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Overview



Author: *Mitsuo Muneyuki**

Increasingly sophisticated modern-day crimes call for a highly advanced security system to meet customers' safety needs. In addition to crime prevention, such an advanced system can also provide added value through the ability to identify and track objects of surveillance.

Based on this concept, the "DIGUARD" total security solution was developed.

The DIGUARD system not only provides an enhanced level of security by coordinating multiple security components, but also supports such applications as linking of personal information with other systems including building facilities (e.g., elevators, air conditioners and lighting fixtures), office equipment (e.g., personal computers and printers), and remote services operated from a control center to provide a service tailored specifically to each customer's attributes and/or requirements. In other words, the DIGUARD system makes it possible to realize a more comfortable and environmentally friendly building facility, in addition to providing a service customized for each individual on a one-to-one basis. Several case examples are presented in this issue.

Facima & DIGUARD in Progress: Providing Both Security and Ecology

Authors: *Masato Matsuoka** and *Nobuo Inoue***

Today's companies are confronted with the challenges of ensuring safety and security and conserving energy and the environment. Through an approach that links these two themes, Mitsubishi Electric supports effective and efficient activities to achieve solutions for both challenges.

This paper presents the Facima and DIGUARD systems, and describes their concept, collaboration and prospects.

1. Introduction

In today's world, all companies must rise to the challenges of ensuring safety and security and conserving energy and the environment. In the area of safety and security, many companies have already introduced measures to protect public confidence in their business. However, successive incidents of information leaks and other problems confirm the need for further improvement.

In terms of energy and the environment, energy-saving measures are emerging as an urgent regulatory issue. Among others, the revision of the Act on the Rational Use of Energy (Energy Saving Act), enforced in two stages in 2009 and 2010, has had a significant impact. Mandatory energy management has been imposed on business entities consuming energy greater than a certain level. This obligation was previously based on units of business; after the revision, it will be based on each business establishment. As a result, some offices that were not subject to regulation, such as branch offices and sales offices, may need to calculate their energy consumption and report the results to the government.

Through an approach that links the themes of "Safety and Security" and "Environment and Energy Conservation", Mitsubishi Electric supports effective and efficient activities to create solutions for both challenges. First, for ensuring safety and security, we have systematized individual security-related products as the DIGUARD total security solution⁽¹⁾. The DIGUARD system provides new functions and the added value of a total coordinated system through communication and information sharing among multiple security systems over the DIGUARD NET security system integration platform⁽²⁾. The coordination between system, maintenance and service functions makes it possible to offer

customers optimum solutions.

The DIGUARD system also plays an important role in supporting environment and energy conservation countermeasures, through coordination with the Facima system for building equipment operation and planning.

This paper presents the Facima and DIGUARD systems, and describes their concept, collaboration and prospects.

2. Concept of DIGUARD

In November 2007, the Total Security Systems Department was set up as the operations center for security-related business conducted by various business units. Through this organizational reform, the framework was established for providing security-related system, maintenance and service functions with one-stop support. Mitsubishi Electric's DIGUARD total security solution was realized from this framework, as shown in Fig. 1.

Mitsubishi Electric also developed the DIGUARD NET security system integration platform, as shown in Fig. 2, which realizes communications between various security systems by using its own protocol. All security systems share a standardized data format for ID, logging, images and other types of information, a common communication protocol, and the same application programming interfaces (APIs), thus making it possible to deliver a total security system that satisfies the customer's needs, to respond more quickly to requests for maintenance, and to realize a wide scope of services.



Fig. 1 Total security solution: DIGUARD

3. Concept of Facima

In January 2009, Mitsubishi Electric launched the Facima BA-System, an open integrated management system for building facilities, which centrally controls building equipment such as air conditioning, lighting, elevators and water supply and drainage. The Facima BA-System is compatible with BACnet, an international open protocol for building facilities, thus enabling centralized control of any type of building equipment made by different manufacturers, as well as the display of a wide range of energy usage conditions in an easily understandable format. For example, while viewing the

electric power consumption on a graphic chart, the time-series variation at each office can be determined. In other words, the Facima BA-System enables visualization of the amount of energy consumption, which is indispensable for taking energy-saving measures and complying with the Energy Saving Act.

The Facima system also provides planning services, as shown in Fig. 3. Mitsubishi Electric Building Techno-Service acquires and analyzes detailed data to offer energy-saving suggestions based on their experience and know-how. Mitsubishi Electric Building Techno-Service has 55 years of experience in building

