



Setel's SeeMBox-V



Real-time remote monitoring of
your vessel over FleetBroadband



Version 2.0

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inmarsat.com/fleetbroadband

Revision history table

Document Issue	Date	Owner	Notes
1.0	06-26-2013	Setel Hellas	First edition
2.0	10-03-2013	Setel Hellas	Second edition

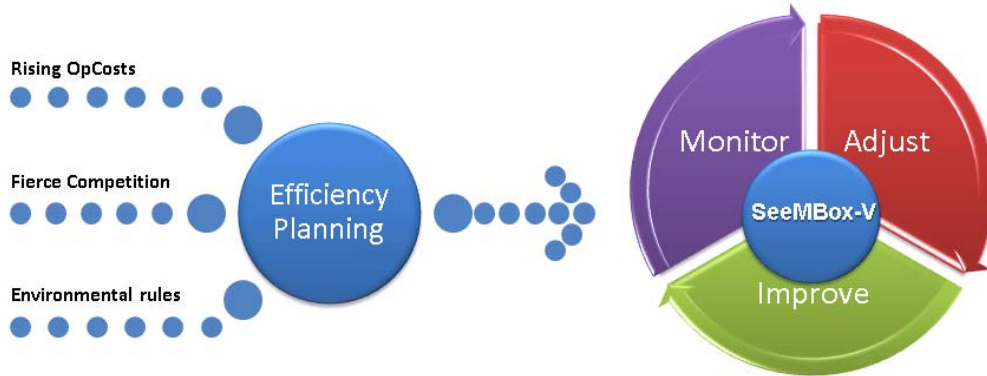
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1. Overview

The three drivers for investigating further potential savings on board vessels are rising operating costs, fierce competition and stricter environmental rules for emissions control.

SeeMBox Efficiency Planning Concept



Setel's SeeMBox-V is a unique solution which allows users to collect and process all the information necessary to devise a ship's energy efficiency plan and sustain it by accurate and reliable monitoring.

Real-time signals view

Tag	Description	F(x)	Unit	Low	High	LL	L	H	HH	Value
NAVLON0	GPS LONGITUDE INT	TX		-180	180					-33
NAVLON1	GPS LONGITUDE DEC	TX		0	999					954
NAVLAT0	GPS LATITUDE INT	TX		-180	180					49
NAVLAT1	GPS LATITUDE DEC	TX		0	999					871
NAVHDG	GPS HEADING	TX	°	0	360					84
NAVSOG	GPS SPEED	TX	Kt	0	100					11.40
NAVDIST	GPS DISTANCE	TX	Mi	0	1					0
NAVLOG	SPEED LOG SPEED	TX	Kt	-50	50					10.20
NAVHDT	TRUE HEADING	TX	°	0	360					83
NAVDEP	ECHO SOUNDER (DEPTH)	TX	m	0	100					0
MX_0_0_0	AE 2 EXH GAS TEMP CYL 1	TX	°C	0	600					45
MX_0_0_1	AE 2 EXH GAS TEMP CYL 2	TIAH	°C	0	600					8
MX_0_1_0	AE 2 EXH GAS TEMP CYL 3	TIAH	°C	0	600					0
MX_0_1_1	AE 2 EXH GAS TEMP CYL 4	TIAH	°C	0	600					17
MX_0_2_0	AE 2 EXH GAS TEMP CYL 5	TIAH	°C	0	600					67
MX_0_2_1	AE 2 EXH GAS TEMP CYL 6	TIAH	°C	0	600					280
MX_0_10_0	AE 2 LO PRESSURE	PIAL	bar	0	10					0
MX_0_3_0	AE 1 EXH GAS TEMP CYL 1	TIAH	°C	0	600					60
MX_0_3_1	AE 1 EXH GAS TEMP CYL 2	TIAH	°C	0	600					63
MX_0_4_0	AE 1 EXH GAS TEMP CYL 3	TIAH	°C	0	600					64
MX_0_4_1	AE 1 EXH GAS TEMP CYL 4	TIAH	°C	0	600					64
MX_0_5_0	AE 1 EXH GAS TEMP CYL 5	TIAH	°C	0	600					63
MX_0_5_1	AE 1 EXH GAS TEMP CYL 6	TIAH	°C	0	600					0
MX_0_10_1	AE 1 LO PRESSURE	PIAL	bar	0	10					0
MX_0_6_0	AE 3 EXH GAS TEMP CYL 1	TIAH	°C	0	600					113
MX_0_6_1	AE 3 EXH GAS TEMP CYL 2	TIAH	°C	0	600					383
MX_0_7_0	AE 3 EXH GAS TEMP CYL 3	TIAH	°C	0	600					365
MX_0_7_1	AE 3 EXH GAS TEMP CYL 4	TIAH	°C	0	600					377
MX_0_8_0	AE 3 EXH GAS TEMP CYL 5	TIAH	°C	0	600					0

