

Local Monitoring

The product has been developed as a System for the real time management of a multiplicity of mobile targets moving within a limited-size volume (order of 10 km radius) who need to send towards a base-station position data, measured by a target-borne GPS receiver, along with housekeeping data.

The application is mainly with reference to light aircrafts, rescue activities, sport events, etc.



Purpose: short range user' HouseKeeping data and position information relaying in a scenario characterized by a very high users' density or high interferences.

System configuration:

- multiple portable user terminals;
- one re-locatable base station.

Operational frequency band: the ISM⁽¹⁾ around 433 MHz

Typical ranges: 5-10 km with very low power users' transmitters and low EIRP base station.

The innovation of the system stays in the transmission system, using a mix of FH-SSA and TDMA for sharing the channel among the many simultaneous users, while reducing the co-channel interference. The applications considered did include sport and entertainment events, characterized by a high number and a high density of users. The system could also be used in certain military and scientific missions who are interference-critical.

Note (1): ISM (Industrial – Scientific – Medical) frequency bands.

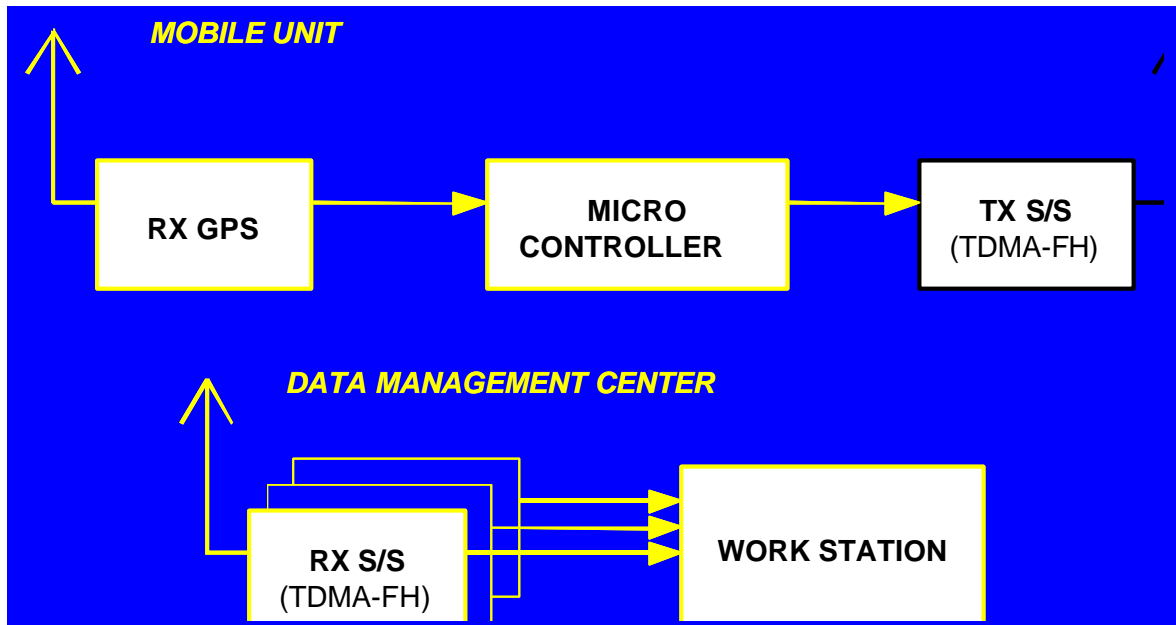
The transmission of narrow band and wideband data over short (less than 100 m) to medium (less than 10 km) distances can be efficiently implemented using the ISM frequency bands.

These present several advantages:

- there are several bands with attendant increasing instantaneous bandwidth available depending on the application: around 434 MHz (with 1.7 MHz BW); 868 to 868.8 MHz in Europe but from 902 to 928 MHz in the USA; around 2.4 GHz with 83.5 MHz; around 5.8 GHz with 125 MHz BW. These bandwidth are more than adequate to support voice, narrow and wide band data and single or multiple video channels of high quality;
- their use is usually license-free on ground, with an attendant large low-cost market which can be advantageously exploited for COTS-based space applications.

The system is composed by:

- Data Management Center (DMC), that shall manage the traffic data and generate the coordination instructions of the traffic. It is equipped with an antenna with the geographic coverage of the interested area, a Transceiver and a data management workstation including relevant software.
- A number of remote and mobile user equipments consisting of:
 - a) standard GPS receiver, including antenna;
 - b) transceiver module (including antenna) working with 'spread spectrum' access mode to the TX channel to the DMC.



The user terminal is conceived as a highly portable unit and includes a GPS receiver chip, sensors' and users' interfaces, a digital section, a Radio interface and a VHF (ISM band) transceiver cooperating, interactively, with a re-locatable base station, up to a maximum range of about 10 km in open space.

The base Station includes a PC for general supervision and network management, a digital section for messages' reconstitution, a UHF (ISM band) transmitter for connecting – using a polling multiple access - the base station with all user' receivers; and a bank of UHF receivers for accepting all data packets arriving via the N sub-channels.



Internal view of the mobile unit demonstration model



Data Management Center User Graphics Interface

A complete demonstration system is available for customer verification. A System development would need about 15 weeks for delivery, depending on number of users required.

Local Monitoring Specification

ELECTRICAL (For mobile unit)

Power Supply: + 9V

Power consumption: 390 mA (@ +9.0V)

DATA MANAGEMENT CENTER DATA RATE

4800bps (by using IFM frequency @ 430 MHz)

MECHANICAL (for the demonstration remote unit)

Dimensions: 140 mm * 35 mm * 280 mm

Weight: about 0.7 Kg

Significant improvement can be obtained for a recurrent production model

ENVIRONMENTAL

Temperature: 0°C ÷ +50°C

Contact:

IMT s.r.l.

Via Carlo Bartolomeo Piazza, 8
00161 Roma - Italy

Tel.: +39-06-44292634

Fax: +39-06-4393828

Email: imtsrl@imtsrl.it

URL: <http://www.imtsrl.it/>