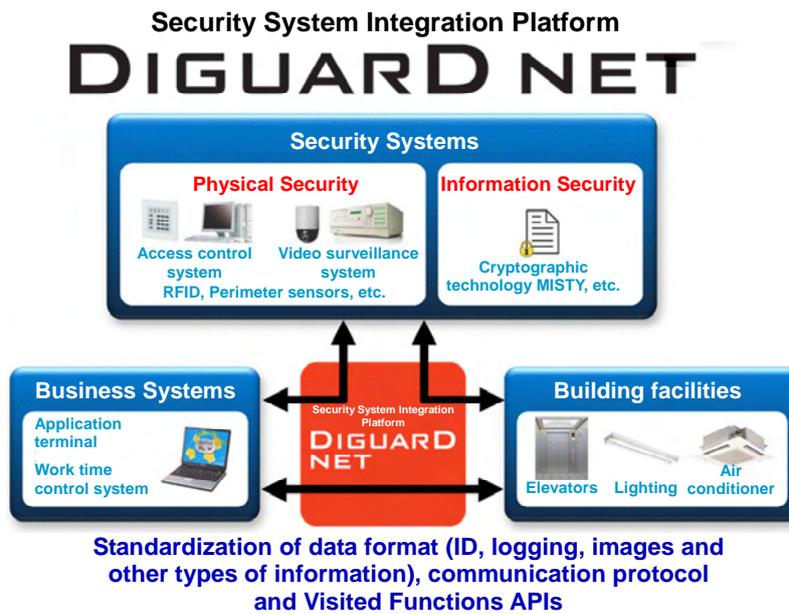


Fig. 2 Security platform: DIGUARD NET

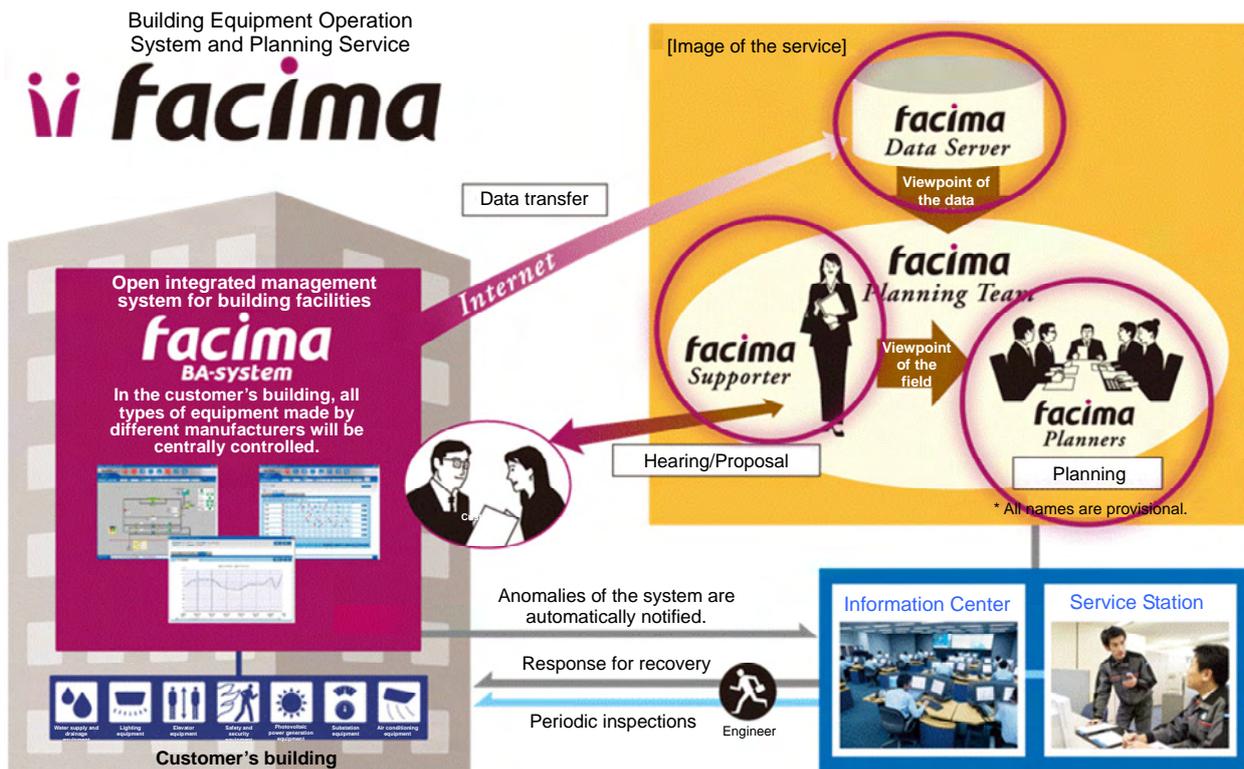


Fig. 3 Overview of Facima

equipment management and currently provides some 20,000 buildings with remote surveillance services. They also offer 24/7 customer support from their 290 service stations throughout Japan.

4. Facima & DIGUARD

In addition to the above described features, the DIGUARD system has further evolved through coordination with the Facima system for building equipment operation and planning useful for energy saving. This combination makes it possible for the customer to effectively cover both Safety and Security” and “Environment and Energy Conservation”.

As shown in Fig. 4, by closely coordinating their subsystems and equipment, both the Facima and DIGUARD systems are able to play a more advanced role. In addition, since all subsystems and equipment are linked on a common platform, the entire system can be implemented in a step-by-step manner; for example, starting with the security countermeasures then expanding the system to control the building equipment.

5. Future Prospects of Facima & DIGUARD

The DIGUARD system providing safety and security and the Facima system providing countermeasures

for environment and energy conservation could be further integrated to provide customers with new added value such as higher operational efficiency and lower cost. In addition, since DIGUARD NET uses the Internet protocol (IP), additional applications utilizing a wide area network can be considered, such as a remote surveillance service at the operations center, and an on-call maintenance service. We are currently considering an application that supports operational management such as the evaluation of security operations by periodically performing on-line statistical analyses on system operations data.

6. Conclusion

We will continue to offer customers optimum solutions by realizing the potential of the Facima & DIGUARD systems.

References

- (1) Masahiro Takeda et al.: “Total Security Solution DIGUARD”, Mitsubishi Denki Giho, Vol. 82, No. 4, pp. 245–248 (2008).
- (2) Kenjiro Miura et al.: “DIGUARD NET”: Security System Integration Platform, Mitsubishi Denki Giho, Vol. 82, No. 4, pp. 249–254 (2008).

