	O	Vessel registration detail; name of the vessel
Contracting Party Internal Reference Number	IR	O	Vessel registration detail. Unique Contracting Party vessel number as ISO-3 flag state code followed by number
External Registration Number	XR	O	Vessel registration detail; the side number of the vessel
Latitude	LA	M	Activity detail; position at time of transmission
Longitude	LO	M	Activity detail; position at time of transmission
Date	DA	M	Message detail; date of transmission
Time	TI	M	Message detail; time of transmission
Record Date	RD	M	Year, month and date
Record Time	RT	M	Hours and minutes in UTC
Record Number	RN	M	Serial number of the record in the relevant year
From	FR	M	Address of the transmitting party (Contracting Party)
End of record	ER	M	System detail; indicates end of the record

Each data transmission is structured as follows:

- double slash ("/") and the characters "SR" indicate the start of a message;
- a double slash ("/") and field code indicate the start of a data element;
- a single slash ("/") separates the field code and the data;
- pairs of data are separated by space;
- the characters "ER" and a double slash ("/") indicate the end of a record

- In Part VI.B (Satellite tracking)

- Sub-paragraph 1c is deleted
- Sub-paragraph 1d is deleted.

