Specifications of VSAT

Antenna Unit **KU-100AT**		
Antenna Diameter		Dish size: 1.0 m
Antenna Gain	Transmission	41.8 dBi at 14.25 GHz
	Reception	40.6 dBi at 12.50 GHz
Polarization		X-POL
		CO/X-POL (option)
Transmitting Frequency		14.0-14.5 GHz (STD)
		13.75-14.5 GHz (option)*
Receiving Frequency		10.95-12.75 GHz (STD/option)
RF Package	TX	8 W BUC (Block Up Converter)
		8 W Extended BUC (option)
	RX	Wideband LNA
GPS Receiver		Incorporated
Ship's Motion	Roll	±30°/7 sec
	Pitch	±10°/5 sec
	Yaw	±4°/20 sec
	Rate of Turn	±6°/1 sec, 1°/sec²

* Extended BUC required

Below Deck Unit Antenna Control Unit **KU-100AC**	
Interface	Antenna Interface (Power, L-band with control), TRX IF (for Modem), Ethernet, Heading, RS232 (for maintenance)
Power Supply	100-240 VAC (50, 60 Hz) 300 W

Environment		
EMC		IEC 60945 Ed. 4 2002-08
Shock		IEC 60068-2-27
Vibration		IEC 60945 Ed. 4 2002-08
Temperature	Operational	ADE: -25 to +55°C, BDE: 0 to +55°C
	Storage	-40 to +70 °C
Humidity		up to 93 % at 40 °C
Wind Speed		60 m/sec Max.

Satellite Router iDirect 5100		
SatCom Interface		TX-IF: Type-F, 950-1700 MHz, +7 to -35 dBm RX-IF: Type-F, 950-1700 MHz, -65 to 0 dBm
Data Interface	LAN	Single 10/100 and 8-port 10/100 Switch, * 802. 1q VLAN
	RS-232	RJ-45 (for Console connection or Antenna Pointing)
Power Supply		100-240 VAC, 50/60 Hz, 1.32 A max (90 VAC), 0.53 A max (254 VAC)

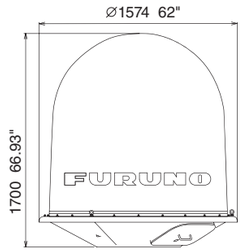
* One LAN port must be interfaced with KU-100AC.

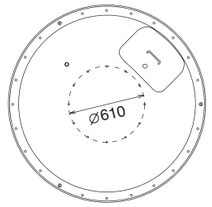
UPS	E11A102A002USJ	E11A102A001
System Topology	Hybrid	
Output Power	700 W/1000 VA	
Voltage	230 VAC	100 VAC
Frequency	50/60 Hz±8%	
Battery Type	Maintenance free sealed lead-acid battery	
Battery Backup Time	5 mins	
Environment		
Operating Temperature	0 to 40 °C	
Humidity	20 to 90 %	

VoIP Switch	AFG200	AFG400	AFG800
FXS Ports	2	4	8
FXO Ports	0	0	0
VoIP Ports	2	4	8
Voice Algorism	G.723.1a, G.729ab, G.711 Auto codec negotiation		
FAX Support	T.38 (ITU-T) and G3 at 2.4, 4.8, 7.2, 9.6, 14.4 kbps		
Echo Canceller	ITU Rec. G168, up to 128 ms		
IP Options	DHCP Client		
Interface	RJ-11 for analog telephones, 10/100 Base-T RJ-45 LAN Interface		
Power Supply	10-240 VAC, 56/60 Hz 22 W		