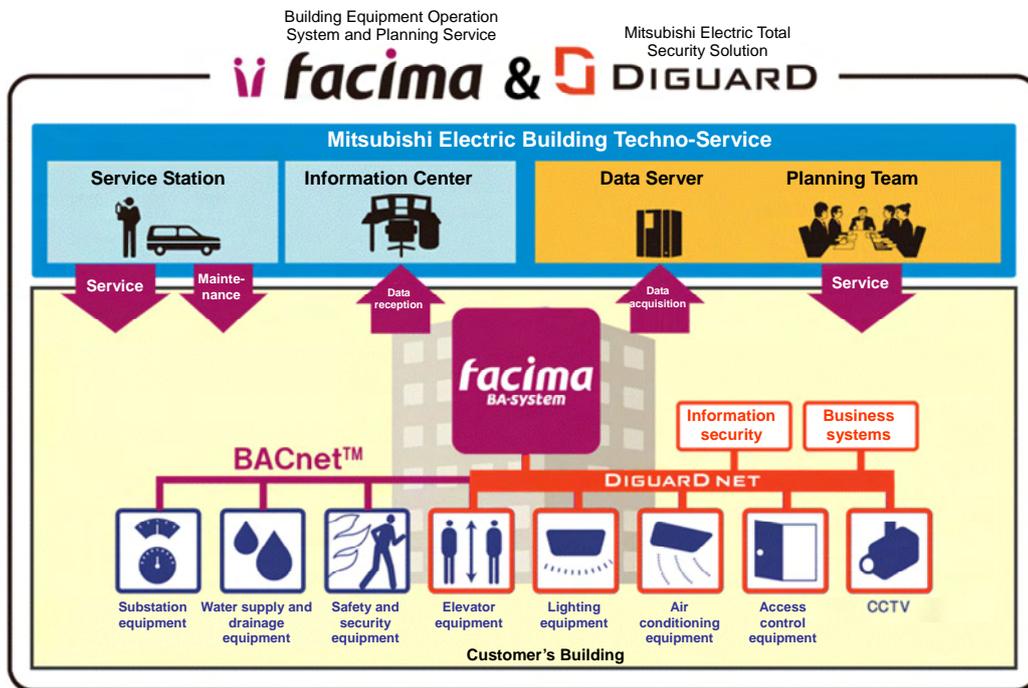


Fig. 4 Collaboration between Facima and DIGUARD

One-Dimensional Display Interface for Monitoring Multiple Areas

Author: Keiko Imamura*

For a total security system with integrated video surveillance and access control systems to meet the need for highly sophisticated security measures, we have developed a graphical user-friendly interface that clearly displays a list of the type, location and status of each detected event on the same screen so that the information can be intuitively grasped.

1. Current Status of the User Interface for the Access Control and Video Surveillance Systems

The access control system consists of a graphics window that displays the floor plan of the monitoring area, and an alarm window that displays a text description of the alarm.

The video surveillance system consists of a surveillance video display and a user interface that controls the video display. The main subject of the system is the monitoring image, and system operations are controlled by switching the user interface as required.

The basic objects of surveillance in both systems are doors and specific locations, and when an alarm occurs, the operator views the door or location where the alarm originated, and determines its cause.

2. Challenges to the User Interface When Integrating the Systems

The integration of security systems generally results in complex operations for assessing the alarm. Thus, integration requires improved operability.

2.1 Confirming the location and details requires a greater number of display operations, resulting in slow response time.

- Display operations during assessment require multiple window switching, which could interfere with thinking and make it difficult to efficiently assess the situation.
- Instructions for the display operations and resulting display images are arranged in different areas on the screen, making operations difficult to understand.
- The user can make mistakes due to hurrying to respond quickly.

2.2 The operator must picture where the alarm originated based on the text information, which makes it difficult to intuitively grasp the situation.

- If multiple alarms occur simultaneously, it would be impossible to instantly grasp the entire situation, which could delay the response and have serious consequences.

Thus, an integrated security system is necessary for simple operation that allows the operator to easily grasp the necessary information.

3. Development of User Interface for Monitoring Locations, Persons and Goods

Based on the user's viewpoint, we have developed a one-dimensional display interface for monitoring multiple areas for the integrated system. This interface displays the required information in the same window, facilitates comprehensive decision making, and simplifies the assessment. In addition, the location where the alarm originated can be intuitively viewed, enabling prompt response to the incident and minimizing its impact. (Fig. 1)

3.1 In an alarm condition, operability for assessment is improved by listing the required information

- All required information is displayed on the same screen, and can be compared and referred to, for ef-

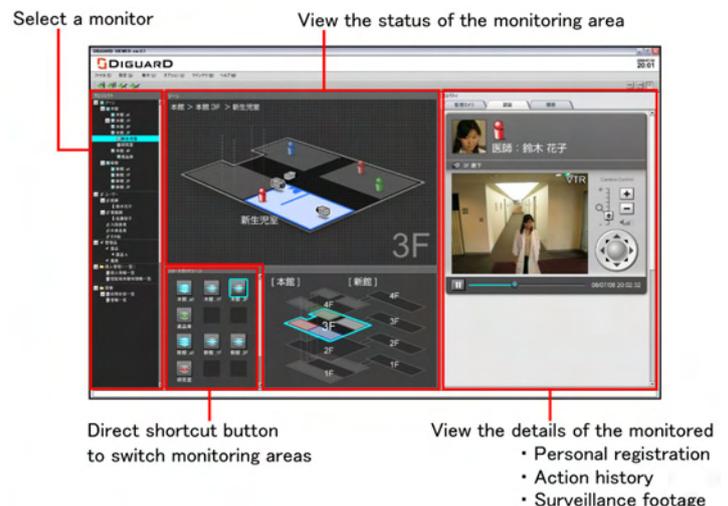


Fig. 1 Basic structure and operating procedures of the user interface screens

ficient assessment.

- According to the surveillance procedures, the operation is started from the top left of the screen. The monitoring area is selected from the tree chart and its status is displayed on the 3D image viewer. Detailed information and logging data on the monitoring area are displayed to the right of the 3D image viewer. In this way, the operational steps match to the movement of the line of sight to achieve an efficient response to an emergency.

3.2 Visual presentation of monitoring areas enables an intuitive grasp of the situation

- By displaying the objects of surveillance such as a door, camera, person, goods, and event as icons on the simplified 3D image viewer, visibility and distinguishability are enhanced.
- By clicking on an object, the required detailed information is displayed on the screen, and the operability is improved.
- By installing additional screens to display all monitoring areas, where and what has happened can be intuitively grasped. Displaying all monitoring areas also immediately shows multiple simultaneous alarms.

4. Development Example

Using our newly developed user interface, we created a development example for medical institutions, where sophisticated security solutions are required.

