

Explosion-Proof Wireless LAN System†

1. Introduction

Wireless LANs have been widely adopted in offices and elsewhere as large-volume data transmission systems, beginning with the internet, but at present, there are few wireless LAN devices that can be used in hazardous areas. If possible, adoption of explosion-proof wireless LAN systems in gas, petrochemical, and chemical plants, etc. would enable simple implementation of an inexpensive, large-volume information transmission technology supporting higher levels of operation and maintenance. Moreover, taking advantage of the merits of mobility and reduced use of wiring cables, which are distinctive features of wireless technologies, introduction in logistics facilities handling hazardous materials, various types of fuel yards, and tunnels is also considered possible. JFE Engineering is developing various devices necessary for implementation of explosion-proof wireless LAN systems. This report introduces the features of representative devices and presents an image of system introduction.

2. System Configuration

2.1 Merits of System Introduction

Conventionally, systems for voice communications, such as PHS, transceivers, etc., have been the

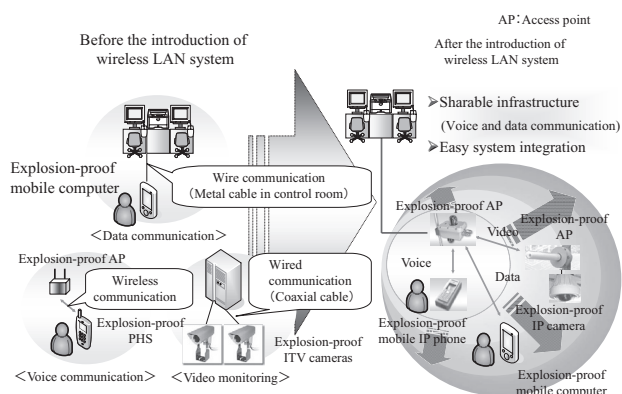


Fig. 1 Advantage of introduction of explosion-proof wireless LAN system

main stream in mobile telecommunications systems for hazardous areas. However, accompanying the progress in IT technology in recent years, needs for mobile solutions have expanded from mainly voice systems to wireless LAN systems which make it possible to integrate large-volume data transmission and voice (Fig. 1).

2.2 Features of Explosion-Proof Wireless LAN System Devices

2.2.1 Explosion-proof access point "LANEX™-AP"

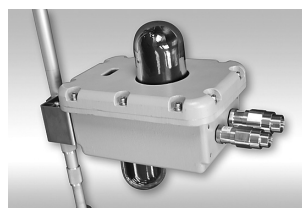
An access point (hereinafter, AP) is a relay device for transmitting data from various types of wireless terminals to other devices via a LAN, etc. The features of LANEX™-AP (Photo 1), are presented below.

- (1) Selection of the optimum antenna for the installation location is possible.

The JFE Engineering product line includes directional antennas which are effective when the user wishes to secure a linear communication area, e.g., in a passageway or tunnel, and the optimum omni-directional antennas for securing a communications area with 360° omni-directional coverage from the AP. Selection of the antenna corresponding to the purpose of installation is possible.

- (2) Use is possible in virtually all hazardous areas.

Explosion-proof certification for pressure-resistant explosion-proof construction (Explosion-proof class: Exd II BT4) by the Technology Institution of Industrial Safety has been obtained, enabling use in virtually all hazardous areas. For devices in which an omni-directional antenna is installed, use with equipment handling hydrogen is also possible (Explosion-



Omni-directional antenna type



Directional antenna type

Photo 1 LANEX™-AP (Access point)

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* LANEX is registered trademark in Japan.

proof class: Exd IIB + H2T4).

- (3) Realizes efficient radio wave transmission with a dedicated explosion-proof antenna.

These products were not commercialized using antennas available in the market. Rather, a dedicated explosion-proof antenna was developed in-house and installed so as to obtain the maximum effect as an antenna by housing the antenna in an explosion-proof case. Although range will differ depending on the environment where the device is installed, communication at a range of 400 m from the AP is possible if a directional antenna is used.

- (4) Conforms to most recent IEEE802.11n by a single housing.

At present, LANEX™-AP conforms to IEEE802.11g (transmission rate: maximum 54 Mbps)/11b (transmission rate: maximum 11 Mbps) in IEEE802.11 (regulations for wireless LAN established by the IEEE). Therefore, upgrading to IEEE802.11n (transmission rate: maximum 300 Mbps) will be possible in the future without major device improvements.

2.2.2 Explosion-proof mobile IP phone “LANEX™-TL”

Mobile IP phones are mobile phones which can be used under a wireless LAN environment. The features of LANEX™-TL (**Photo 2**) are described below.

- (1) First mobile IP phone in Japan which can be used in hazardous areas.

This explosion-proof mobile IP phone was the first in Japan to receive explosion-proof certification (Explosion-proof class: ExnC II BT4) from the Technology Institution of Industrial Safety. At present, development of a device with improved telecommunication performance combined with a more compact size and lighter weight than the existing model has been completed, and an application has been filed for explosion-proof certification (Explosion-proof class: Exib II + BT4), with sale scheduled to begin during FY 2011.

- (2) Possible to connect many more phones to 1 AP unit.
Because this is an IEEE802.11g (maximum

54 Mbps) device, a large number of phones can be connected to 1 AP unit. Although performance will differ depending on the distance from the AP, in comparison with PHS and IEEE802.11b (maximum 11 Mbps) mobile IP phones, it is possible to connect approximately twice as many phones.

- (3) Easy coordination with external lines, paging, and other systems.

Use is not limited to calls via internal lines. Interface is also provided for connection with external lines and other telephone systems. SIP servers (device having a switching device function for calls by mobile IP phones) accommodate small-scale (10 persons or fewer) to large-scale equipment (1 000 persons or more).

2.2.3 Explosion-proof IP camera “LANEX™-CM”

IP cameras are cameras which can be used under IP network environments, including wireless LAN. The features of LANEX™-CM (**Photo 3**) are described below.

- (1) Use is possible in virtually all hazardous areas.

Because pressure-resistant explosion-proof construction (Explosion-proof class: Exd II BT4) by the Technology Institution of Industrial Safety has been obtained, the dome-type IP camera can be used in virtually all hazardous areas.

- (2) Clear image quality and monitoring is possible even under low illumination.

Video monitoring (resolution: 640×480 pixels, transmission rate: 30 frames per second) can be performed by MPEG-4 or MJPEG, and by using electronic sensitivity enhancement, monitoring at the same light level as in daytime is possible under low light (0.04 lux) environments.

- (3) Outdoor use is possible in cold climates (−20°C).

The camera is equipped with a built-in space heater, enabling use in cold climates.



Photo 2 LANEX™-TL (Mobile phone)



Photo 3 LANEX™-CM (Camera)