2. Typical users

The SeeMBox-V solution enables maritime companies to monitor all equipment on board their vessel(s) independently of make and type as long as there is digital or analog output.

All data is collected and stored on board while at the same time it is automatically synchronized with the office server. The system's typical uses include:

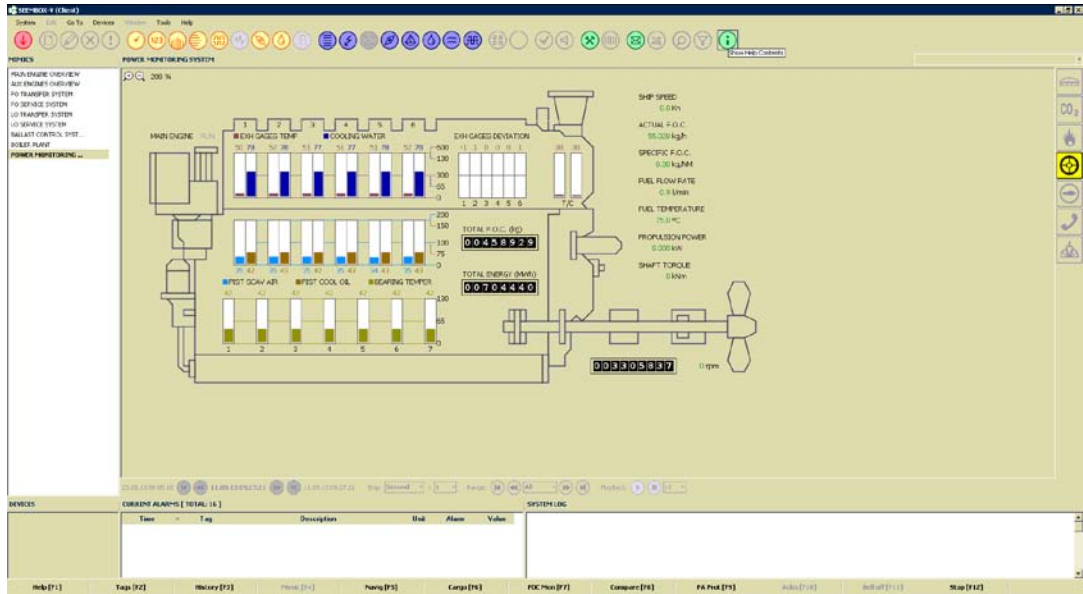
- Real-time monitoring of alarm monitoring system (AMS)
- Navigational data
- Fuel Bunkering reports
- Fuel Consumption monitoring
- Energy Efficiency Operational Indicator (EEOI) and emissions reporting

