

Thrane & Thrane A/S

TT-3026L/M/S easyTrack Transceiver User/Operators Manual

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SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment

Thrane & Thrane A/S assume no liability for the customer's failure to comply with these requirements.

MICROWAVE RADIATION HAZARDS

During transmission this unit radiates microwaves from the antenna. This radiation may be hazardous to humans if they are exposed to it directly at short distances from the antenna. During transmission, make sure that nobody is closer than the recommended minimum safety distance of 1 ft. (0.3 meter).

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. Only qualified maintenance personnel must make component replacement and internal adjustment. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

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1 SCOPE AND PURPOSE

The purpose of this document is to describe the system in which the easyTrack Mobile Earth Station (MES) is used and how the easyTrack MES is operated. The information found in the manual is only an overall briefing. For detailed description read the documents listed in section 1.1 Related Documents. For access to these manuals please contact the local distributor.

1.1 RELATED DOCUMENTS

Looking for	Please read
Detailed description of the installation of the easyTrack MES.	TT 98116078, TT-3026L/M/S Installation Manual
Detailed description of RS232 interface to the easyTrack MES.	TT 98-116080, TT-3026L/M/S Software Interface Reference Manual
easyMail Inmarsat-C Message Handling Control Software Installation and User manual.	TT 98-116077, easyMail Installation & User Manual
Detailed description of the Land Earth Station PSDN interface	TT 99-103879, PSDN User Interface Manual
Detailed description of the Land Earth Station Internet interface	TT 99-110036, Internet Gateway User Manual
Something not described in any of the above listed documents	On www.tt.dk how to contact the local Thrane & Thrane distributor for further assistance.

Table 1 Related documents

1.2 ABBREVIATIONS AND TERMS

AA	Accounting Authority.
Capsat Manager	Thrane & Thrane fleet tracking program
DNID	Data Network ID (for tracking purpose)
Inmarsat-C mobile	The easyTrack satellite communication modem
ISP	Inmarsat Service Provider. Company offering the service. Most likely also a PSA and AA.
ISN	Inmarsat Serial Number
LES	Land Earth Station
Login	Registration of easyTrack MES in the Inmarsat-C system
Mailbox	Storage account on an LES that holds position reports transmitted from an easyTrack MES
Member number	Used to distinguish easyTrack MES's with same DNID from another
MES	Mobile Earth Station – the name of the transceiver in Inmarsat-C
NCS	Network Coordination Station
Ocean region	Coverage of one of four geostationary Inmarsat satellites
Omni-directional	All directions simultaneously when in free space conditions
OS	Operating System
Position report	Compact information transmitted from easyTrack that includes the GPS position.
PSA	Point of Service Activation. Company making the registration. Most likely also an ISP and AA.
PSDN	Public Switched Data Network e.g. X25 data network
PSTN	Public Switched Telephone Network is the plain old telephone system i.e. analog modem
SARF	Service Activation Registration Form
Store and forward	LES receives complete mails before forwarding it to the recipient
Telex	TELEprinter EXchange is a standardized, internationally recognized, means of real time text communications.

Table 2 Abbreviations and terms

2 INTRODUCTION TO INMARSAT-C

The Inmarsat-C is a store and forward mailing system, which enables the user to send and receive data to and from mobile terminals in the Inmarsat-C system. The Inmarsat-C system provides the possibility of reaching remote areas where other methods of communication are impossible.

The Inmarsat-C system offers:

- Data transmission to and from a mobile unit.
- Broadcast data to groups of mobile terminals.
- Manage position reporting from fleets of mobile units.
- Unique polling system, that enables the operator to request various data from the mobile units.

The Inmarsat satellite network provides the communication link between the mobile and the destination office. Inmarsat is a world-wide satellite network. 4 geostationary satellites are used to cover the world. Satellite data link coverage is excellent between 70° North and 70° South. Because the polar regions cannot be seen from geostationary satellites these regions are not covered.

The Inmarsat-C system contains 2 satellite stations types that are of interest for the operator of the easyTrack MES. One type is the NCS stations and the other is the LES stations.

The NCS handles the registration of the MES in the Inmarsat-C system. The Inmarsat-C system has one NCS for every geostationary satellite i.e. the world contains four NCSs. Each NCS controls what is called an ocean region. This naming comes from the fact that the four geostationary satellites covers the Atlantic Ocean Region East, Atlantic Ocean Region West, Indian Ocean Region and the Pacific Ocean Region. Before using the Inmarsat-C system the easyTrack MES must be registered in one of the four ocean regions. This is done by instructing the easyTrack MES to perform a Login to one of the four NCSs.

