



Shaping the future

... in NAVAL COMMUNICATIONS



**Secure
Fast
Reliable Communications**

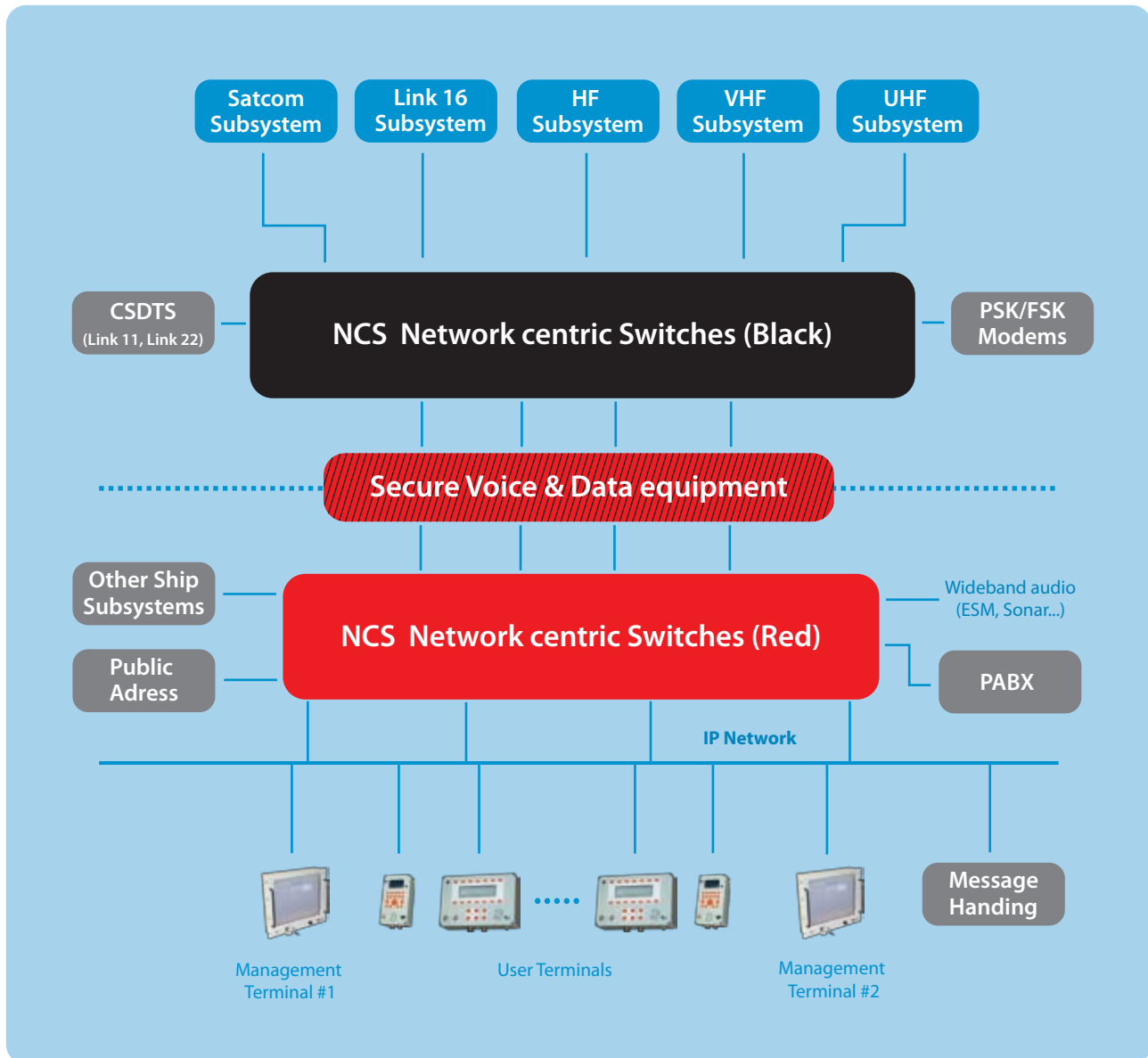
for all types of warships



ICCS

Integrated Communications Control System, featuring

- Full integration of all internal and external communications resources, including remote control functions
- Powerful, comprehensive control and supervision tool
- Unique operational characteristics, namely through the concept of communication plans (Complans); an extremely efficient management of resources is achieved, as well as the capability to react quickly to changes on the operational scenario
- Embedded Training facilities allowing the set-up of a communications training environment; coexisting with normal operation, it enables on-board users to develop their operational proficiency
- High survivability and reliability; no single point of failure at the system level



