BLUECOM+

BROADBAND COST-EFFECTIVE INTERNET ACCESS AT REMOTE OCEAN AREAS

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AN INNOVATIVE COMMUNICATIONS SOLUTION FOR INTERNET ACCESS AT REMOTE OCEAN AREAS

MOTIVATION

There is no communications solution enabling broadband, cost-effective Internet access at remote ocean areas in alternative to satellite communications.

GOAL

The goal is to develop an innovative communications solution that will enable broadband, affordable Internet access at remote ocean areas for regular devices using standard wireless access technologies, such as Wi-Fi and 4G. The project includes the specification, implementation and laboratory testing of the communication solution, to ultimately create a prototype that will enable broadband Internet access in remote ocean areas, beyond 100km from shore, in alternative to satellite communications.

TARGET GROUPS

THE TARGET GROUPS INCLUDE: MARITIME TRANSPORTATION; FISHERIES, AQUACULTURE AND FISHING INDUSTRY; SCIENTISTS AND RESEARCHERS; COASTAL AND MARINE WATER MANAGEMENT SYSTEM; MARINE BIOTECHNOLOGY, MARINE MINERAL AND ENERGY RESOURCES.

FUNDING

THIS PROJECT IS FUNDED BY NORWAY, ICELAND AND LIECHTENSTEIN THROUGH EEA GRANTS

INESCTEC
TECHNOLOGY & SCIENCE
ASSOCIATE LABORATORY
PORTUGAL

INESC TEC
R DR. ROBERTO FRIAS
4200-465 PORTO
PORTUGAL

T +351 222 094 000
F +351 222 094 050
info@inesctec.pt
www.inesctec.pt

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JANUS - NC

MULTI-TECHNOLOGY MESH ACCESS POINT FOR NEAR-COAST COVERAGE

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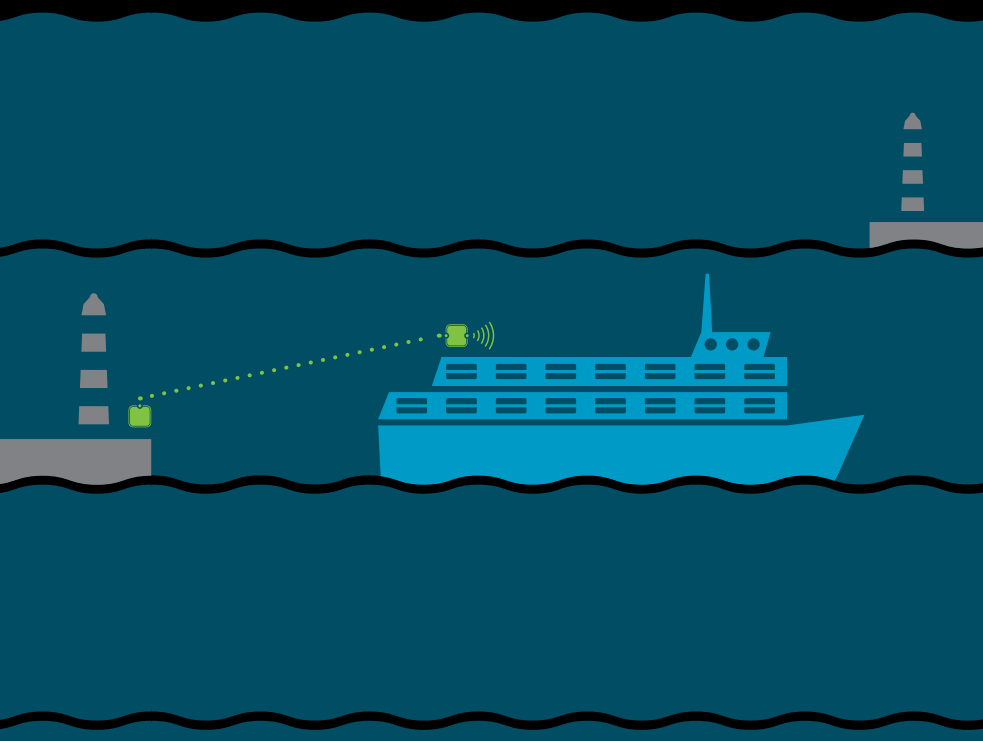