3. Key features

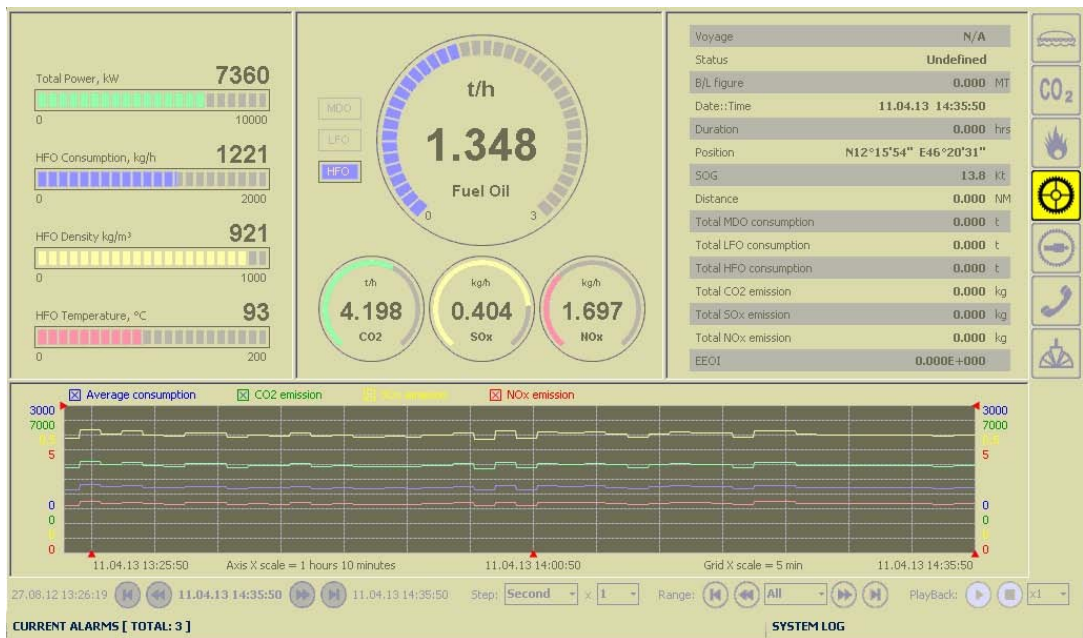
The SeeMBox-V's main features can be summarised as follows:

- Real time monitoring of vessel operational metrics at extremely low volume and bandwidth requirements (lowest requirements in the market)
- Historical data repository may be used to extract valuable information and daily reports easily
- Interactive mimic drawings provide unparalleled support if in distress
- Enhances responsiveness and improves assistance from the shore in distress situations
- New operational performance module enables decision support in real time, allowing economies in operation by adjusting operational models
- Seamless monitoring of equipment behaviour can significantly reduce maintenance and repair costs

Example of engine power & performance monitoring screen



Example of fuel consumption & EEOI screen



4. **Benefits to FleetBroadband (FB) users**

Setel's SeeMBox solution offers the following main benefits:

- Reliable connectivity ensured by FleetBroadband's global coverage
- Predictable costs since the user controls allowable data traffic
- Behavior Trends evaluation lead to loss prevention and minimization of a fleet's running costs enabling Condition Based Maintenance (CBM)
- Real-time monitoring of a vessel's fuel consumption, bunkering, (energy efficiency operational indicator/energy efficiency design indicator (EEOI) and nitrogen oxide (NOx), sulphur oxide SOx, carbon dioxide (CO2) emissions
- It is maintenance free and simple to use. The complete data synchronization cycle is fully automatic and unattended
- Minimal bandwidth requirement for data transfer (typical system needs less than 50 megabytes/month for around 200 continuously acquired signals)
- Company customisation is available.

5. **Setting up SeeMBox**

Before installation, the customer must fill out a questionnaire prior to an onboard survey. The purpose of the survey is to evaluate all the requested systems and identify the optimal way of acquiring the necessary information. The final scope of work is prepared before the actual installation.

During the installation, marine type approved equipment is used to acquire and process the requested information. All information is stored locally on a vessel server and is also transferred to the customer's office through the satellite terminal in real-time. If the connection is dropped for any reason the data will be synchronised automatically.