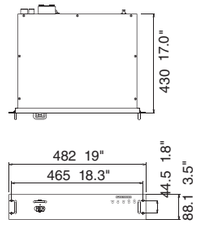
Equipment List	
Standard	
Above Deck Equipment	
Antenna Unit	KU-100AT
Below Deck Equipment	
Antenna Control Unit	KU-100AC
Satellite Router	iDirect 5100
Rack-Mount Tray	iDirect 5100 TRAY
19-inch Rack	RC-600V
UPS	E11A102A002USJ/E11A102A001
Antenna Cable	8D-FB-CV
Option	
VoIP Switch	AFG200 (up to two analog telephones connectable) AFG400 (up to four analog telephones connectable) AFG800 (up to eight analog telephones connectable)
Analog Telephone	FC755D1

Antenna Unit
Weight: 175 kg 385.88 lb

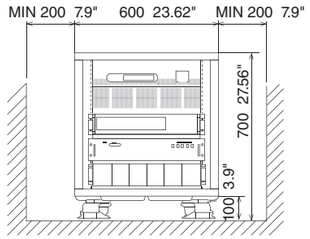


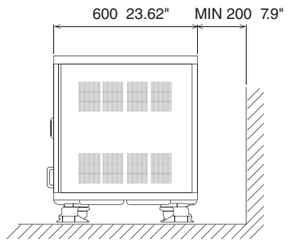


Antenna Control Unit
Weight: 8 kg 17.64 lb

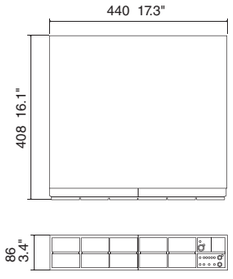


19 inch Rack
Weight: TBC

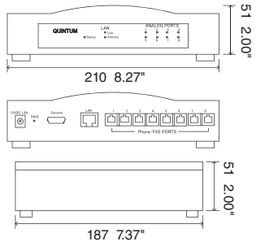




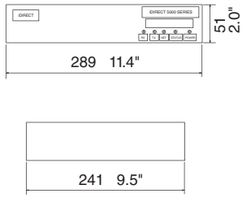
Uninterruptible Power Supply
E11A102A001
17 kg 37.48 lb



VoIP Switch
AFG200/400/800
0.6 kg 1.32 lb



Satellite Router
iDirect 5100
4.6 kg 10.1 lb



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FURUNO

VSAT
Ku-band VSAT

FV-100

FURUNODEEPSEA.com

Bring cost-effective and high-speed broadband communications to your vessel with FURUNO's VSAT

FURUNO brings a Ku-band VSAT communications solution to the maritime industry to meet the growing demand for more bandwidth at sea. VSAT provides broadband communications at sea that are comparable to the communication speeds we are accustomed to using while on shore. On top of fast communication speed for data and voice applications of up to 1 Mbps, VSAT delivers the cost-effective means to maritime broadband communications through its monthly flat communication rate, allowing ship owners to budget air-time rate without any unanticipated fare to be charged. The ERP (Enterprise Resource Planning) system at the head office can be extended to the vessels via VPN (Virtual Private Networks). This means that the officers and crewmembers are now able to make use of more bandwidth-hungry applications such as videoconferencing and downloading, streaming video on demand and others without worrying about the communication bill thanks to the flat communication rate.

This will totally transform maritime communication, with increasing levels of both operational and social communications conducted all at the same time through this new service. Navigators can obtain weather and chart updates* online in order to optimize their route planning and monitoring tasks, while all onboard can still enjoy the benefit of the Internet, e-mailing and making voice calls to the head offices or their friends and families back home all via a single terminal. It would greatly increase information efficiency onboard. It will change the way mariners and vessels communicate, just as on-shore broadband data communications paved the way for the broadband IP era.