JANUS - NC

MULTI-TECHNOLOGY MESH ACCESS POINT
FOR NEAR-COAST COVERAGE

Network equipment capable of offering Wi-Fi coverage, while connecting to the Internet via multiple heterogeneous links such as 3G, WiMax, and even other Wi-Fi connections. The devices connect to JANUS via a single stable Wi-Fi connection and the box transparently selects the best connection to the infrastructure, depending on temporal conditions. JANUS can form a transparent mesh network that is used to extend a network infrastructure or Internet link to remote locations, via multi-hop wireless links. JANUS can offer Internet connectivity and services (e.g., VoIP) to passengers on boats near the coast or at the dock. Improved Internet connectivity can be achieved using fiber or ADSL as backhaul instead of 3G/WiMax. It can also be used to provide a dedicated network for nodes of the same entity.

FUNCTIONALITIES

Near coast Internet extension
Self configured network
Support for prioritised traffic and QoS
Support for data storage
Remote management
JANUS GPS location - estimated position of network clients

MAIN FEATURES

Support for multi-hop and mobile mesh network mode (Wi-Fi)
Scales to large mesh networks (up to 7000 JANUS boxes)
Multiple link layer technologies: 3G, Wi-Fi, WiMax, etc.
Stable Wi-Fi connection regardless of the Internet link used
Unnecessary network planning: dynamic auto-configuration

TECHNICAL SPECIFICATIONS

Dimensions: 26cm length, 23cm width, 8.8 cm height
Power: DC jack or passive POE, 7-20 V, 5-6 W
Supports renewable energy sources (e.g., solar panels)
Internal Batteries: 12 V, 7.2 Ah
Autonomy: ~10 hours
WRAP-BOX is rated NEMA-67 / IP67

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TECHNOLOGY & SCIENCE
ASSOCIATE LABORATORY
PORTUGAL

CAMPUS DA FEUP
R DR. ROBERTO FRIAS 378
4200 - 465 PORTO
PORTUGAL

T +351 222 094 000
F +351 222 094 050
www@inescporto.pt
www.inescporto.pt

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JANUS-SR

MULTI-TECHNOLOGY MESH ACCESS POINT FOR SEARCH-AND-RESCUE OPERATIONS

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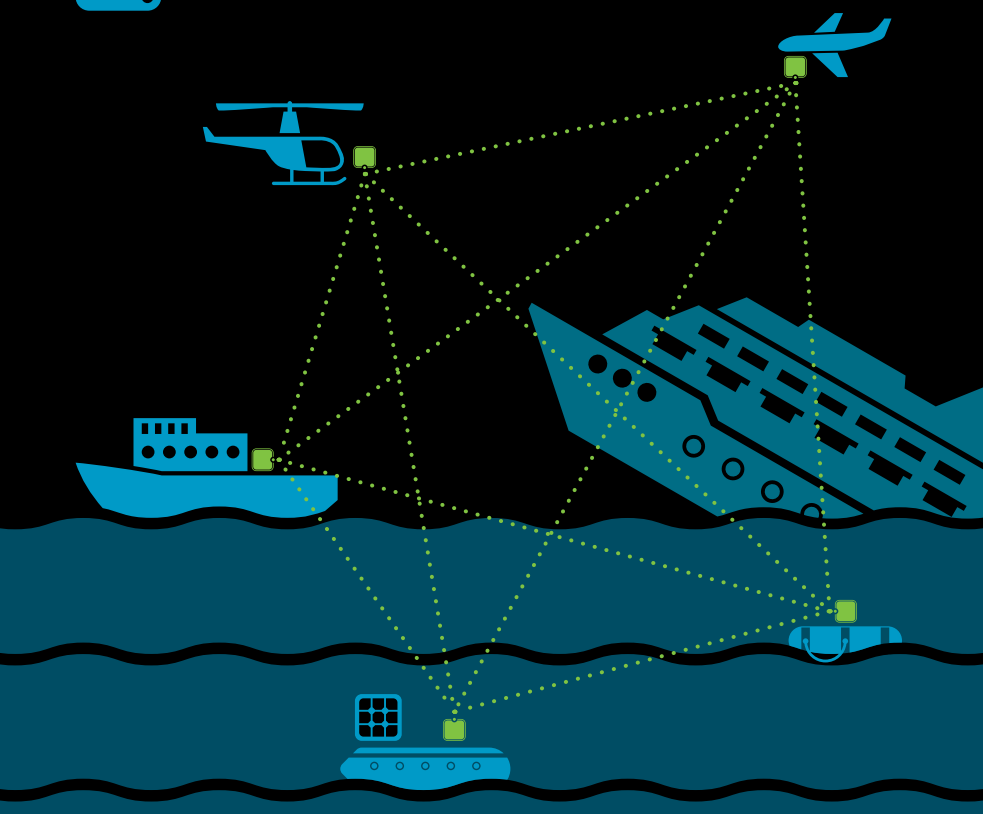