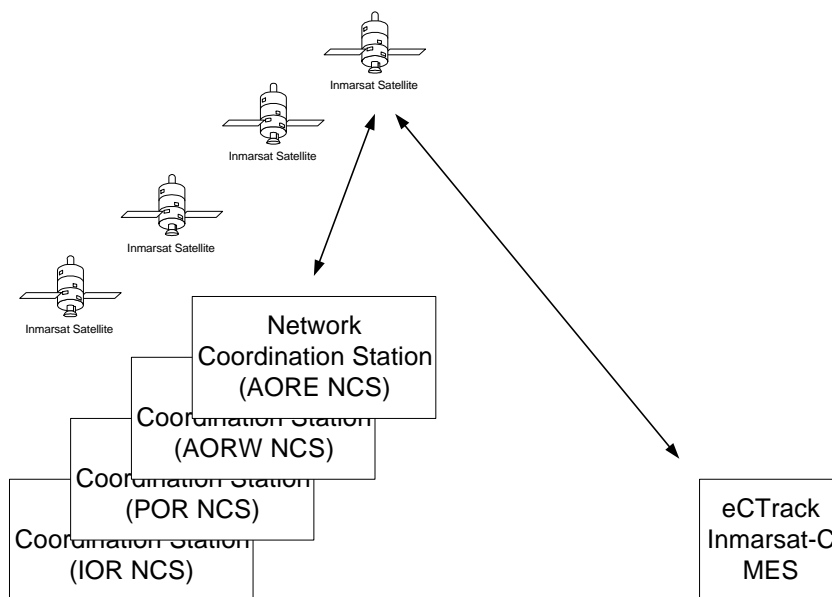


Figure 1 Registration at NCS

The LES handles the data transmission to and from the easyTrack MES. When the easyTrack MES is logged into an NCS, several LESs are available for data transmission. The number of LESs available may vary. This depends entirely on the number of companies that wishes to offer Inmarsat-C services. (Note: If your easyTrack was distributed with LES lock enabled, you may only be able to transmit to specific LESs).

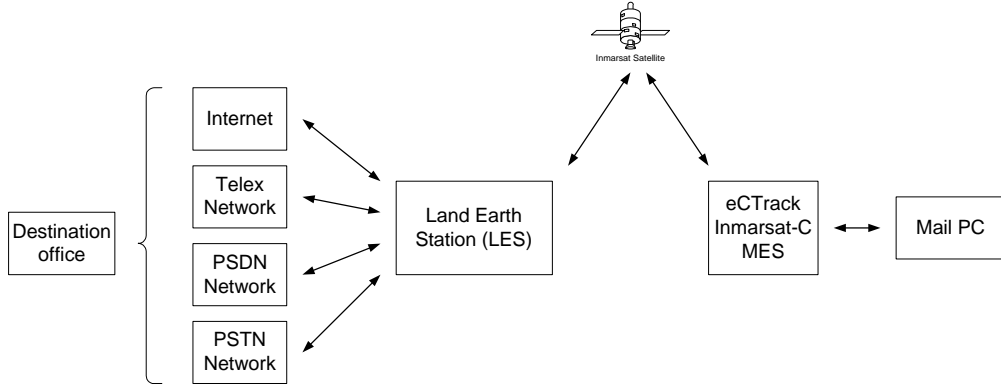


Figure 2 Data transmission using LES

When the easyTrack MES is logged into an NCS it contains a list of currently available LESs that support the Inmarsat-C service. When the easyTrack MES is instructed to make a transmission the operator must select an LES prior to initiating the transmission so that the easyTrack MES knows what LES to use. The operator can use this list to select an LES for data transmission.

The easyTrack MES contains a built-in omni-directional antenna unit and a built-in communication unit. The antenna unit is the physical interface to Inmarsat-C system and the communication unit is the protocol interface to both the Inmarsat-C system and to the RS232 terminal interface that is used to operate the easyTrack MES.

The easyTrack MES also contains a built-in GPS receiver. The GPS receiver is used to compute the position of the easyTrack MES. The built-in GPS uses the Global Satellite Navigation System developed and controlled by the U. S. Department Of Defence. This system uses at least 24 special GPS Satellites that orbit the earth in 12 hours. At least four satellites are visible for an observer at any point on earth at any given time. Each of the satellites includes very accurate atomic clocks and all the satellites simultaneously transmit signals to the earth and the difference in arrival time of the signals is used to compute the position.