4.1 Confirmation of entry

When an authorized person goes through the authentication process to enter a restricted area, an event is indicated on the 3D image viewer. Once the personal authentication is confirmed, a video image from the surveillance camera linked to the authentication device is displayed on the detailed information window. (Fig. 2)

4.2 Intrusion of suspicious individual

The intrusion of an unauthorized individual into a restricted area has been detected, an alarm icon is displayed on the 3D image viewer, and a video image from the intruded area is displayed on the alarm pop-up window. (Fig. 3)

4.3 Removal of goods

When an authorized person enters the chemical storage room, it is detected as an event and an event occurrence icon is displayed on the 3D image viewer. Once the personal authentication is confirmed, a video image from the surveillance camera linked to the chemical storage room is displayed on the detailed information window. When the person leaves the room carrying the restricted chemical, the 3D image viewer displays both the person and the chemical subject to surveillance and traces their movement. (Fig. 4)

The system interface must be easy to use for maximum performance in the real world, as well as to prevent accidents or malicious incidents. We plan to implement this user interface in commercial products after verification with this development example.

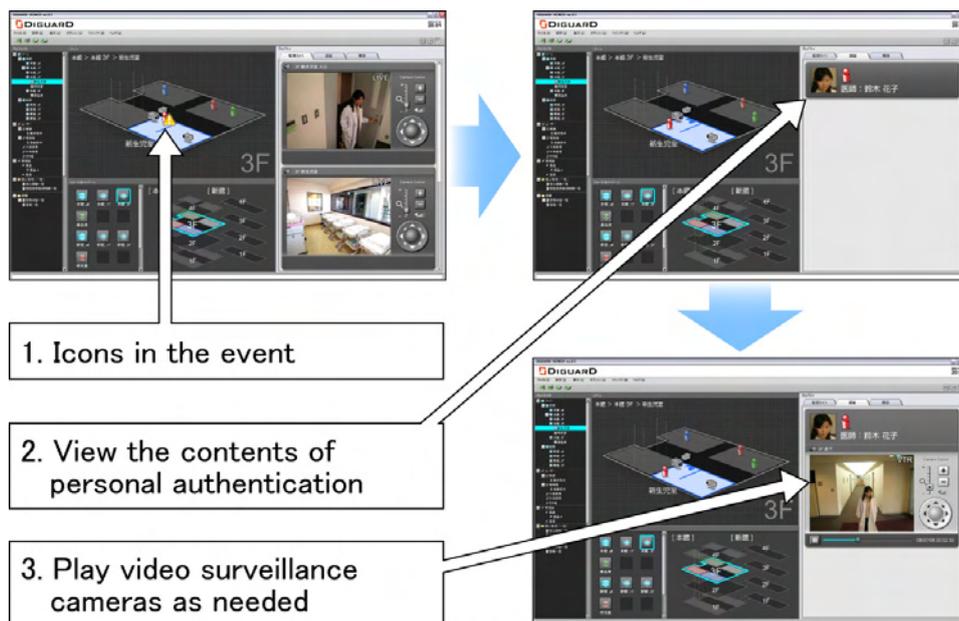


Fig. 2 Entrance confirmation

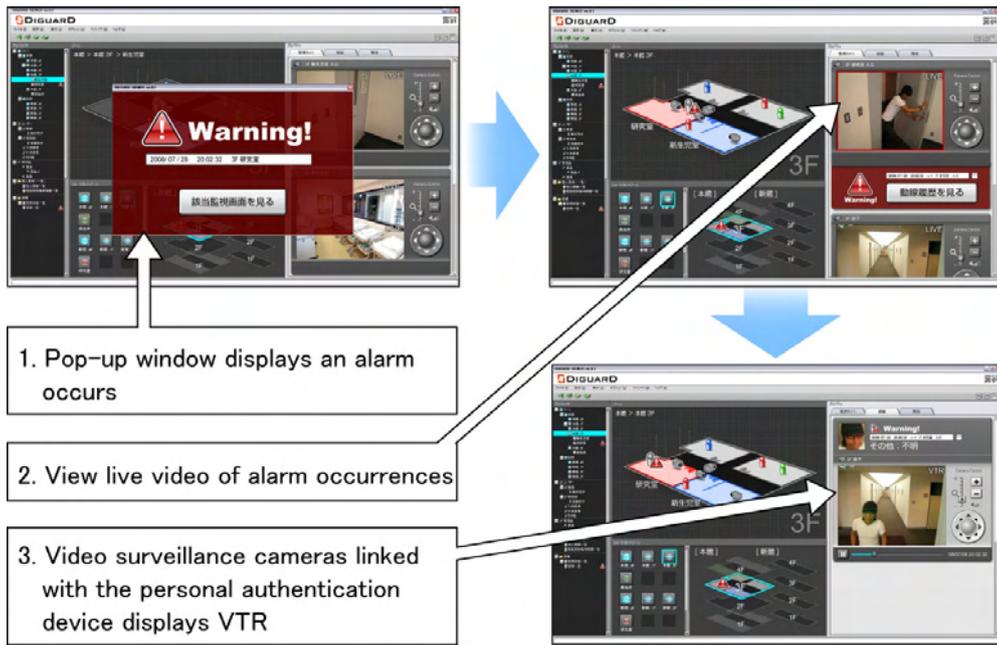


Fig. 3 Suspicious intrusion

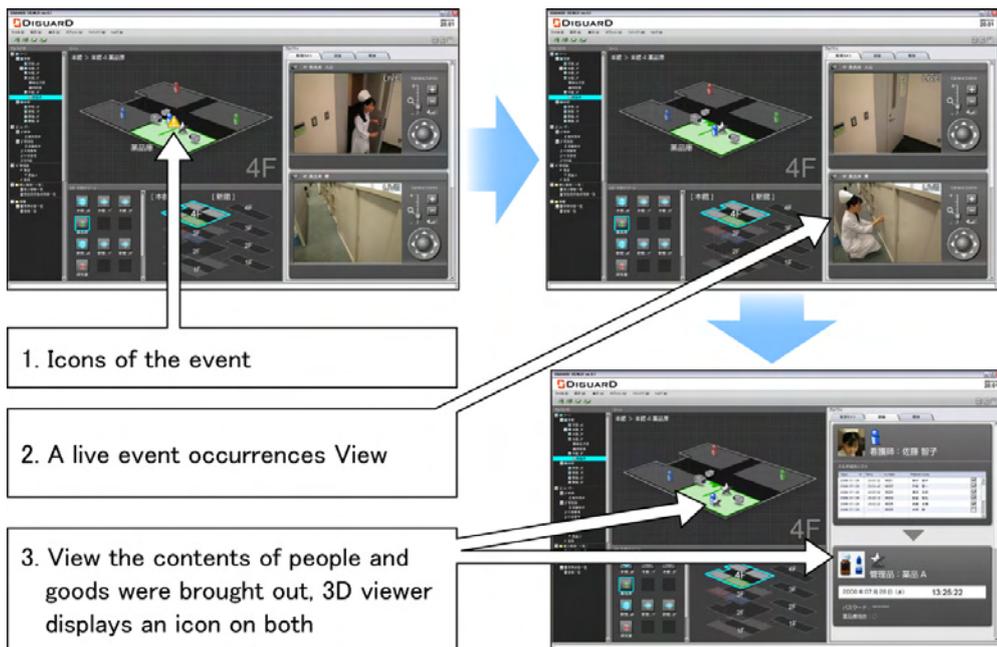


Fig. 4 Removal of goods

Energy-Saving Lighting Control System Linked to Access Control

Authors: Yosuke Kaneko* and Shinji Kitagami*

For conserving energy in the lighting of office buildings, an energy-saving control system was developed by coordinating the access control and lighting subsystems. The light dimming rate is controlled depending on the presence or absence of people and their density. By evaluating this novel system in an actual operating environment, we confirmed that it could reduce the power consumption for lighting by about 25%.

1. Background

Since people are constantly entering and leaving an office building, it is generally wasteful to control the air conditioning and lighting in a fixed settings. The energy-saving control system is an effective approach for reducing the waste by using the entering/leaving information on individuals such as the number of people on a floor, and the presence or absence of a person at each desk.

In an office building, the power consumption for lighting accounts for 20 to 35% of the total consumption and its usage pattern remains almost constant throughout the year; hence, it is relatively easy for the power-saving control system to reduce energy consumption. The power consumption for lighting (P_L) is expressed by the following formula⁽¹⁾.

$$P_L [Wh] = W \times H \times \frac{E \times A}{F \times U \times M} \quad (1)$$

where:

W: Power consumption [W/unit], H: Used hours,
E: Illuminance, A: Area, F: Luminous flux [lm/unit],
U: Utilization factor, M: Maintenance rate.

As indicated, the power consumption can be reduced by controlling the lighting so that the required illuminance is ensured (minimization of E) only in the required area (minimization of A) and for the required time (minimization of H).