Cost-effective, modular system design

- Open system, based on widely accepted standards and technology, thus guaranteeing easy, fast and cost-effective integration of communication equipment and subsystems of any manufacturer
- Interfaces to the Combat System enabling the transfer of information between both systems
- Inherent upgrade and growth capabilities, both in terms of configuration and technological evolution
- Flexible architecture, suitable for any type of warship
- State-of-the-art technology

Tailored to meet the requirements of each specific Customer

ICCS is indeed a step ahead in terms of shipboard communications management, supporting high-level concepts such as COMPLANS and On Board Training facilities.

The system features a centralized control, with an appealing, intuitive and powerful Human interface, that turns the control and management of the ship's communications into a simple and trivial task, requiring a minimum of skilled personnel.

The screenshot displays the ICCS interface with a table of communication channels. The table has columns for 'Number', 'Frequency', 'Mode', 'Radio Equipment', 'Auxiliary Equipment', and 'Users'. A callout 'EMCON emission control' points to the 'Profile' dropdown menu. Other callouts describe system capabilities like flexible transceiver use, parallel keying, and remote control integration.

S/N	Number	Frequency	Mode	Radio Equipment	Auxiliary Equipment	Users
1	CC654 RP	24395.750K	USB USB	RHF2/2		ASA-DB, ASA-EB, CCOM, FDD, PONTE, BRGDIA
2	E654 RP	24395.750K	USB USB	RHF2/1		ASA-DB, ASA-EB, CCOM, FDD, PONTE, BRGDIA
3	4227K			PKFY		ASA-DB, ASA-EB, CCOM, BRGDIA
4	-> 8	15360.000K	USB	TRHF1/1	REV	
5	-> 1	24580.000K	USB	TRHF2/1	REV	
6	-> 2	265.500M	FM	VHF1/1	WSV	
7	-> 3	243.550M	FM	VHF1/2	WSV	
8				RETRAD		
9				FHF1/1	MOD1	EWR
10				VHF1/1	MOD2	
11				PKFY		CLARO
12				TRHF1/1	MOD3	
13				TRHF2/1	MOD3	
14				VHF1/1	MOD3	
15				VHF1/2	MOD3	
16				VHF1/3	MOD3	
17	A654 EE	12550.000K	USB	TRHF1/1	REV	ASA-DB, ASA-EB, CCOM, FDD, PONTE, BRGDIA
18	S4LK 11	12550.000K	USB USB	TRHF1/1		CCOM
19	S4LK 11	12550.000K	USB USB	TRHF1/2		PONTE
20	148 ZX	278.800M	AM	VHF1/3		ASA-DB, FDD, BRGDIA
21	6451 A			GPO		ASA-EB

The overall system set-up (channel allocation, frequencies, operation modes, etc.) can be changed either automatically or with a single command, enabling short reaction time to changes in the operational context.

Powerful internal communication capabilities including:

- Point-to-point and conference circuits
- Special facilities such as group calls and programmable priority break-in

Flexible utilisation of transceivers, modems and crypto devices.

Parallel keying and Radio relay circuits.

Frequency "kick" support, to allow fast reaction time to changes in the operational context.

Remote control of communications equipment, including real-time status monitoring, fully integrated into the COMPLANS.

Multiple and dynamic assignment of external channels, either plain or secure to User Terminals.