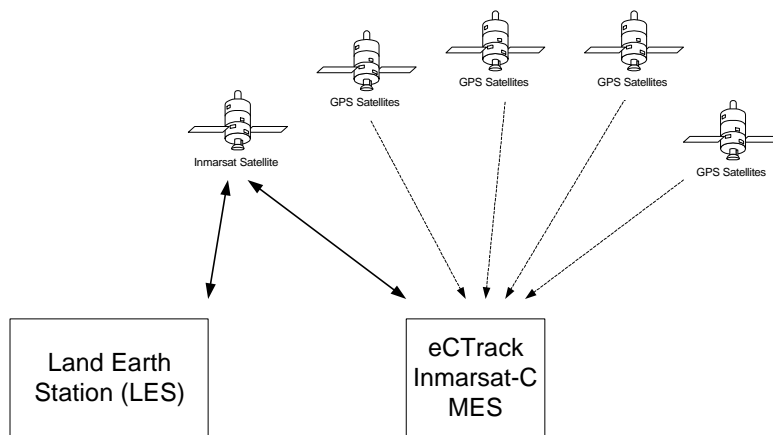


Figure 3 GPS System

The operator can request the easyTrack MES to display the position but the easyTrack MES can also be configured to transmit the position to the destination office on a regular interval. This feature makes the easyTrack MES ideal for use in vehicle tracking systems.

Using the Thrane & Thrane Windows™ based Capsat Manager enables full knowledge of the vehicle whereabouts at any time.

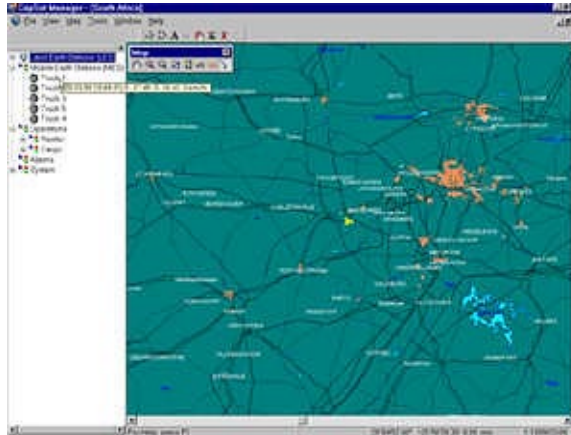


Figure 4 Capsat Manager

The position is not the only thing that is possible to transmit from the easyTrack MES. As Inmarsat-C is a store and forward mailing system it is ideal for transmission and reception of email, fax and other message formats. Transmission of email or other types of messages is easily done using the Thrane & Thrane Windows™ based easyMail message terminal program. This program enables easy transmission and reception of emails when using one of the default configured ISPs that has email service.

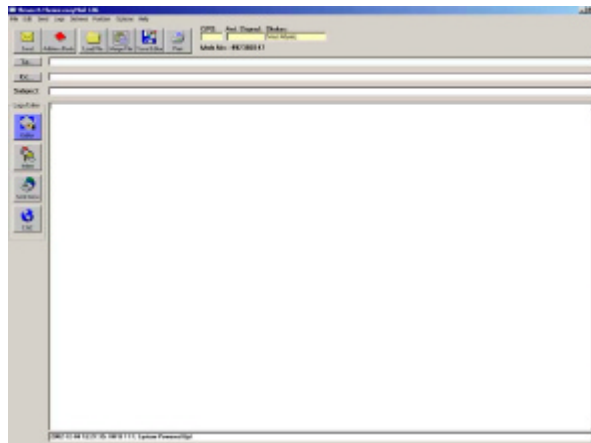


Figure 5 easyMail Message Processing Software

For experienced users of the T&T Inmarsat-C MESs the easyTrack MES supplies a broad range of interface commands on the RS232 that can be used to control the behaviour of the satellite modem. The interface supplies commands for message reception and transmission, configuration of regular transmission of position to destination office along with other facilities. For detailed description please refer to relevant document found in section 1.1 Related Documents.

3 GETTING STARTED

3.1 INSTALLATION

All matters regarding installation is described in the installation manual please refer to section 1.1 Related Documents. You must read the installation manual carefully before any use of the easyTrack MES.