JANUS - SR

MULTI-TECHNOLOGY MESH ACCESS POINT
FOR SAR OPERATIONS

Network equipment capable of automatically interconnecting with other boxes to form a single broadband mesh network covering a large area for Search-and-Rescue (SAR). JANUS automatically discovers and reconfigures the network topology, providing broadband Wi-Fi connectivity to legacy terminals for local Command and Control. Each terminal, mobile or not, can communicate with any other terminal as if they all belonged to the same LAN, even if they are kilometres apart. Connections to the Internet can also be established if at least one JANUS box has Internet access, through Wi-Fi, 3G, WiMAX or other technology. Integration of drones is supported using the 802.11p wireless technology.

FUNCTIONALITIES

Broadband wireless coverage - JANUS in boats or buoys
Data exchange among equipment of different technologies
VoIP, video, and convey alarm information from sensors
Self configured network
Support for prioritised traffic and QoS
Remote management
Integration of drones - using the 802.11p wireless technology
JANUS GPS location - estimated position of network clients

MAIN FEATURES

Support for multi-hop and mobile mesh network mode (Wi-Fi)
Scales to large mesh networks (up to 7000 JANUS boxes)
Multiple link layer technologies: Wi-Fi, WiMAX, ZigBee, etc.
Stable Wi-Fi connection regardless of the Internet link used
Unnecessary network planning: dynamic auto-configuration
Fast deployment of broadband telecommunications networks

TECHNICAL SPECIFICATIONS

Dimensions: 26cm length, 23cm width, 8.8 cm height
Power: DC jack or passive POE, 7-20 V, 5-6 W
Supports renewable energy sources (e.g., solar panels)
Internal Batteries: 12 V, 7.2 Ah // Autonomy: ~10 hours
WRAP-BOX is rated NEMA-67 / IP67

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TECHNOLOGY & SCIENCE
ASSOCIATE LABORATORY
PORTUGAL

CAMPUS DA FEUP
R DR. ROBERTO FRIAS 378
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PORTUGAL