High Survivability and Reliability

- Automatic re-routing facilities
- Duplication of all system vital components
- Modularity
- Distribution of Network Centric Switches (NCS) through different ship's compartment, minimising the consequences of a single hit
- Allocation of communication equipment of the same type to multiple NCS, considerably reducing the impact of a single failure
- Minimum cabling; extensive use of fibre optics
- Separate cable runs, avoiding the risk of simultaneous cable cuts
- Special coating of circuit card assemblies for protection against environmental agents
- EMI/EMC protective measures
- Extensive use of high-quality, low cross-talk and self-extinguishable, halogen-free cables
- Careful design and construction of mechanical parts bearing in mind the shipboard, corrosion prone environmental conditions
- Resilient mounting of equipment cabinets whenever required to cope with the shock and vibration phenomena prevailing on board naval vessels

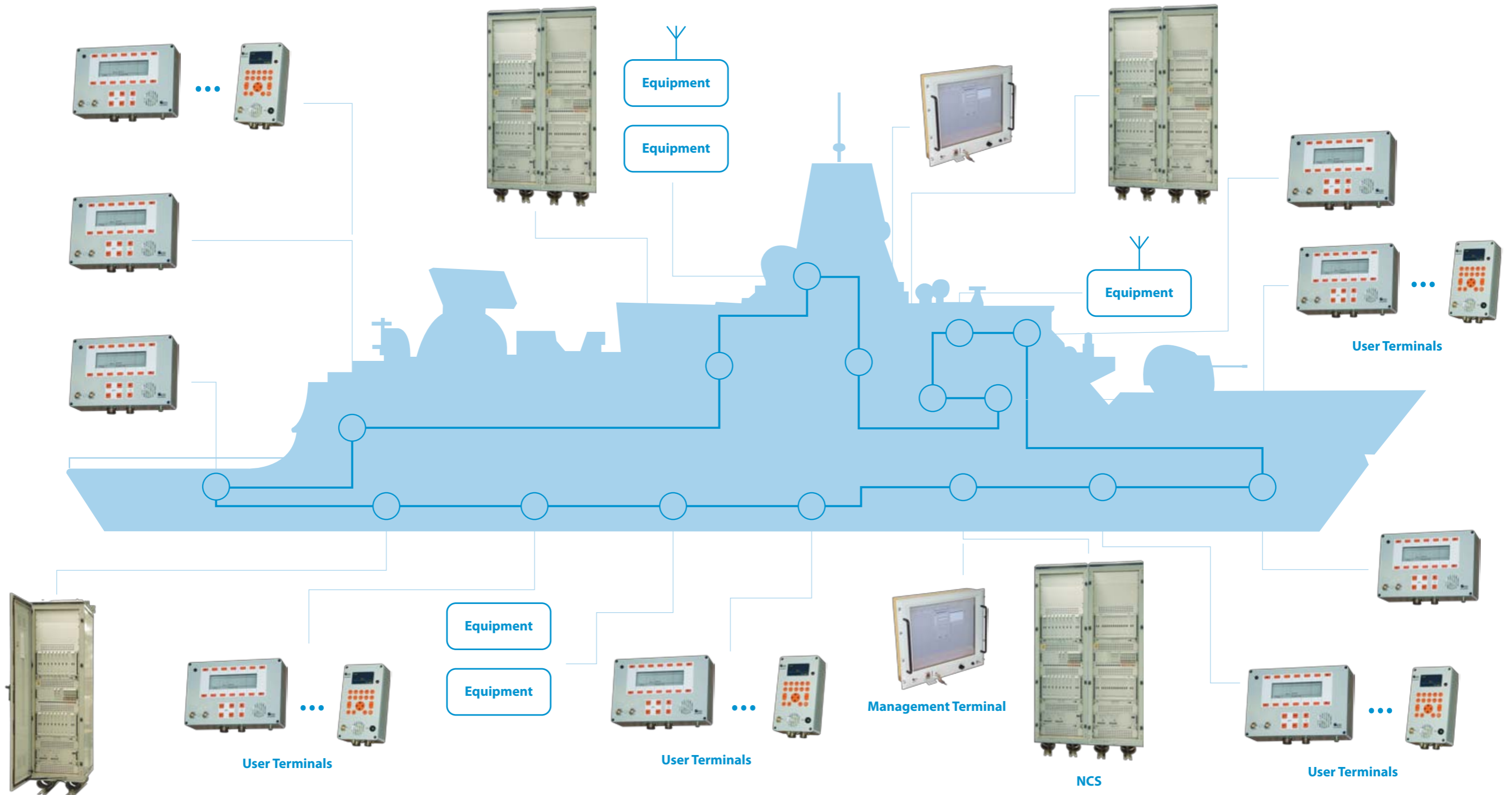
Nowadays, as naval platforms expand their operational capabilities and naval operations move towards cooperative engagement and defence (over and over in a multinational environment), communications (both external and internal) are facing new challenges and demands.