3.2 REGISTRATION

Before use of the easyTrack MES on the Inmarsat-C system the supplied easyTrack MES must be registered to the system, which involves a little paper work. This is done using the SARF (Service Activation Registration Form) supplied with the easyTrack MES. The TT-3026L includes a registration form for Land Mobile Earth Stations and the TT-3026M and TT-3026S a registration form for Maritime Mobile Earth Stations. The two forms are almost identical so the following will be a general explanation.

The Service Activation Registration Form contains different abbreviations that will be explained here.

The image shows a registration form with the following sections:

- Section 1: Your details (flow note A)** - Includes fields for account type, name, address, telephone number, and fax number.
- Section 2: Paying the bill (flow note B)** - Includes fields for the type of bill and the accounting authority.
- Section 3: What type of Mobile Earth Station (MES) are you registering? (flow note C)** - A grid of checkboxes for selecting services like Land Mobile, Maritime, and various applications like Government, Medical, and Industry.

Figure 6 Service Activation Registration Form

The easyTrack MES must be registered at either a PSA company or directly to the ISP. A PSA is a company handling the activation of Inmarsat mobiles and is short for Point of Service Activation. ISP is the company that provides the Inmarsat service and is short for Inmarsat Service Provider. In many cases the PSA and ISP is the same company that also operates a Land Earth Station (LES). The local PSA or ISP can be obtained by following the guidelines in the registration form.

The Service Activation Registration Form also includes information needed to find out how to pay the bill for the Inmarsat-C service. This payment will be done directly to the Accounting Authority. In many cases the Accounting Authority (AA) is also the same company as the Inmarsat Service Provider (ISP).

In addition to the general information like name, address, etc. the ISN of the easyTrack MES must be specified. The ISN is located on the Delivery Note and in the bottom of the easyTrack MES.



Figure 7 easyTrack MES

When the easyTrack MES is registered at the ISP it is ready to be used on the Inmarsat-C network. The ISP has returned a Mobile Number for the easyTrack MES and prior to operating the easyTrack MES it must be configured with this Mobile Number.

3.3 INITIAL CONFIGURATION

This is the first initial power up of the easyTrack MES. It is expected that section 3.1 Installation has been completed and that the easyTrack MES is connected to a PC or Laptop. If the PC or Laptop is running the Windows™ operation system (Windows 95,98,2000,NT) the easyMail program on the supplied CDROM can be used to configure the easyTrack MES. If the PC or Laptop is running another OS please skip this section and continue with section 3.3.3 Manual Configuration

3.3.1 INSTALLATION OF EASYMAIL

easyMail is a message-handling program that is designed for T&T Inmarsat-C mobiles. The program offers easy access to all the services available in the Inmarsat-C system.

The TT-3026L/M/S package includes an easyTrack CD. When placing the CD in the CDROM drive the welcome page should start automatically. Follow the onscreen instructions on how to install easyMail. In case the welcome pages does not start automatically use Windows Start->Run->Browse to select the easyMail installation file *setup.exe* in the easyMail folder. When found press the OK button to install easyMail.

In case the installation need to update some Windows™ files the program shows a dialog box. Please answer Yes/Ok to update these files. In case the program shows a “Version Conflict” dialog box it is recommended that the existing file is kept. This is done answering YES to the question asked.

When the installation is complete a shortcut to easyMail is placed in the Start Menu Program list. Run the program by selecting *Start->Programs->easyMail*.

Power up the easyTrack MES and run the easyMail program. As this is the first time the easyMail program is operated please read the Disclaimer of Warranty.

If the installation of the easyTrack MES is correct and the PC or Laptop is connected to the easyTrack MES using a serial cable then the Status field in the top of the easyMail program should be green/yellow (not red) indicating that the protocol between easyMail and easyTrack MES is up and running. In case the Status field is red please select *Options->Configuration->COM Settings...*, and select the right communications port and baud rate. The baud rate of the easyTrack has a default value of 4800. If the Status field is still red please check the installation and the power supply as described in 3.1 Installation

3.3.2 CONFIGURATION USING EASYMAIL

easyMail offers an easy way of entering the Mobile Number. Select *Options->Configuration-> Mobile Number* to display the Mobile Number dialog box. Enter the Mobile Number into the dialog box and press *OK*.

The easyTrack MES is now ready for operation.

3.3.3 MANUAL CONFIGURATION

This section describes how to setup the mobile number in the easyTrack MES manually using a RS232 terminal interface program. If section 3.3 Initial was read and completed please skip this section.

