

# Mobile Access Controller



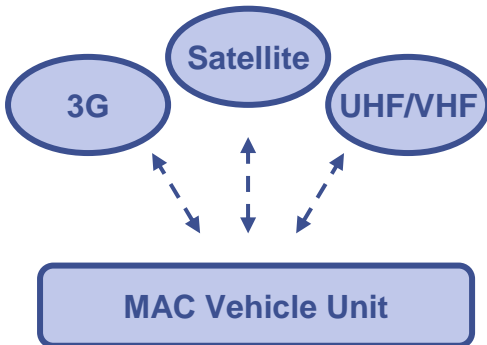
## General Overview

### What is MAC?

MAC is an integrated communications platform which provides fleet operators with advanced voice and data services. It combines the unique advantage of multiple radio networks with intelligent call routing and management features. MAC is a hardware and software solution providing in-vehicle equipment, handheld radios and a management & reporting system. Additionally, NEC can provide a full installation, maintenance and support programme.

### How is MAC different?

MAC is a unique solution because it leverages multiple radio paths. Many solutions provide voice and data services from a single platform, however they typically operate over proprietary networks with limited coverage. MAC interfaces to a large number of public access networks, providing the best combination of coverage and features to allow the latest applications to be deployed.



### Return on Investment

MAC can enable significantly improved productivity for fleet radio users and allows additional applications such as job dispatch or user manuals to be deployed remotely in the field. Through the use of multiple networks, downtime due to lack of radio coverage can be eliminated, and a single common user interface reduces operational and training expenses because only a single platform is required to support all users and locations.

## MAC Gateway

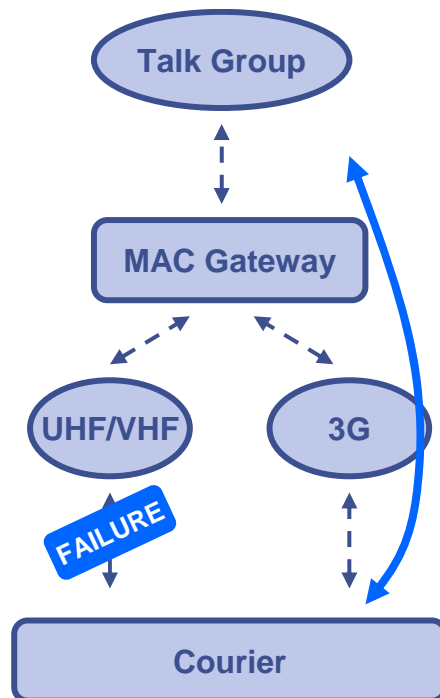
### How does the Gateway work?

The MAC terminal provides the ability for outbound calls from the vehicle to select the most appropriate network, but what about inbound calls from a dispatcher or other caller?

The MAC gateway maintains a database of which networks each vehicle should be reached on, such that callers need not worry about which network to use, or cycle through them until the call completes. The gateway also includes advanced network bridging features, please see the example below.

### Network Bridging Example

Suppose a courier vehicle is listening to an open channel talk group via a conventional UHF radio network. When the vehicle enters a road tunnel, it will lose the use of this network. The Gateway will detect this network loss, and join the vehicle back into the open channel via another network such as 3G Cellular. The user will once again hear the open talk group. Furthermore, this procedure is completely transparent to the user.



## MAC Management Centre

### What is the Management Centre?

The management centre provides central control, configuration and reporting functionality for a group of MAC terminal units deployed in vehicles.

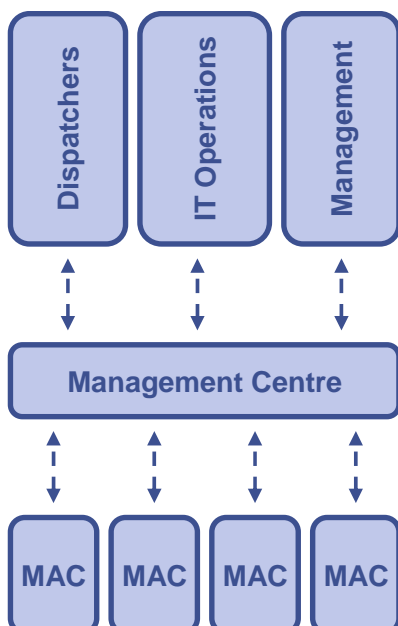
### What features are provided exactly?

A range of features are provided by the Management Centre such as:

- Configuration interface for MAC terminal units
- Reporting system for performance or errors
- Alarm collection system from remote terminals
- Vehicle Tracking database with graphical access
- Duress alarm message management
- Email reporting interface
- Status reporting of MAC terminal units
- Browser based user interface

### Who hosts the Management Centre?

NEC can provide hosting of the Management Centre in our professional hosting environment. Alternatively, the Management Centre can be deployed as a standalone system at a customer premises.



## System Features

### How does MAC ensure reachability?

The MAC solution allows vehicles to be reached via multiple radio networks. It also allows vehicles to reach other users (such as dispatch or regular telephone numbers) via multiple networks. If one network is busy or unavailable, an alternative will be used.

### Is single number supported?

Yes. When using the MAC gateway, the vehicle can be reached via a single number, regardless of the actual radio network used to support the call.

### Does MAC support Vehicle Tracking?

Yes. A GPS unit is included and position reports are sent back to the MAC management system at customer defined intervals. The output is displayed graphically and reports can be generated.