* available in the future

VSAT

Ku-band VSAT

FV-100 VSAT terminal

Features of VSAT

▶ **Brings land-based broadband communications environment onboard vessels**

Selectable communication rates meeting with requirements onboard:

- Service providing best effort delivery of up to 1 Mbps down-link
- Fixed flat rate charge according to the selected bandwidth

▶ **Provides broadband communication that can be utilized for a wide variety of applications including both operational and social purposes**

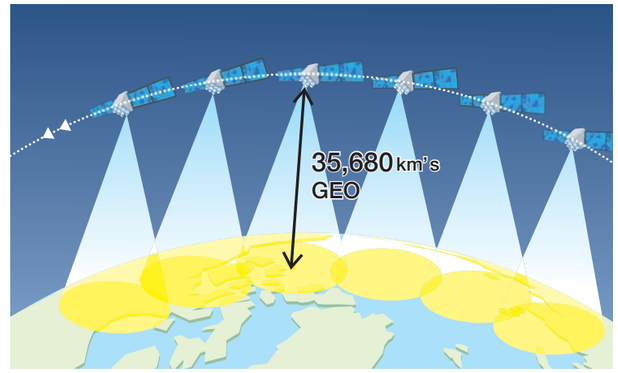
VPN networking, Internet (web browsing, e-mailing), VoIP, Video Store and Forward, high quality live video transmission, two-way videoconferencing, onboard monitoring, chart updates, remote ship management system, etc.*

*Please note that some of these applications listed will be available in the future. Also, certain network devices must be arranged locally, in order for you to make use of some of the applications.

▶ **Allows for unlimited connection at a fixed monthly fee, depending solely on the bandwidth you require**

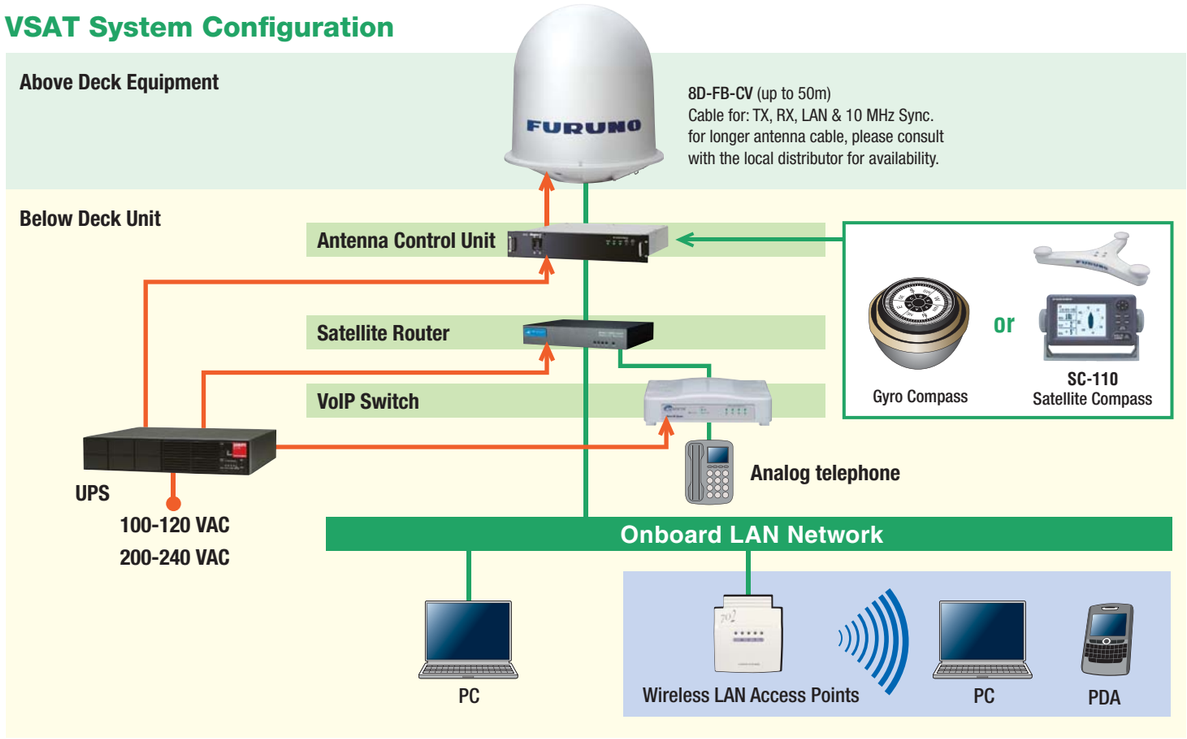
You will no longer need to worry about the communication bill, for independently of how extensive your broadband connection is utilized, the communication costs remain the same, dpending on the service plan you select.