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JANUS - OS

MULTI-TECHNOLOGY MESH ACCESS POINT FOR OFFSHORE FACILITIES

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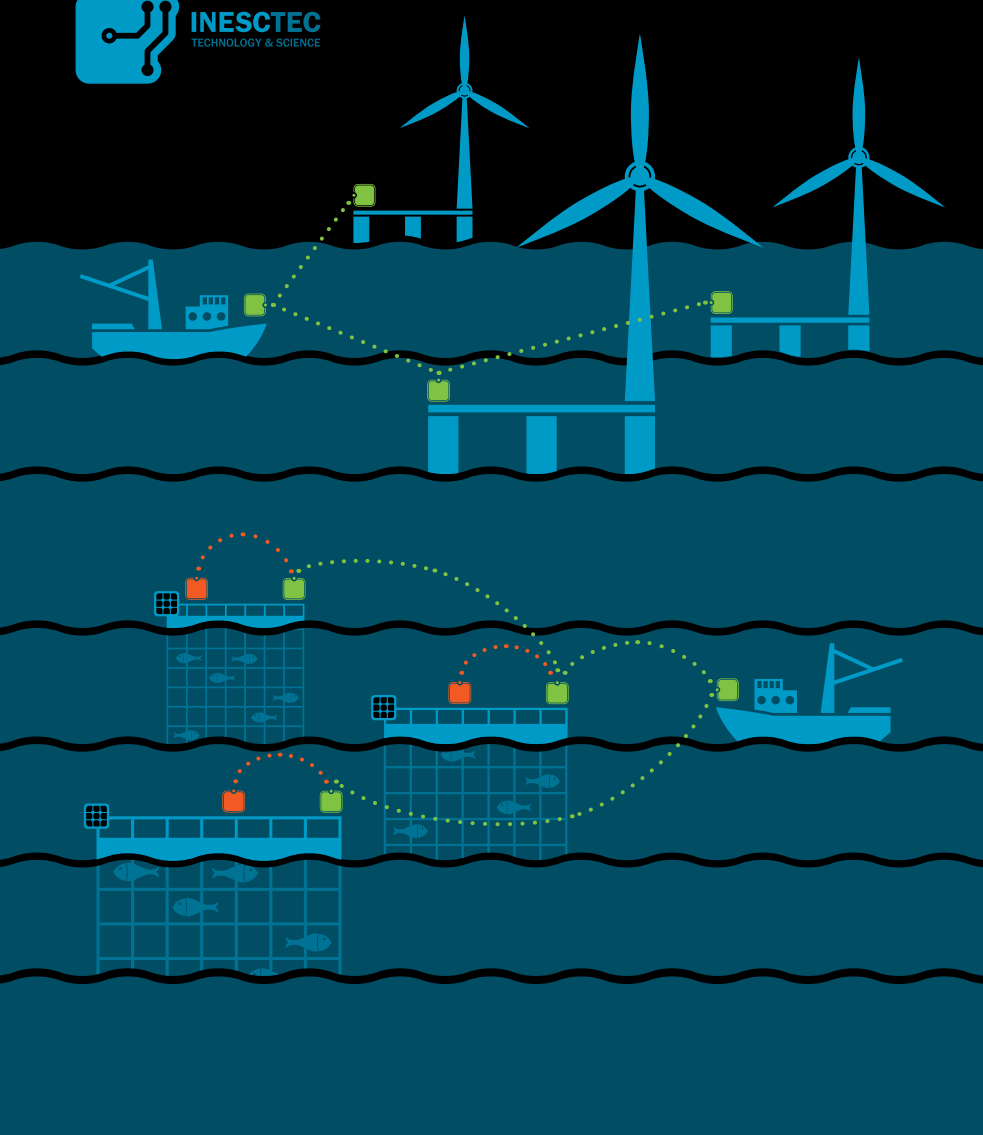

JANUS - OS

MULTI-TECHNOLOGY MESH ACCESS POINT
FOR OFFSHORE FACILITIES

Network equipment capable of automatically interconnecting with other boxes to form a single large area mesh network. At the same time, it offers Wi-Fi connectivity to normal terminals. The terminals connected to a JANUS box may communicate with any other terminals, even if they are kilometres apart, as long as they are connected to this broadband network. Each JANUS box provides a set of interfaces to support the integration of different devices and technologies (e.g., GPS, sensors, BT, ZigBee, etc.) and it is capable of providing QoS.

FUNCTIONALITIES

Broadband network connecting off-shore infrastructures
and mobile terminals (e.g., user terminals on boats)
Self configured network
Video, VoIP and data exchange among different equipments
Prioritised traffic and QoS – namely events/alarms
Support for data storage
Remote management
JANUS GPS location – estimated position of network clients

MAIN FEATURES

Support for multi-hop and mobile mesh network mode (Wi-Fi)
Scales to large mesh networks (up to 7000 JANUS boxes)
Multiple link layer technologies: Wi-Fi, WiMAX, ZigBee, etc.
Nodes/Clients connect to a normal Wi-Fi connection
Unnecessary network planning: dynamic auto-configuration

TECHNICAL SPECIFICATIONS

Dimensions: 26cm length, 23cm width, 8.8 cm height
Power: DC jack or passive POE, 7-20 V, 5-6 W
Supports renewable energy sources (e.g., solar panels)
Internal Batteries: 12 V, 7.2 Ah
Autonomy: ~10 hours
WRAP-BOX is rated NEMA-67 / IP67

