

# secure communication communication nodes

for network-enabled field-deployable operations

## Civil and National Security

**Atos Communication Nodes provide the platform for network-enabled operations even for field-deployed or mobile missions. The multitude of available interfaces allow for connection of a wide variety of field-deployed applications and equipment.**

The Atos CommBox can be used to provide routing, switching and media conversion to access whole IP networks such as MPLS but also for the integration of existing data transport equipment like Line of Sight equipment, radio, wireless LAN and satellite transceivers into a battlefield/damage zone IP network.

CommNodes are available in a mobile and a fixed configuration to suit any need for connectivity. Atos mobile CommNodes, the so-called Atos CommBox, is designed for outdoor deployment with sufficient protection to withstand adverse environmental conditions. It can be operated from - 30 to + 55 °C and has a degree of protection of IP 64.

All CommNodes share the same modular and extensible architecture to allow for customization and adaptation to suit any need or interface. Atos is capable of offering any customization and adaptation to allow for the integration of your existing data transport layer and/or your existing equipment to be used for network-enabled operations.



Built-in security is realized with firewalls, virtual private networks, encryption and virtual LANs. A robust implementation of Quality of Service allows to shape traffic and to provide the necessary priorities for real-time applications or time-critical data.

Remote management capabilities allow for a minimum of technical field staff as CommNodes which are integrated into a network can be administered centrally. Nevertheless the CommNodes adapt gracefully to split networks and continue to operate within their local range. Network problems or equipment problems are notified towards one or more Network Management Centers which control the network and its nodes.

The presence of a VoIP service channel allows for an easy and controllable set up and deployment of the CommNodes. Internode communication and also gateway functionality towards the public switched telephone network are provided with every node. Special implementations allow for a reduced VoIP capability even if the network is split, and centralized telephone directories are no longer available.

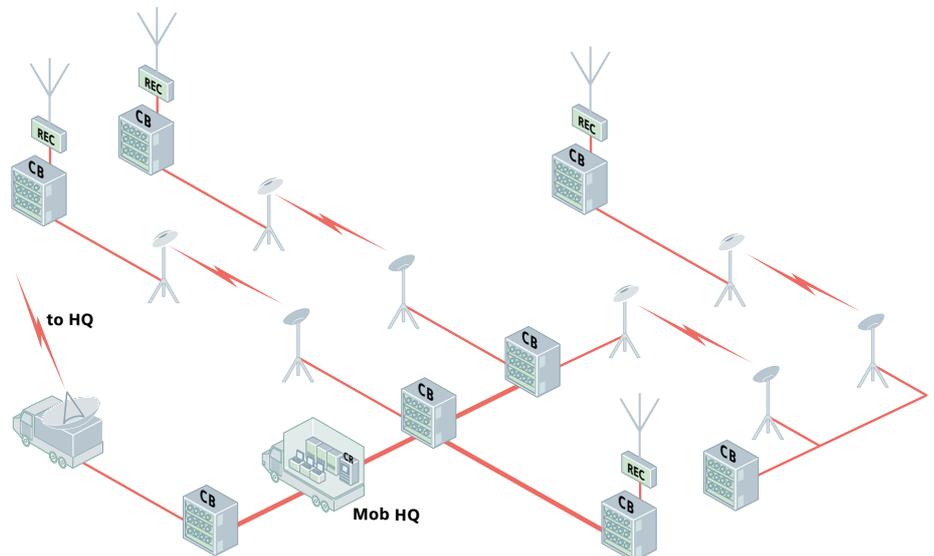
The small power consumption allows also for generator-driven operation.

On the CommBox all control elements and interfaces are located on one side of the Box. Currently there are 19 connectors providing up to 38 different connections. The connector cover houses optical and electrical interfaces. The electrical interfaces are protected internally. An external signal distribution box adapts the military type of connectors to civilian types.

A single switch allows for operation. This switch also allows to enter a maintenance state where the power consumption is minimized for a configurable duration. Three light-emitting diodes show the operational state of the CommBox.