Ku-band GEO Satellite system

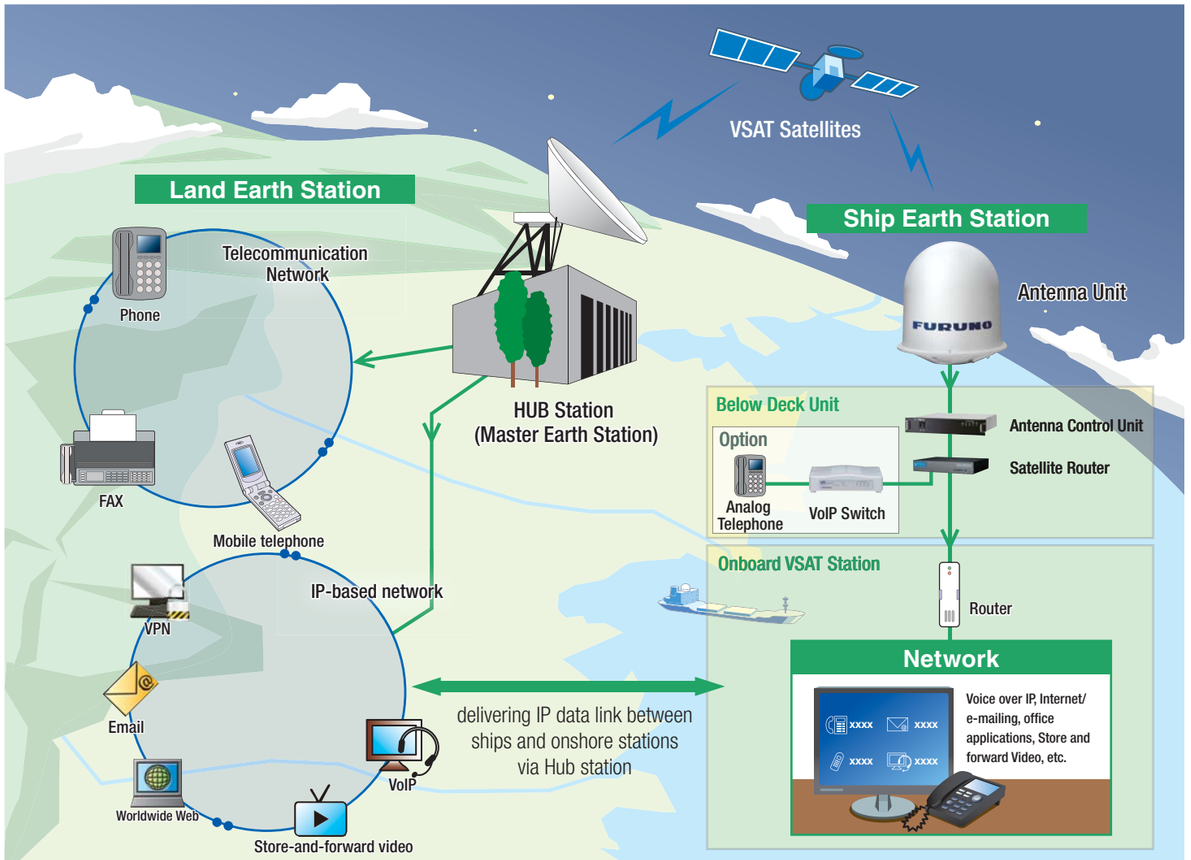


Hundreds of Ku-band GEO (Geostationary Earth bit) Satellites are located 2-3 degrees apart at altitude of 35,680 km. Although each VSAT transponder has a limited coverage delivered by its regional footprint, SafeComNet facilitates switch-over from footprint of one satellite to another in order to deliver a seamless Ku-band service that embraces the major shipping lanes around the world.