Meanwhile, with the increase in company awareness about security, more access control systems are introduced into office buildings. While the primary function of the access control system is to control the entry and exit of individuals, it can also be utilized as a means to grasp the entering/leaving information such as the number of people on a floor, and the presence or absence of individuals in their rooms.

This paper describes the “energy-saving lighting control system linked to access control”, which uses entering/leaving information obtained from the access control system to automatically control the lighting so that each light is turned on only in the required area and for the required time ensuring a certain level of illuminance only in the vicinity of the surface of attended desks.

2. Energy-Saving Lighting Control System Linked to Access Control

2.1 System architecture

Figure 1 illustrates the system architecture of the “energy-saving lighting control system linked to access control”. This system consists of an access control subsystem, lighting subsystem, and energy-saving control server. Both subsystems and the server are linked over DIGUARD NET, Mitsubishi Electric’s security system integration platform⁽²⁾. The access control subsystem is equipped with two types of card readers for entry and exit at each door on a floor, and is able to identify employees entering and leaving a room. The lighting subsystem is able to turn on/off and adjust the dimming rate for each lighting fixture. The energy-saving control server is installed with the equipment configuration management program and the energy-saving control program linked to the access control system, and performs energy-saving control of the lighting.

2.2 Key technologies

This system is built around two key technologies: “energy-saving control technology linked to access control” and “equipment configuration management technology”.

2.2.1 Energy-saving control technology linked to access control

The “energy-saving control technology linked to access control” performs the lighting control based on the entering and leaving information obtained from the access control subsystem, and it uses two control methods: “spot lighting control” and “density-based correction control”.

The spot lighting control method uses the entering

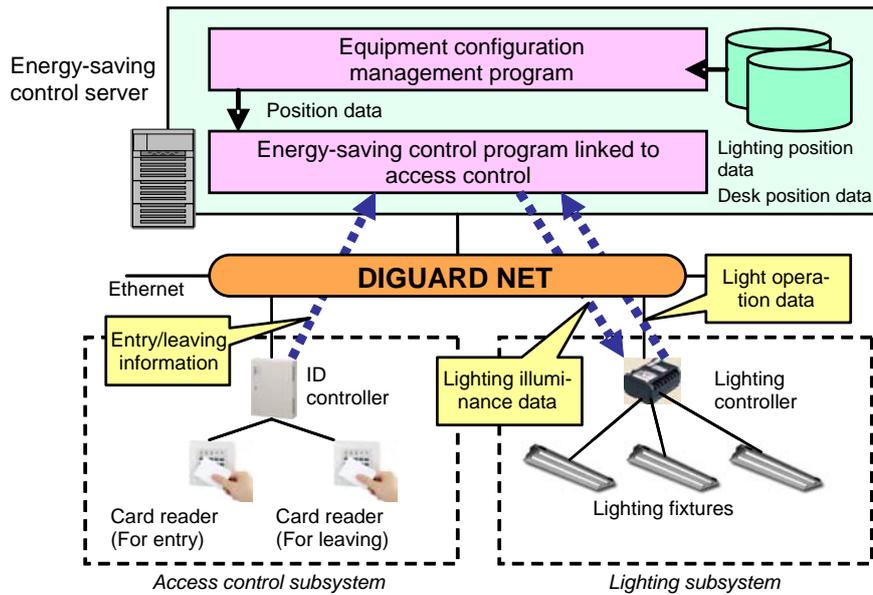


Fig. 1 System architecture

and leaving information obtained from the access control subsystem to recognize the presence of individuals in a room; it then considers the location information between the individuals and the lights in the room so that the lights are turned on and the dimming rate is controlled only around the individuals present, where the dimming rate is reduced according to the distance between an individual and the light. For example, as shown in Fig. 2(a), the dimming rate for the lights within one meter from each individual is set to 75%, and the lights within two meters are set to 25%. Through this dimming control, areas near the individuals are kept bright, and a sharp decrease in brightness is prevented, mitigating the detection of any change in brightness. In addition, the lights for individuals who have gone home or who are away from their desk for a meeting are automatically turned off, resulting in a reduction of wasted power.