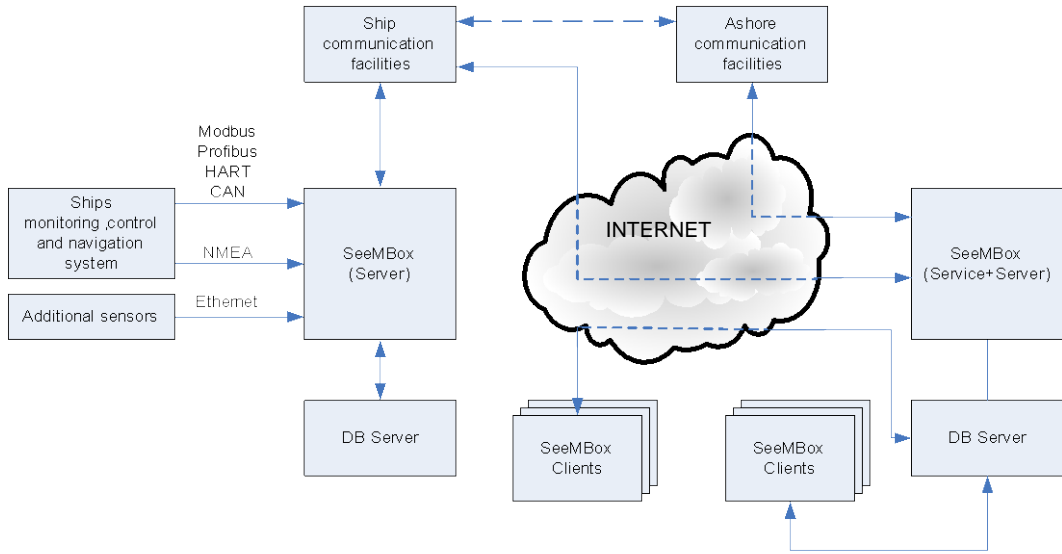
The client has access at the office to all data, including historical information, and can either visualise the vessel's systems in real-time or run reports on demand.

Setel Hellas will also train staff and deliver 24/7 support including annual maintenance and software upgrades.