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COTTOS-D

MULTI-TECHNOLOGY EQUIPMENT FOR SECURE BROADBAND SELF-CONFIGURED MESH NETWORK

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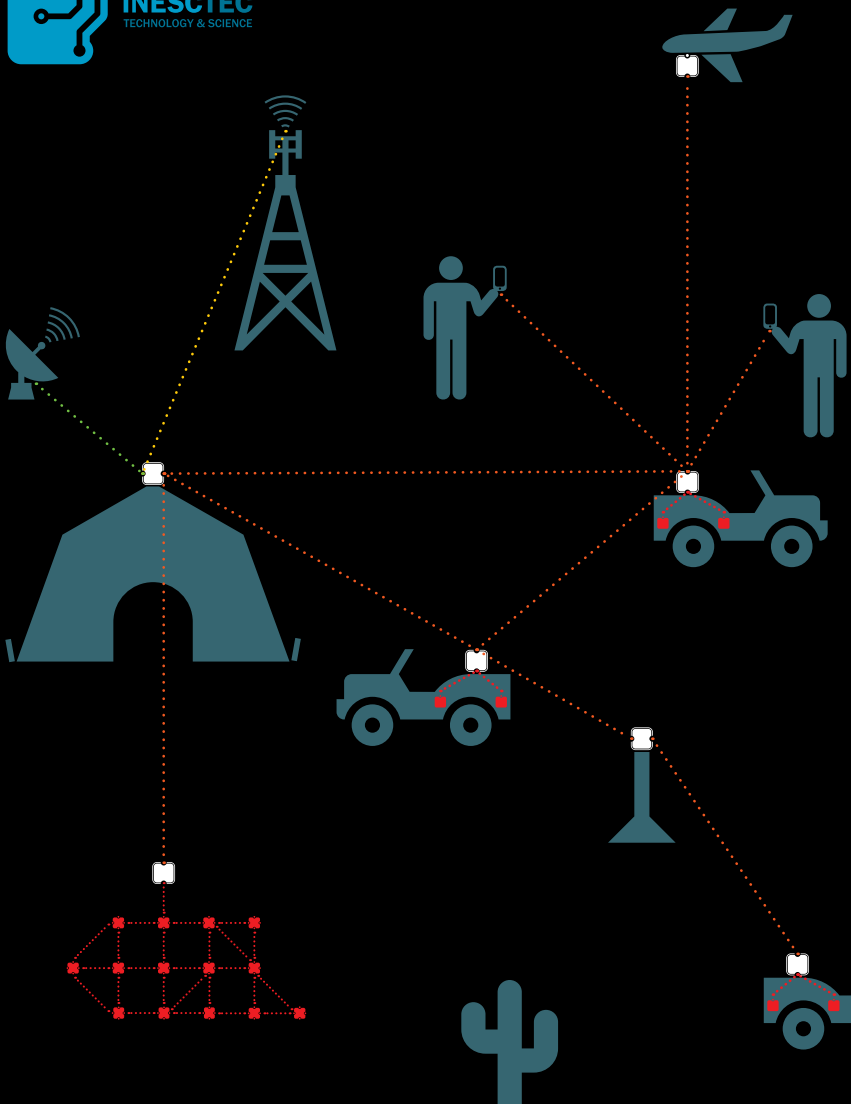

COTTOS-D

MULTI-TECHNOLOGY EQUIPMENT FOR SECURE BROADBAND SELF-CONFIGURED MESH NETWORK

COTTOS-D is a versatile network equipment capable of automatically and dynamically interconnecting with other boxes to form a single, private and secure broadband mesh network covering a large area and supporting legacy terminals (Command and Control operations). Connections to outside the private network can also be established if at least one box acts as a Gateway, using Satellite, 3G/4G or other technology. Integration of Sensors and Wireless Sensor Networks is possible. Drones may be supported by IEEE 802.11p.