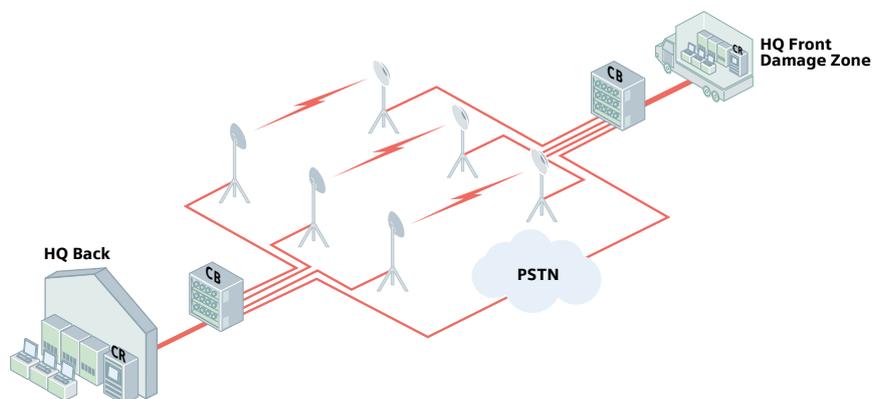
### System Deployment Example "Sensor Network"

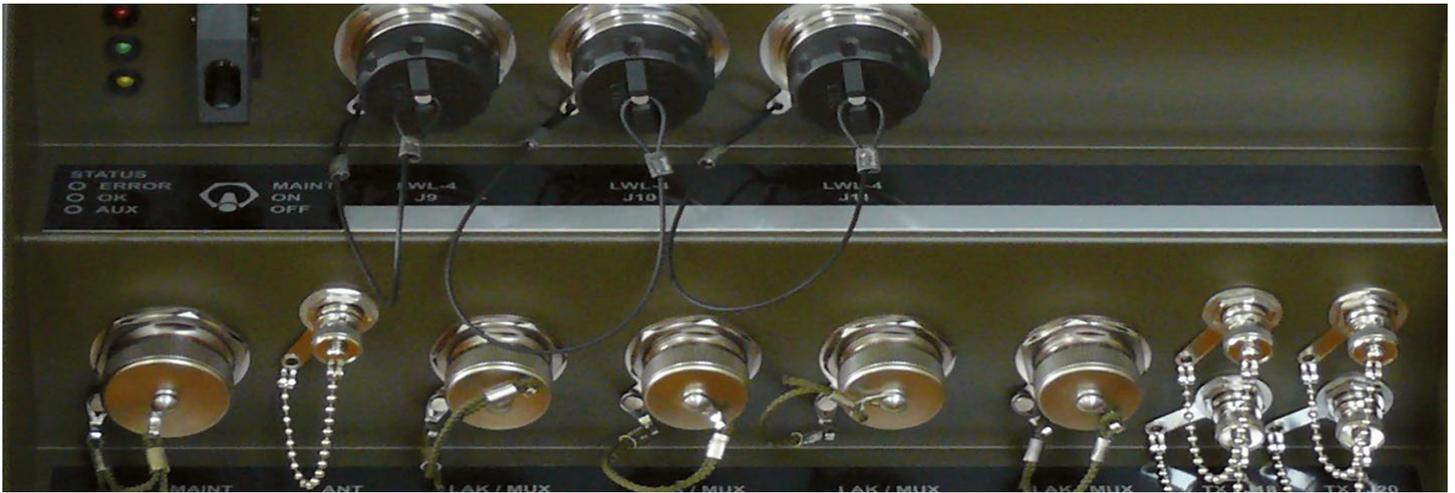
The Atos CommNodes depicted in a configuration which enables a mobile sensor network to be interconnected with mobile headquarters. Mobile sensors (receivers, REC) are connected either directly with CommBoxes or via the deployment of Line of Sight equipment to overcome larger distances. Line of Sight equipment can be aggregated on one CommBox. The CommBox can also be used in a daisy chain manner to extend operational distance using fiber optic lines. This configuration connects the mobile mission to a fix network using a satellite link.