The density-based correction control method uses the entering and leaving information to grasp the location information among the individuals present in the room, and identify areas with a high density of individuals; then, as shown in the diagram on the right in Fig. 2(b), the lighting is controlled to reduce the dimming rate in the high-density area. The spot lighting control serves to provide the optimum illuminance for each individual present. As a result, in the area with a high density, the light for illuminating a certain individual also has an effect on other individuals, resulting in excessive illuminance. The density-based correction control resolves this issue and reduces wasted power.

2.2.2 Equipment configuration management

The energy-saving control linked to access control performs lighting control in the vicinity of individuals present and dimming control in areas with a high density of individuals by using the location information on the lights and seats; the equipment configuration management manages this location data. Normally, the location data for installed lights and employee seating is set separately, and thus the location information between the seats and lights needs to be predetermined in order to obtain the relationship. However, the seating position may change during the system operation, and a running cost is required to maintain the definition data.

To resolve this issue, in the equipment configuration management system, the light-employee location information is retrieved by using separately defined logical position data for the lights and the logical seat-location data for the employees. As shown in Fig. 3, the equipment configuration management program identifies the lights in the vicinity of a given seat

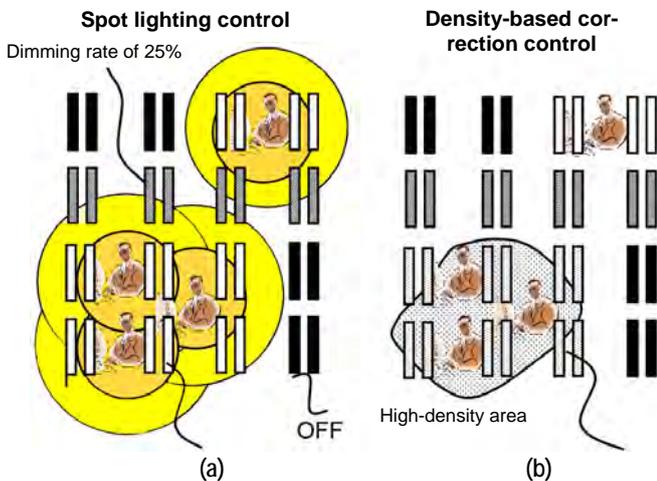


Fig. 2 Energy-saving control technology linked to access control

by mapping the lights onto the logical coordinate space for the seating, taking into consideration the difference in the logical coordinates, e.g., the difference in the position and spacing of the lights and seats.

3. Evaluation of Developed System

In order to evaluate the effectiveness of the developed technology, a prototype system was built in an office building and an evaluation was performed. The experimental evaluation was conducted in one section on a floor (about 850 m²) where about 50 employees work at desks. In addition to the desks assigned to the employees, there is a meeting room and a break room on the same floor.

As a result of the experimental evaluation, which was conducted for one year, it was confirmed that the power consumption for lighting was reduced by about 25% from the level before the system was introduced. The power consumption for lighting accounts for about 34% of the total consumption on the floor including air conditioning and electrical outlets, and thus the developed technology reduces the power consumption of the entire office by about 8.5%.

The developed technology determines the presence of an employee using only the access control information. Therefore, while employees are in the meeting room or break room, electric power is wasted. Despite these conditions, it was confirmed that a sufficient energy-saving effect can be achieved.

It should be noted that the above-described experimental evaluation involved only the spot lighting control technology.

Figures 4 and 5 show example results of the effect of visualization tools. The first tool, shown in Fig. 4, displays the total amount of reduction in power consumption and CO₂ emission accumulated during the evaluation period. These figures represent the effect of electric power reduction achieved by the developed technology. The other tool, shown in Fig. 5, visualizes the reduction effect where the illuminance level is expressed by gradation, and each circle indicates the location of an individual present. This tool provides a visual expression of the illuminance level changing in accordance with the activities of employees entering and leaving the area. The upper and lower images in Fig. 5 show the illuminance distribution patterns before and after the technology was applied, respectively. Even when the distribution of individuals is identical, the illuminance distribution is different, showing the effect of the reduction in power consumption.

The energy-saving effect measured in this evaluation represents only one example in a specific experimental environment. The energy-saving effect of this technology is expected to vary depending on the size of the office building, arrangement and model of lighting fixtures, entering and leaving frequency of employees (occupancy rate), etc. Therefore, in order to verify the effectiveness of this technology, it is essential to evaluate and demonstrate its performance in various actual environments. For that purpose, we consider it necessary to develop a simulation for simulating and measuring the energy-saving effect in various office building environments.

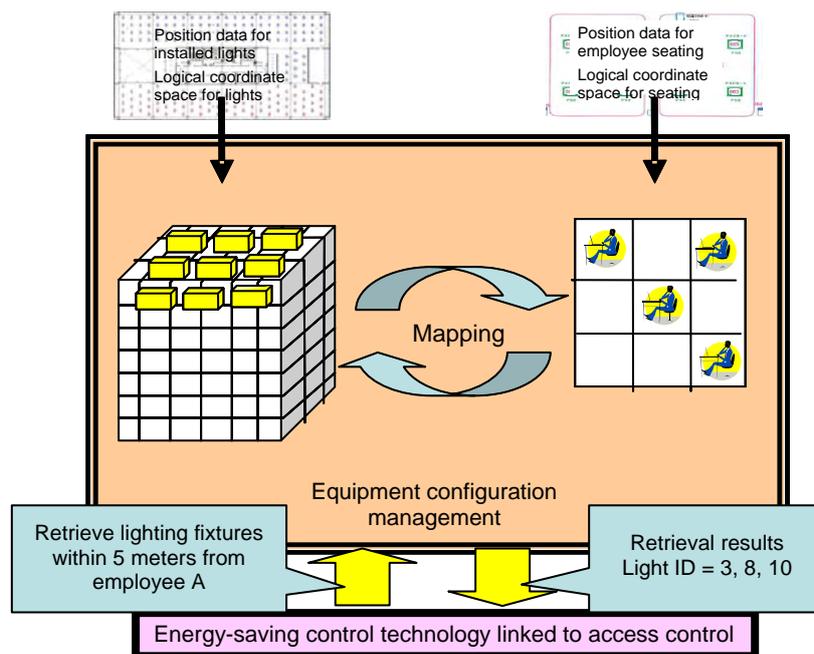


Fig. 3 Equipment configuration management technology



Fig. 4 Energy-saving effect visualization (1)