### How does the Duress feature work?

Three modes of duress alarm are available to MAC users:

- Traditional push button (from handheld and vehicle)
- Man-down alarm via handheld radio
- Continuous acknowledgement via push button

When a duress alarm is initiated, it is transmitted over all available radio networks to ensure delivery. The vehicle's GPS position is also transmitted in the duress message to aid the response.

### Is in-vehicle repeating supported?

Yes, both cross-band and co-band operation is supported. This feature enables a vehicle to act as a local base station for handheld radios or laptop users within a given radius. It is useful for situations such as incident response.

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## Installation

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### What is installed in my vehicles?

The MAC solution consists of a MAC terminal unit, an LCD control panel, push to talk microphone, antennas and associated cabling.

### What user interfaces are available?

Each MAC terminal is supplied with an LCD control panel designed to be mounted in a vehicle. The panel includes a numeric keypad and several soft keys for feature/menu navigation. For dispatchers and configuration, MAC offers a browser based configuration system with graphical information display for vehicle location tracking.

### How much space does MAC need?

The MAC terminal is a modular chassis and its size varies depending on the number of radio modules selected. The typical chassis size is approximately the size of a shoebox. Several form factors are available such as a “drawer” style chassis which can be accommodated under a parcel shelf.

### How many antennas are required?

An antenna is required for each radio module on board the MAC terminal unit. There are many flexible antenna options such as traditional whip antennas, on glass and low profile options.

### Is MAC a rugged solution?

MAC is designed to operate in the harsh environment often found in fleet vehicles. It requires no fan for cooling which enhances the reliability of the system. The case is manufactured from high strength steel.

### Which vehicle types are compatible?

MAC has been installed in many different vehicle types such as standard sedans and station wagons, trucks, utility vehicles, vans, trains and ships.

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## Service & Support

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### Is MAC provided as a managed service?

MAC can be provided as a managed service or a standalone system. NEC can provide total system support for MAC including both the vehicle equipment and head office systems.

### Does NEC provide installation services?

Yes. NEC can provide complete MAC solution installation services, or, existing radio technicians can install the system.

### Where is service available?

NEC has an extensive support network throughout the country with service centres established in most regional centres.

### How is MAC configured?

Using a simple browser based interface, remote MAC terminals can be provisioned ‘over the air’ in real time. This eliminates costly vehicle downtime and servicing charges.

### Can MAC terminals be monitored?

Yes. An important feature of the MAC solution is the ability to provide centralised status reporting and alarm collection. Each MAC terminal in the field will report to the MAC Management Centre when an error or failure occurs.

### Is MAC future-proof?

MAC has been designed as a modular system to accommodate future radio modules. New modules and processors can be easily installed when required and software updates can be deployed remotely without taking the vehicle off the road.

### How reliable is the system?

High reliability is a direct result of MAC utilising multiple radio networks. If a given radio module or network becomes unavailable, MAC will simply select an alternative. Furthermore, MAC can record call attempts and other SLA related parameters.

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## Radio Networks

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### Which radio networks are supported?

MAC supports several radio networks including:

- Traditional UHF/VHF networks
- State Mobile Radio
- Metropolitan Mobile Radio
- Private Mobile Radio
- 3G Cellular Mobile
- GSM Cellular
- Satellite

### How are networks selected?

The MAC solution contains intelligent routing features to enable automatic bearer selection. Based on a customer's business rules – such as time of day, cost or operator privileges, the MAC terminal will select the most appropriate network and place the call.

### Does MAC support handheld radios?

Yes. The MAC solution can be equipped with an In-Vehicle Repeater which enables the vehicle based functionality of MAC to be extended to a handheld portable radio.

### Can MAC call PSTN numbers?

Yes. The MAC terminal can reach public telephone numbers through either standard networks such as 3G cellular or Satellite, or via the customer's private radio network.

### Can I access the internet using MAC?

Yes. Data capabilities are integral to MAC's design. As standard, MAC includes internet access via 3G HSDPA cellular data services, but other service options exist.

### Does MAC use VoIP?

Typically voice traffic is carried natively over either a traditional radio network, or over a cellular radio network. Customers can utilise MAC's data services to operate a VoIP overlay service.

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## Interfaces

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### Does MAC support USB?

Yes. MAC provides an onboard USB connection which can be used to provide high speed data services to laptops or PDAs.

### What other data interfaces can I use?

MAC supports 10/100Mbps Ethernet for connection to a laptop, PDA or other Ethernet enabled device such as an IP Camera. Optionally, MAC can also provide WiFi services for roaming users around the vehicle.

### Does MAC support VPNs?

Yes. Users can connect via MAC's data services to a remote corporate VPN concentrator using standard protocols such as IPSec.

### Can MAC interface to other systems?

MAC contains a number of built in inputs and outputs for connection to external systems. Both analogue and digital inputs are provided, as well as relay drivers to control items such as lights or sirens remotely. A number of serial interfaces are also supported for telemetry applications.

### Does MAC support the CAN bus?

CAN bus connections can be supported on request.

### What bandwidth is available via MAC?

MAC supports standard interface bandwidths which will vary depending on the radio network being utilised, and network conditions. The highest data rates will be obtained via WiFi or 3G Cellular data services.

### Does MAC support encryption?

Yes, either internally or via an externally connected third-party encryption device.