FUNCTIONALITIES

Broadband wireless coverage in ad-hoc scenarios
Support for data exchange using different communications technologies
Secure, mobile and private communications
Support for VoIP, video and alarm information from sensors
Support for data storage
Self-configured network
Support for prioritised traffic and QoS
Remote management
Prepared for integration with renewable energy sources
Integration of drones supported by IEEE 802.11p
Data exchange among fast moving nodes using IEEE 802.11p
GPS positioning and estimation of the location of other terminals

MAIN FEATURES

Works in a multi-hop mesh network mode
Scales to large mesh networks (up to 7000 boxes)
Supports multiple link layer technologies, such as Wi-Fi, WiMax, Ethernet, ZigBee
Discovers and reconfigures the topology dynamically
Supports moving boxes and terminals
Works without a telecommunications infrastructure (such as in desert scenarios)

TECHNICAL SPECIFICATIONS

500 MHz AMD Geode, 256 MB RAM // Dimensions: 26cm length, 23cm width, 8.8cm height // Power: DC jack or passive POE, 7-20 V, 5-6 W // Supports renewable energy sources (solar panels, for instance) // Internal Batteries: 12 // V, 7.2 Ah // Estimated autonomy: 10 hours // WRAP-BOX is rated NEMA-67 / IP67

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ASSOCIATE LABORATORY
PORTUGAL

CAMPUS DA FEUP
R DR. ROBERTO FRIAS 378
4200 - 465 PORTO
PORTUGAL

T +351 222 094 000
F +351 222 094 050
www@inescporto.pt
www.inescporto.pt

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COTTOS-C

MULTI-TECHNOLOGY NETWORK EQUIPMENT FOR SECURE, MOBILE AND PRIVATE COMMUNICATIONS

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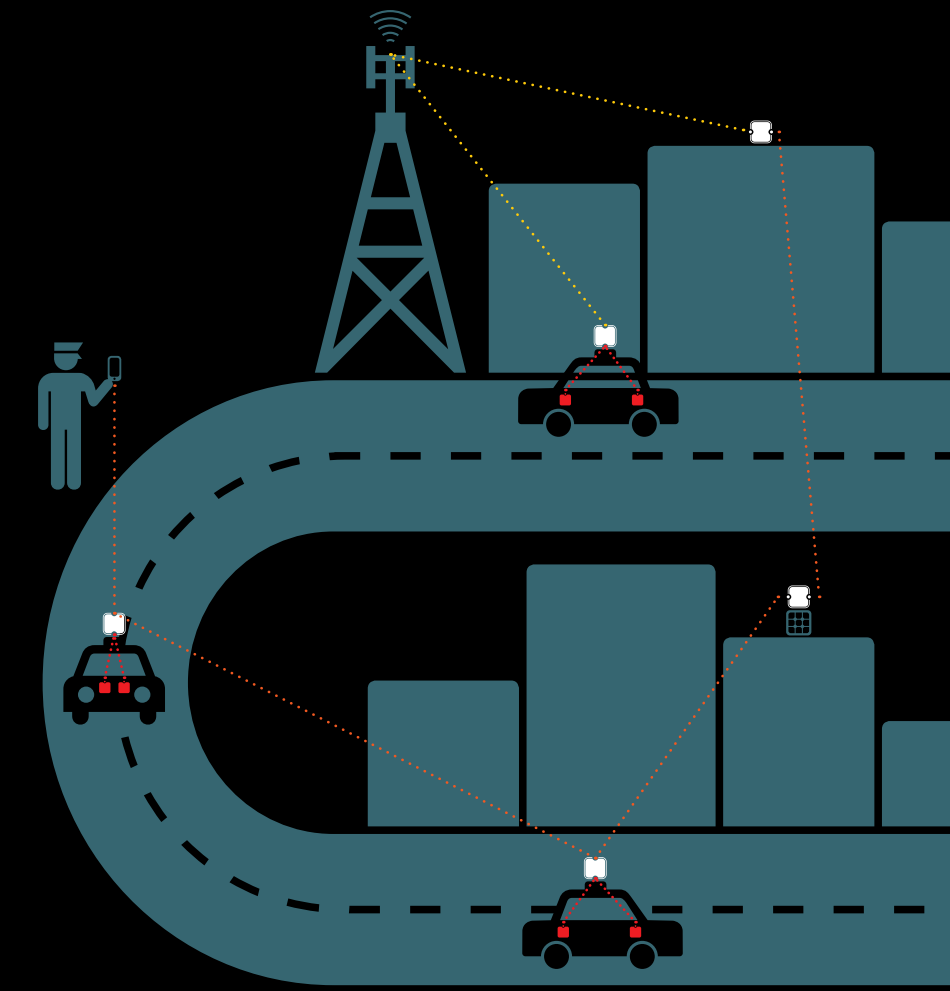