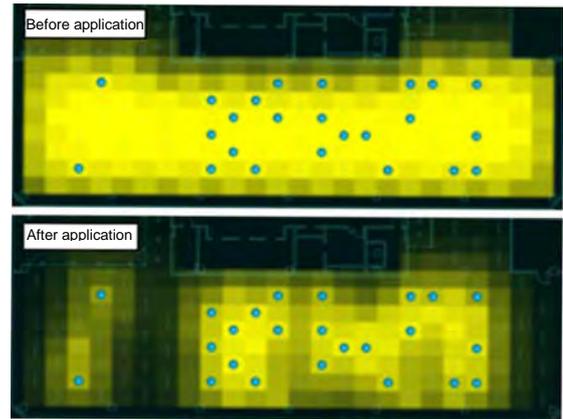


Fig. 5 Energy-saving effect visualization (2)

4. Conclusion

This report presented the architecture, component technologies, and assessment results of the “energy-saving lighting control system linked to access control”.

We will work on developing the lighting control simulation, which will allow us to verify the effect of this energy-saving technology in various operation types of buildings.

References

- (1) Japan Electric Engineer's Association, “Lighting management and energy saving”, <http://www.jeea.or.jp/course/contents/09105/>
- (2) “DIGUARD NET”: Security System Integration Platform, Mitsubishi Denki Giho, April 2008.

Cooperation between the Temporary ID Card Registration System and Access Control System

Author: *Koki Okunishi**

The employee identification (ID) cards distributed at all Mitsubishi Electric business bases in Japan use a contactless-type IC card with a uniform format, which can be registered to the access control system at Mitsubishi Electric headquarters. We built a cooperative system that temporarily registers these ID cards to the access control system at headquarters for improved convenience and security.

1. Background

Since 2005, for the purpose of corporate governance, Mitsubishi Electric has introduced access control systems using contactless IC cards at Mitsubishi Electric's branch offices, sales offices, manufacturing bases, factories, laboratories, and other business bases in Japan. Meanwhile, in November 2005, Mitsubishi Electric moved its headquarters to the Tokyo Building, where the Mitsubishi Electric MELSAFETY system was introduced to perform access control using employee identification cards.

The Mitsubishi Electric employee ID cards are contactless IC cards with a uniform format, and are distributed at the company headquarters as well as at all business bases in Japan. Therefore, we are technically able to register all employee ID cards to the headquarters access control system. However, in order to avoid safety and administrative risks, this is not permitted, and instead temporary guest cards are issued to internal visitors from other business bases within the company.

Each internal visitor presents his/her ID card and then receives a temporary guest card, resulting in a waiting line at the reception desk at headquarters. In addition, internal visitors waiting to receive a guest card may keep external guest visitors waiting.

Consequently, for improved convenience and security, we built a system for internal visitors, which temporarily registers a Mitsubishi Electric employee ID card to the headquarters access control system.

This paper describes the configuration of this system.

2. System Requirements and System Configuration

The requirements for the temporary ID card registration system to be introduced at Mitsubishi Electric headquarters are as follows:

- (1) To be able to use the existing MELSAFETY access control system;
- (2) To be able to use the existing employee ID cards;
- (3) To be able to use the existing employee identification information server;
- (4) To cooperate with the newly introduced visitor acceptance application server;
- (5) ID card registration to the existing MELSAFETY security system is to be valid for use by the visitor only during the period of his/her business trip; and
- (6) Security gates and card readers available for each internal visitor are to be restricted to those within his/her accessible area.

To satisfy the above requirements, we coordinated the existing systems to develop the temporary ID card registration system that realizes the required functions. Figure 1 shows a diagram of the entire system configuration.

The temporary ID card registration system receives the application of an internal visitor from the visitor acceptance application server, extracts the visitor's ID card information from the employee identification information server, and registers the information to MELSAFETY. For efficient system development, we used "DIGUARD NET", Mitsubishi Electric's own security system integration platform to interface with MELSAFETY.

3. Basic System Functions

The process flow of the temporary ID card registration system is as follows:

- (1) An application entry for the visit is sent from the visitor acceptance application server;
- (2) The interfacing function of the visitor acceptance application server receives the application data and registers it to the task management function;
- (3) The task management function checks the schedule of application entries, and then notifies the user information delivery function of those that have ex-