To cope with these new scenarios EID developed and launched an IP based Integrated Communications Control System.

This new ICCS generation is the outcome of EID solid know-how and enduring presence in the naval communications field, together with long-term and fruitful relationships with a diversity of navies and multiple crews.

ICCS main components

- **NCS**, Network Centric Switches, providing
 - Digital and analogue interfaces to the communications equipment
 - Signal distribution functions
- **User Terminals**
 - Simultaneous access to internal and external communication channels
 - Equipment Remote Control
 - Other services
- **Management Terminal**, enabling a single operator to take care of the full control and supervision of the system



Network Centric Switches Technical Data

Gigabit Ethernet Interface	1000Base-SX (802.3z Physical Layer)
ISDN Basic Access	according to ETS 300 012 (ISDN; Basic Rate User Network Interface, Layer 1, Specification and Test Principles)
ISDN Primary Access	according to ETS 300 011 (ISDN; Primary Rate User Network Interface, Layer 1, Specification and Test Principles); CCITT G.703 (Physical-Electrical Characteristics of Hierarchical Digital Interfaces); CCITT G.704 (Synchronous Frame Structure Used at Primary and Secondary Hierarchical Levels); CCITT G.706 (Frame Alignment and CRC Procedures Relating to Basic Frame Structures Defined in Recommendation G.704); CCITT I.412 (ISDN User Network Interfaces)
Analogue Interfaces	4-wire, 0dBm @600Ω; balanced/unbalanced
Vinson Interfaces	Digital, 6-12Vpp
Link11 Interfaces	0 dBm@600Ω, balanced
Digital outputs	Solid state relay
Digital inputs	Optically isolated
Serial Data Interfaces	RS232/MIL-188/RS422, synchronous or asynchronous
Remote Control Interfaces	10/100 Ethernet RS232/RS422, synchronous or asynchronous Baud rate configurable from 75 to 57600 N° of stop bits: 1, 1.5, 2 Parity: none, odd, even
PTT delay	Link11 < 1 ms
Power Supply	115/230 Vac ±10%, single phase, 50/60 Hz ±5%
Temperature range	0 to 50° C, operating
Humidity	up to 95% non-condensing
Vibration	MIL-STD-167
Shock	MIL-S-901D, grade A (cabinet with shock absorbers)
EMI/EMC	MIL-STD-461E (Ships)