COTTOS-C

MULTI-TECHNOLOGY NETWORK EQUIPMENT FOR SECURE, MOBILE AND PRIVATE COMMUNICATIONS

COTTOS-C is a versatile network equipment capable of offering broadband wireless coverage, acting as a Gateway to an external network / Internet via multiple heterogeneous links, such as 3G/4G, WiMax and Wi-Fi connections. The box dynamically and transparently selects the best connection to the external network. COTTOS-C provides private and secure network connectivity for nodes belonging to the same entity (the police or the army, for example).

FUNCTIONALITIES

- Broadband wireless coverage in infrastructured scenarios
- Support for data exchange using different communication technologies
- Secure, mobile and private communications
- Support for VoIP, video and alarm information from sensors
- Support for data storage
- Self-configured network
- Support for prioritised traffic and QoS
- Remote management
- Integration of drones supported by IEEE 802.11p
- Data exchange among fast moving nodes using IEEE 802.11p
- GPS positioning and estimation of the location of other terminals

MAIN FEATURES

- Works in a multi-hop mesh network mode
- Scales to large networks (up to 7000 boxes)
- Supports multiple link layer technologies, such as Wi-Fi, WiMax, Ethernet, ZigBee
- Nodes/Clients benefit from a stable Wi-Fi connection, regardless of the chosen mesh connection link
- Discovers and reconfigures the topology dynamically
- Supports moving boxes and terminals (for instance, in cars)

TECHNICAL SPECIFICATIONS

- 500 MHz AMD Geode, 256 MB RAM
- Dimensions: 26cm length, 23cm width, 8.8cm height
- Power: DC jack or passive POE, 7-20 V, 5-6 W
- Supports renewable energy sources (for instance, solar panels)
- Internal Batteries: 12 V, 7.2 Ah; Estimated autonomy: 10 hours

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ASSOCIATE LABORATORY
PORTUGAL

CAMPUS DA FEUP
R DR. ROBERTO FRIAS 378
4200 - 465 PORTO
PORTUGAL

T +351 222 094 000
F +351 222 094 050
www@inescporto.pt
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VSAT

VERY SMALL APERTURE TERMINAL FOR SATELLITE COMMUNICATIONS

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VSAT
VERY SMALL APERTURE TERMINAL FOR SATELLITE COMMUNICATIONS

A Very Small Aperture Terminal (VSAT) is a two-way satellite dish antenna, typically around 1 metre in diameter. VSAT can be used in both terrestrial ground stations and stabilised maritime antennas, providing data rates up to 4 Mbit/s from satellites in geosynchronous orbit.

This technology allows for simultaneous voice and data communication, including Internet connectivity. Therefore, this is a more practical alternative to terrestrial connectivity, especially when terrestrial networks are not available or reliable such as in remote areas.

INESC TEC specialises in designing and characterising waveguide devices for satellite applications, particularly for VSAT communications. The developed VSAT microwave configuration includes a feed, which illuminates the antenna dish, an orthomode transducer (OMT), necessary to isolate the transmitted and received signals, and a Transmit/Receive (TR) filter, which provides further isolation between the signals.

MAIN FEATURES

Ku band
Simple and affordable fabrication
Lightweight

SPECIFICATIONS

Receive Frequency: 10.7-12.75 GHz
Receive Return Loss: <-25 dB
Transmit Frequency: 13.75-14.5 GHz
Transmit Return Loss: <-26 dB
Transmit/Receive Isolation: >50 dB
Dimensions: 62mm x 172mm x 120mm
Feed radiation pattern: 40° (FWHM)
Total Weight: 400 g

INESCTEC

CAMPUS DA FEUP
RUA DR. ROBERTO FRIAS
4200-465 PORTO
PORTUGAL

T +351 222 094 000
F +351 222 094 050
info@inesctec.pt
www.inesctec.pt

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