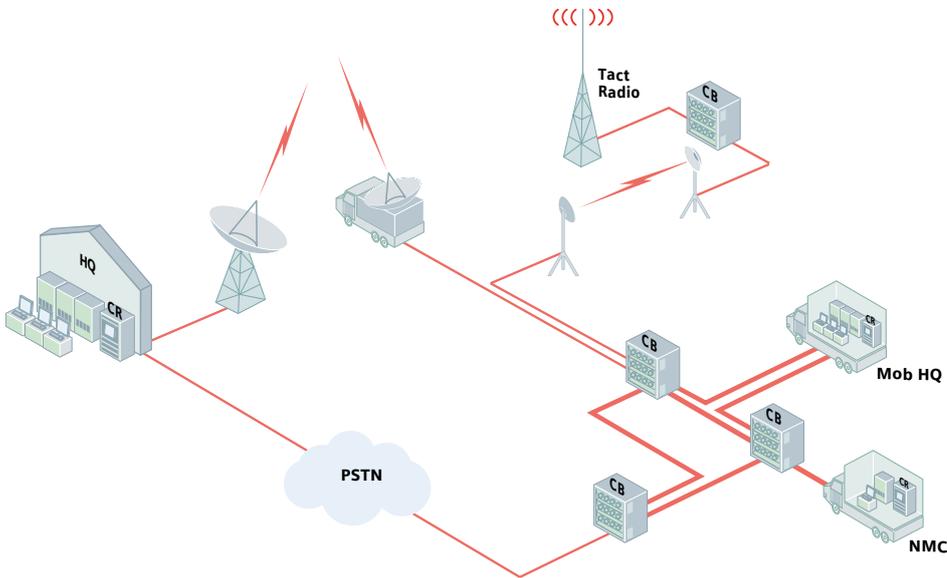
### Link Aggregation

Connections between different CommNodes can be aggregated as shown with the example of the aggregation of multiple Line of Sight links. It is also possible to have several links between sites to ensure higher availability by deploying redundant links. The additional links can be of different type than the main link. A connection loss of the active link leads to an automatic switch over to the next lower type, e.g. from a fibre optic connection with a bandwidth of 100 Mbps to an aggregated Line of Sight link with around 10 Mbps or even further to a link routed via the PSTN with a merely 33 kbps. It is also possible to enable dial up functionality for maintenance purposes.



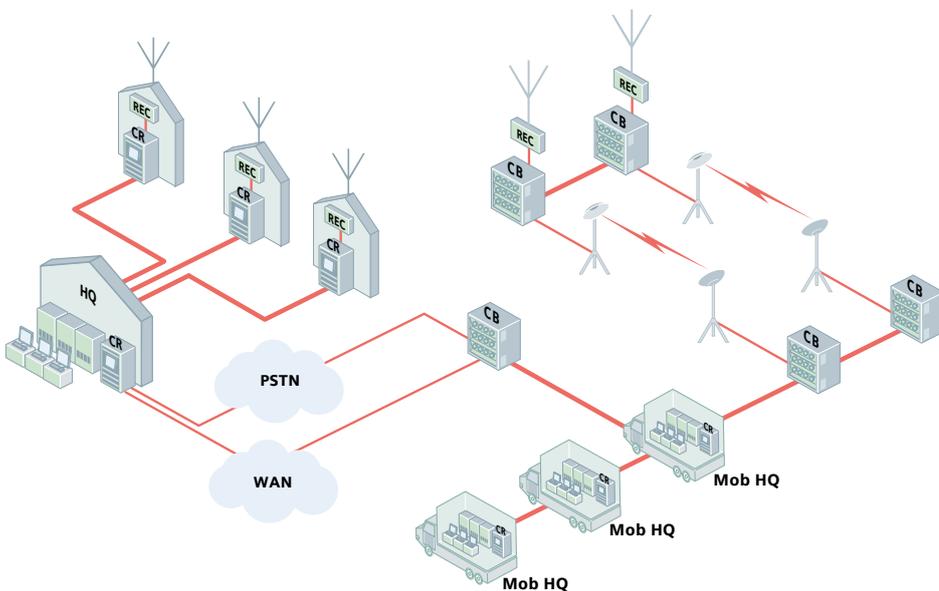


### Redundant Networking and Network Management



The Atos CommNodes can be deployed to build a redundant network which allows for high bandwidth and/or high availability of the deployed missions. In this example the redundant connection between a mobile mission and a fixed installation is shown. The main data stream is routed via a satellite link and a backup connection is provided through the PSTN. It is also possible to fully mesh the CommNodes for further redundancy. The ability to extend the network with Line of Sight equipment allows to place the network elements and their associated functions (e.g. HQ or radio transceiver) from a tactical and/or technical point of view. The design of the CommNodes allows for decentralized management to allow more than one network management center (NMC) to be connected to a system.

### Combination of Fixed Operations with Mobile Operations



The rapid deployment of mobile equipment to a certain area with the ability to access services of a fixed network is being allowed and provided by the mobile CommNodes/CommBoxes. Their variety of interfaces allow to interconnect a mobile deployment with a wide range of available networks including PSTN, MPLS or others. The aggregation of connections allows for higher bandwidth where single links do not provide for the necessary data flows.