The interface to the easyTrack MES is a text based interface compatible with earlier standard of T&T Inmarsat-C MES interface protocols. The Mini-C serial port is default 4800 baud, No parity, 8 databits and 1 stopbit. When connected to the easyTrack MES it will respond with a ':' when Carriage Return is pressed at the PC keyboard. This is the prompt and indicates that the easyTrack MES is ready to accept commands.

Use the SET command configure to the Mobile Number. The SET command has the following syntax:

```
SET -u <mobile number>
```

In the following example the Mobile Number 491234567 is configured in the easyTrack MES. The Mobile Number returned by the authorities handling the Service Activation Registration Form (SARF) should replace this number:

```
SET -u 491234567
```

The easyTrack MES will respond with '*The number will now be stored permanently*'

The easyTrack MES is now ready for operation.

4 USING THE EASYTRACK MES

This chapter explains some overall functions supported by the easyTrack MES and how they are used together with easyMail.

This chapter expects that chapter 3.3.1 Installation of easyMail has been completed.

4.1 MAILING

One of the main features offered by the easyTrack MES is the ability to send messages to any destination in the world from anywhere in the world.

This chapter describes how to send email using the Thrane & Thrane easyMail message handling software.

The main windows of easyMail contains a *To:* field a *Subject:* field and the *text editor*. The message that needs to be sent must be written in the text editor e.g.:

```
Hello John,  
This is my first mail from the T&T easyTrack MES.
```

In the *Subject:* field write an appropriate subject for the mail.

Now configure a recipient using the **Address book** button just below the menus. When the Address book is displayed select the **New Entry** button to set up a new recipient.

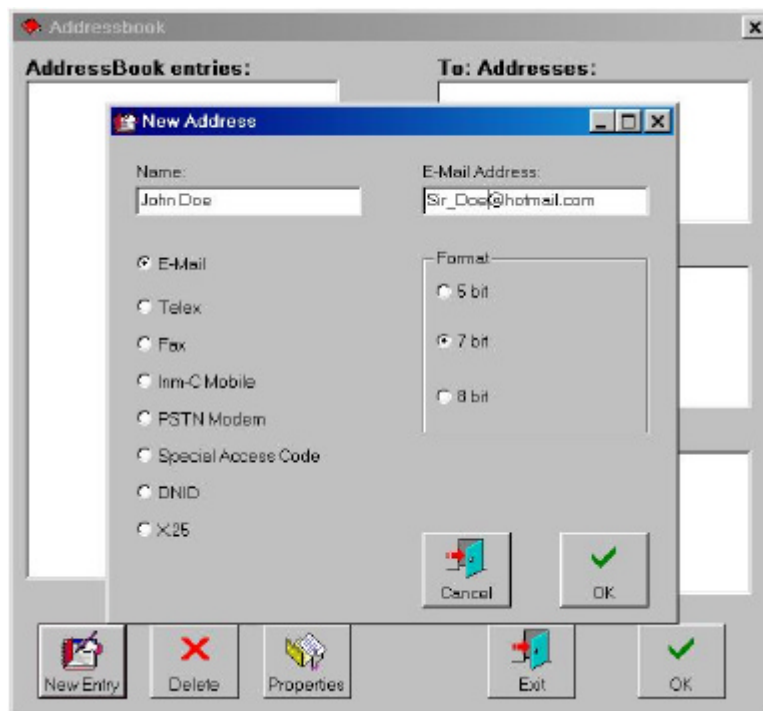


Figure 8 easyMail Addressbook

Select E-mail destination, 5,7 or 8 bit characters, enter an appropriate name for the recipient and finally enter the email address in the *E-Mail Address* field. Press **OK** to save the entry. Now use the mouse pointer to select the recipient from the *Addressbook entries* list and press the **To:=>** button. Press **OK** to close the Address book.

Now select *Options-Set Default ISP* to set the default Inmarsat Service Provider that should be used when sending email.

The mail is now ready to be sent. Press the **Send** button and the *Sending...* window will appear. Select *Confirmation Request* and press **OK** to send the mail.

The mail is now being transmitted by the easyTrack MES. The **Sent Item** button shows the current status of the transmitted mail.

4.2 TRACKING

Another of the main features of easyTrack MES is the tracking feature. easyTrack MES supports standard Inmarsat defined data reporting and position reporting and thereby supports the Thrane & Thrane Capsat Manager fleet tracking program.

The tracking feature introduces some new abbreviations that are necessary to know before using the system. When a normal message or e-mail is transmitted, as described in 4.1 Mailing, the easyTrack is identified to the recipient by its Mobile Number. When using the tracking feature that enables transmission of the GPS position in a very compact format - and thereby reducing the cost compared to normal messages - the Mobile Number is not included in the transmission. To be able to identify the position report another addressing mechanism is used.