VSAT System Configuration



System Overview of VSAT



Comparison between VSAT and FleetBroadband

	VSAT	FleetBroadband
Max. Communication Speed	Up to 1 Mbps*	432 kbps (FELCOM 500, best effort delivery)
Billing	Fixed flat rate according to the selected bandwidth	Pay-as-you-go
Service Coverage	Regional coverage provided by multiple service providers (seamless roaming possible without any roaming surcharge)	Global coverage (with exception of extreme polar regions)
Voice calls	VoIP	Inmarsat rates

* For service faster than 1 Mbps, please consult with your nearest distributors.

SafeComNet™

FURUNO Mobile Satellite Services

FURUNO brings broadband L-band and Ku-band communications solutions "SafeComNet" to the maritime industry to meet the growing demands for more bandwidth at sea. FURUNO's FleetBroadband and VSAT systems provide broadband communication speed that we are accustomed to using while onshore.

FURUNO's new satellite communication solution "SafeComNet" delivers an all-in-one, truly seamless broadband communication to the maritime industry.

www.safecomnet.com


Photo credit Courtesy of AsiaSat


Photo credit Courtesy of Eutelsat

User applications of VSAT*

VSAT supports an extensive range of user applications, which can be conducted all at the same time through a single terminal.

*Certain network devices must be arranged locally, in order for you to make use of some of the applications.

Social communication and increased welfare for crewmembers

Crewmembers are now able to make private phone calls or send SMS using their SIM card to their friends and families back home. They can also browse through the Internet to read news from home, football results or any other news of their interests.

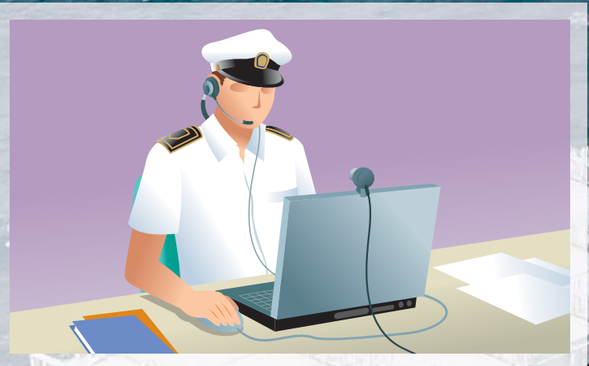
Real-time chart and weather information update for route optimization*

Navigators can now update chart as well as weather information in real-time by which the optimal, fuel-efficient routes can be plotted from port to port based upon the up-to-the-minute chart and weather information.

* available in the future

Educational opportunities for crewmembers using distance learning

Using their off-duty time in a more productive manner has become very popular amongst navigators. VSAT allows crewmembers to attend off-campus distance learning courses through the Internet, using video-streaming or IP-TV to further enhance their skills and academic levels while off-duty.



Briefing with the head office, port authorities and others

Chief officers can conduct briefing with the head offices, port authorities and ship chandlers by using VoIP (Voice over Internet Protocol) and web mail for various occasions. Alternatively, they can make use of two-way live video streaming to facilitate videoconferencing if needed.

Trouble-shooting in case of equipment failure

In case of failure of engine or other onboard equipment, chief engineers onboard can set up live, on-the-spot remote condition-review and trouble-shooting sessions with service engineers from various manufacturers onshore by using two-way live video-streaming. A reliable high bandwidth connection is essential for enabling these functions, and VSAT provides a perfect solution.

"Always on" connectivity to the internet and the head office's network through secure VPN connection

Crewmembers can access the company's intranet through secure VPN channel.