User Terminal Technical Data

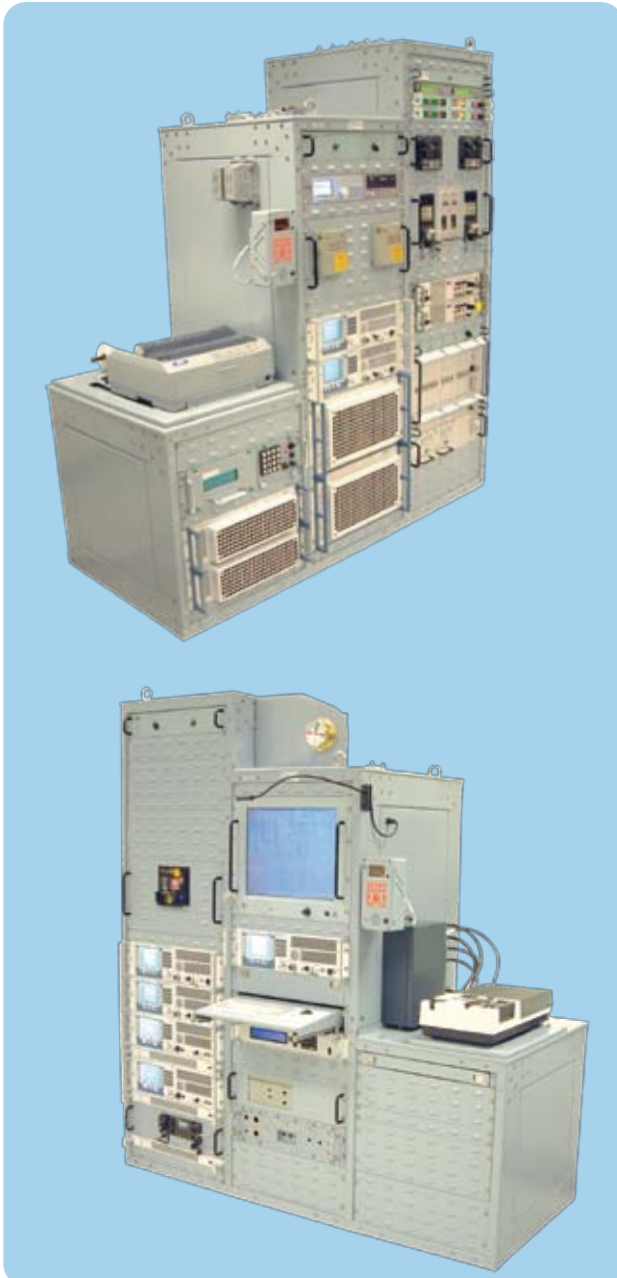
Audio and Data I/O	100Base-TX Ethernet Interface, according to IEEE 802.3u
Power Supply	Powered over Ethernet (PoE), according to IEEE 802.3af
Consumption	10W maximum
Earphone outputs	2 independent channels (left and right), with 65mW @ 600Ω
Microphone input	1 mV, Rin 600 Ω @ 1kHz
Loudspeaker output	2W with volume control
Audio bandwidth	3.1kHz/20kHz
Signal-to-noise ratio	better than 60 dB
Auxiliary connector	1 audio input and 2 audio outputs (left and right channels); 2 independent audio outputs (left and right channels), 0dBm@ 600Ω, balanced; 1 auxiliary relay output (dry contact)
Display	High-resolution colour LCD
EMI/EMC	MIL-STD-461E
Temperature	-20 to +70°C
Humidity	up to 95% non-condensing at +55°C
Corrosion	Salty environment
Vibration	MIL-STD-167
Shock	MIL-S-901D, grade A
Watertightness	IP54 (IP56 with enclosure)
Dimensions (WxDxH)	265 x 75 x 177 mm, without connectors
Weight	2.5 kg

Systems Integration

EID supplies state-of-the-art, high performance Fully Integrated Information and Communications Systems, meeting the most stringent requirements of any type of warship.

With ICCS as the core sub-system that glues together all the on-board communications equipment, the Fully Integrated Information and Communications Systems include all the equipment required to establish the different types of external and internal communication channels, namely:

- radios (covering all the necessary frequencies bands), SATCOM equipment
- modems
- COMSEC equipment
- GMDSS equipment
- Public Address System
- Message Handling System
- Sound Power Telephones and PABX
- Wireless systems
- Data Networks



Besides equipment/sub-systems selection and supply, EID carries out all the design and engineering activities required to provide a fully integrated, operational system. These include:

- system-ship and inter-system interface design (electrical and mechanical)
- power supply requirements, environmental aspects
- room lay-outs
- top-side antenna arrangement
- installation data and drawings, cable plans
- setting to work, acceptance tests
- integrated logistics support, cataloguing and quality assurance plan

Most of the communications equipment is housed in consoles and cabinets specifically designed to cope with the severe space and environmental constraints prevailing aboard warships.

An emblematic Fully Integrated Information and Communications System example is the one supplied by EID for submarines; the overall system complies with demanding requirements, such as:

- Shock standard BV043
- EMI/EMC MIL-STD-461
- Airborne Noise Requirements
- Structureborne Noise Requirements

ICCS

key benefits and advantages:

- Fully integrated communications system
- Unique and thorough systems approach to Naval Communications
- Open system design
- Cost-effective solution
- Customized to meet the specific requirements of the users

Over 70 **ICCS** systems are currently installed in all types of warships, from patrol boats and submarines to frigates, LPDs and aircraft carriers.