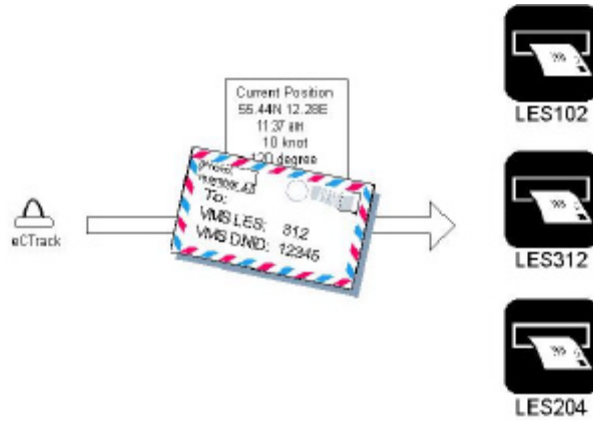


Figure 9 Inmarsat-C position reporting

A position report from an easyTrack MES is identified by the mailbox on the LES that stores the transmitted packet. The correct mailbox is selected by specifying the LES and a mailbox address called DNID (Data Network Identity). Several easyTrack MES's can transmit position to the same mailbox at an LES. To be able to distinguish position reports from one easyTrack MES from another easyTrack MES each easyTrack MES also transmits a member number. A member number is a value between 1 and 255 i.e. giving up to 255 easyTrack MES's that can transmit position to the same mailbox at an LES

Before the position reporting feature can be used the DNID must be setup and the Land Earth Station (LES). Contact one of the LESs that supports the Internet Gateway Option (IGW) that allows you to receive position reports from the easyTrack directly to an e-mail account. You local Thrane & Thrane distributor can help you locate the LES. The LES also downloads the address information into the easyTrack MES via satellite. Because of this the easyTrack must be powered up, logged into the Inmarsat-C system and have clear view of the satellite. The LES also needs to know your e-mail address that the positions should be forwarded to.

When the DNID and member number is downloaded into the easyTrack the DNID can be displayed using easyMail. Select menu *Options->Configuration->DNID* that will display the DNID list.

The GPS position of the easyTrack current location can be transmitted at regular intervals. This can be accomplished in several ways but only the local easyTrack MES configuration is described here. Please read the relevant documents listed in section 1.1 Related Documents for detailed description of the remote configuration of the easyTrack MES.

In easyMail select *Options->Configuration->Position Report->DNID PU Position Reporting*. This will display the Reporting Setup window. Press the **New** button and the interval configuration window is displayed.

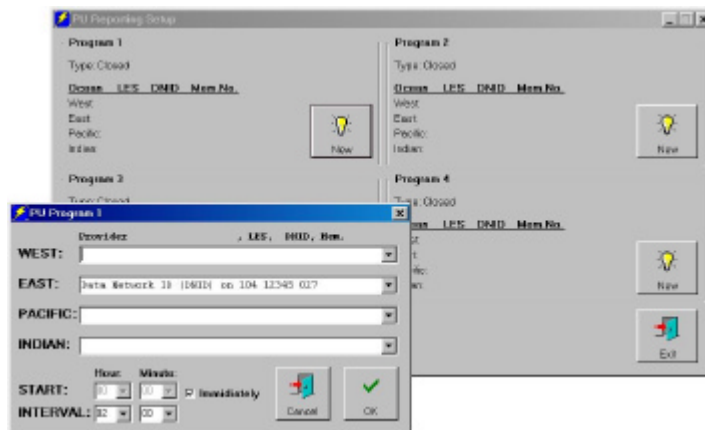


Figure 10 easyMail Position reporting set-up

Now select the LES, DNID and Member Number pair downloaded by the LES, set the interval to e.g. 2 hours that will result in a position being transmitted every 2nd hour. Press the **OK** button to start the automatic reporting.

The easyTrack MES is now configured to send its position at a regular interval to the Land Earth Station that stores the data in the DNID mailbox and shortly after forward it as an attachment to your e-mail account.

An application is needed to decode the position report when received at the email account. The Thrane & Thrane Capsat Manager fleet tracking program is such a program. Contact your local Thrane & Thrane distributor for further information.

5 GETTING FURTHER INFORMATION

If this User/Operator manual did not answer your question or you like to read more please refer to section 1.1 Related Documents that includes a list of other Thrane & Thrane documents that might be of interest.