# Technical features

## Networking Features

- ▶ 10, 100, 1000 Mbps data rates on switch, router and firewall (Ethernet, FastEthernet, Gigabit Ethernet)
- ▶ Electrical and optical interfaces for military type of cables and fibres
- ▶ Compliant to ETSI, ITU-T, ANSI and EN standards
- ▶ Managed switch, switching capacity: 8.8 Gbps
- ▶ Modular, integrated services, high-performance enterprise branch office router with a broad range of interface options
- ▶ NAT/PAT for adaptation to legacy networks
- ▶ QoS capabilities
- ▶ Interfaces to PSTN for data and voice

## Security Features

- ▶ Integrated firewall, stateful inspection
- ▶ Virtual private network support
- ▶ Encryption: 3DES/AES
- ▶ Tamper-proof, sealable enclosure
- ▶ Virtual LAN ports, VLAN access lists

## QoS Features

Support of the entire QoS framework from Cisco and includes the following techniques:

- ▶ Congestion Avoidance: Random Early Detection (RED), Weighted Random Early Detection (WRED), Flow-Based Weighted Random Early Detection
- ▶ Congestion Management using Class Based Weighted Fair Queueing (CBWFQ), First in First Out (FIFO) Queueing, Internet Protocol Real-Time Protocol Priority (IP RTP Priority), Low Latency Queueing (LLQ), Priority Queueing (PQ), Weighted Fair Queueing (WFQ)
- ▶ Packet Marking: Distributed CAR (DCAR), Multi Protocol Label Switching (MPLS)

## Interfaces CommBox

- ▶ 16 × E1 with 2 Mbps (4 interfaces operational, additional interface cards available on request)
- ▶ 2 × E3 with 34 Mbps (interface cards available on request)
- ▶ 4 × 100 BaseT FastEthernet electrical (prepared for PoE)
- ▶ 3 × 100 BaseT FastEthernet optical (multimode, field-capable fibres, single mode on interfaces on request)
- ▶ 1 × 100 BaseT (PoE enabled) for VoIP/maintenance
- ▶ 1 × Power Out for Daisy Chaining of CommBox or for external equipment
- ▶ 2 × analog telephone connectors (33/56 kbps data via PPP)
- ▶ 3 × digital telephone connectors (64 kbps data via PPP, ISDN S/T and U interface)
- ▶ Both analog and ISDN links can be bundled to achieve higher bandwidth links (e.g. 4 × 64 kbps = 256 kbps)
- ▶ 4 × serial interface (EIA 232, EIA 422, EIA 485)
- ▶ 1 × antenna (interface card available on request)

## Physical Specifications CommBox

- ▶ Tested to MIL-STD 810F (shock, vibration and heat)
- ▶ Enclosure dimensions (L × W × H): 98 × 53 × 55 cm (39" × 21" × 22")

## Interfaces CommRack

- ▶ E1 with 2 Mbps
- ▶ E3 with 34 Mbps
- ▶ FastEthernet electrical
- ▶ FastEthernet optical
- ▶ VoIP/maintenance
- ▶ Analog telephone (data/voice) to PSTN
- ▶ Digital telephone connectors (S/T and U interface) to PSTN

## Management System

- ▶ Centralized or decentralized
- ▶ Redundant
- ▶ Node supervision and link supervision

## Remote Management Capabilities of CommNodes

- ▶ Cisco Discovery Protocol (CDP)
- ▶ Remote Monitoring for router and switch (RMON)
- ▶ SNMP trap generation
- ▶ MIB2 and private extensions
- ▶ Secured Web Access

## VoIP Features

- ▶ Support of RTP, SRTP
- ▶ Control protocols: H.323, SIP, Skinny
- ▶ Codecs: G.711, G.723.1, G.726, G.728, G.729, G.729a, G.729ab, G.729b, GSM Full Rate
- ▶ Survivable Remote Site Telephony (SRST)
- ▶ PSTN Gateway

## Power over Ethernet

- ▶ 48 VDC for VoIP equipment
- ▶ All electrical Ethernet interfaces prepared for PoE

## Environmental Features

- ▶ Storage: - 40 to + 70 °C/- 40 to + 160 °F
- ▶ Operation: - 30 to + 55 °C/- 22 to + 130 °F
- ▶ Protection against dust, water and contact: IP64

## Power Requirements

- ▶ Voltage input: 230 V or 110 V ± 10 %
- ▶ Minimal power consumption: normal operation: 250 W
- ▶ Maximal power consumption: with heating 650 W (if operated below - 10 °C/+ 14 °F) or cooling 400 W (if operated above + 23 °C/+ 70 °F)

**For more information:**  
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