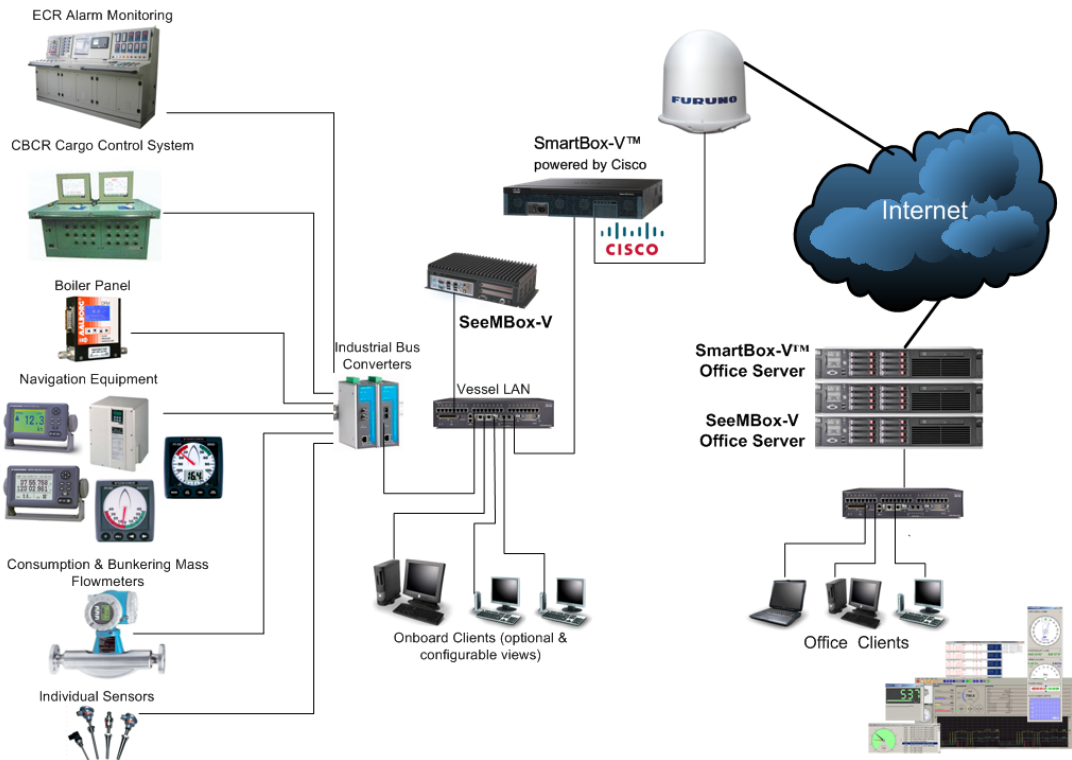
Equipment needed

- Data acquisition modules (installed by Setel)
- Server on the vessel running 32-bit Windows
- Satellite terminal with FleetBroadband and/or GX
- Server at the office running Windows OS

SeeMBox High Level Block Diagram



SeeMBox Installation Example



6. SeeMBox technical summary

The SeeMBox technical features are summarised below:

Features	SeeMBox
Types of satellite terminals supported	FBB 150, 250, 500 and GX
Data connection	Real-time configurable (every 1 to 10 seconds)
Data synchronisation	Automatic/Unattended
Vessel data storage	Depends on number of acquired signals (6-12 months typically)
Reporting	User configurable (may superimpose and compare data from several vessels)
Alarm monitoring system	Standard feature with option for audible indication
Navigational data	Standard feature with map location tracking
Engine control room (ECR), ballast control room (BCR), cargo control room (CCR), flow meters	Optional
Visualisation options	Analog, digital gauges, individual signals or groups (bar charts) user definable
Signals and alarms view	Real-time and historical with play-back option
Mimics	Existing or new per customer's request (e.g. ballast control, cooling system, power plant etc.)
Fuel consumption and performance calculation	For ME and AE in total or separately including emissions calculations and automatic EEOI calculation.
Prevention action protocol	User defined rules allows prevention scenarios using the prevention action protocol solution

7. Test results

SeeMBox over FleetBroadband creates a small amount of traffic only, with data being transferred selectively. A data optimisation engine merely transfers differences and the bandwidth requirements therefore become minimal. Each reading on the vessel may also be independently sampled at a different rate, depending on how fast it changes. In addition, the end user can decide on-demand on the vessel-shore synchronisation rate, which ranges between 1 and 10 seconds and reduces the data footprint even further.

The following table gives an estimate of data transferred based on an actual SeeMBox installation on board a bulk carrier including navigational, access method services (AMS) and fuel consumption readings.

Data traffic requirements

Number of signals	Vessel/office sync rate	Data transfer/month	Equivalent data footprint
250 (typical AMS, navigational and fuel consumption)	1 sec	500MB	200 bytes/second
250 (typical AMS, navigational and fuel consumption)	5 sec	100MB	200 bytes/5 seconds
250 (typical AMS, navigational and fuel consumption)	10 sec	50MB	200 bytes/10 seconds

8. Customisation required

The customer may ask for any customisation of the system's visualisation options. User defined mimics may also be added. Options for acquiring new signals or systems on board the vessel can be added.

9. Further details and support

For general enquiries:

sales@setel-group.com

For technical support:

support@setel-group.com

Setel Hellas S.A:

1, Kantharou & 75, Akti Miaouli str.

185 37 Piraeus, Greece

tel: +30 210 4528157

fax: +30 210 4528123

www.setel-group.com