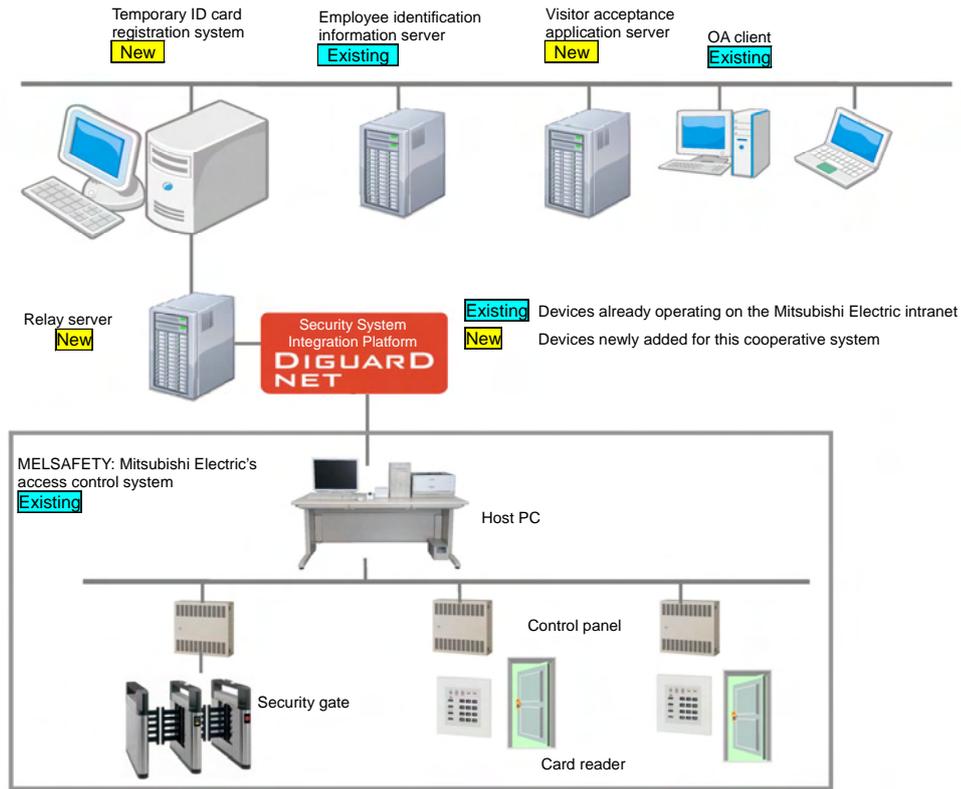


Fig. 1 Entire system configuration diagram

- pired and those that are valid;
- (4) Based on the application data notified from the task management function, the user information delivery function retrieves the user information from the employee identification information server; and
 - (5) The user information update function reflects the received user information and visiting period on MELSAFETY.

In preparation for the occurrence of a mismatch between the task management database and MELSAFETY, this system also has an all-tasks delivery function to correct the mismatch by notifying the infor-

mation of all tasks to be delivered at that moment.

To realize the above process steps, we developed the basic system functions shown in Table 1. Figure 2 shows the internal module configuration of the temporary ID card registration system.

4. System Construction (Ensuring Compliance with the Company Security Policy)

In accordance with Mitsubishi Electric’s security policy, no direct connection is allowed between a physical security system and an information system, and if any connection is made it must be via a firewall.

Table 1 Basic system functions of the temporary ID card registration system

No.	Function	Description
1	Visitor acceptance application server interface	Receives the application data and provides it to the task management function
2	All-tasks delivery command	Executes delivery of all tasks
3	All-tasks delivery interface	Calls for the all-tasks delivery function
4	Task management	Controls and provides the task information to the user information delivery function as needed
4-1	Task registration	Registers the entered task information to the task DB
4-2	Regular task delivery	At each predetermined time, checks the information in the task DB and delivers the required information to the delivery management function
4-3	All-tasks delivery	Provides the information contained in the task DB to the delivery management function
5	User information delivery	Delivers the provided task information to MELSAFETY
5-1	Delivery management	Sends the provided information to the MELSAFETY delivery function and DB delivery function
5-2	MELSAFETY delivery	Delivery to MELSAFETY
5-3	DB delivery	Registers to/deletes from the DB
6	User information update	Reflects the user information on MELSAFETY
7	User information acquisition	Retrieves the user information and ID card information for a specified user from the employee identification information server

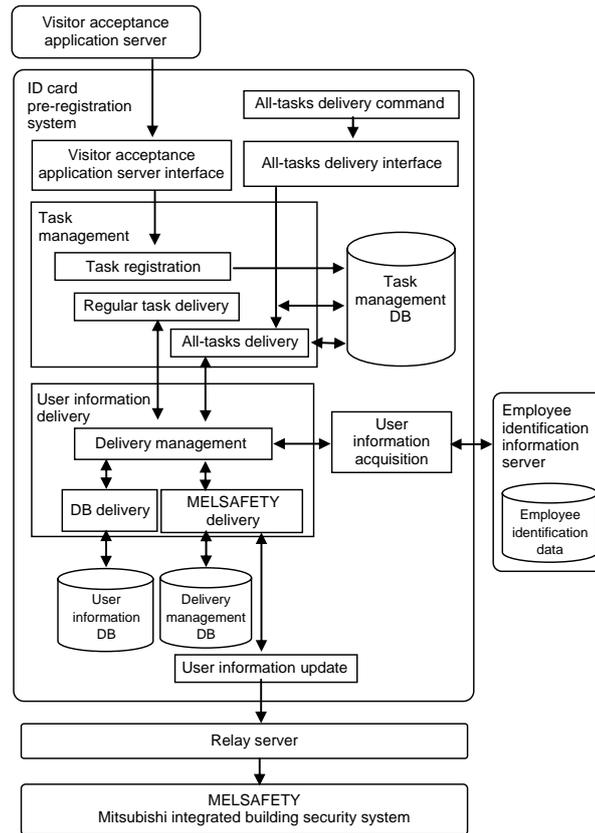


Fig. 2 Internal module configuration of the temporary ID card registration system

The MELSAFETY access control system is categorized as a physical security system, whereas the visitor acceptance application server and the temporary ID card registration system are categorized as information systems; thus, direct connection between these systems is not permitted. Consequently, we have chosen to set up a relay server to relay the user information delivered from the temporary ID card registration system to MELSAFETY.

To pass through the firewall, we adopted HTTP as the protocol between the temporary ID card registration system and the relay server; for the communication between the relay server and MELSAFETY, we adopted DIGUARD NET. Therefore, we designed the relay server to convert the information to be registered. The relay server operates as follows:

- (1) The user information to be registered is received from the temporary ID card registration system via HTTP;
- (2) The user information to be registered is output to a link file, which is then written to the shared folder of the MELSAFETY access control system;
- (3) The file that contains the registration results from the MELSAFETY access control system is read and the registration results are sent back to the temporary ID card registration system via HTTP; and
- (4) The temporary ID card registration system receives the registration results; if the user information was

not registered, the system repeats the registration of the user information.

Since we designed this system using a relay server and DIGUARD NET, construction of the system was easy even in an environment such as headquarters where no direct connection is allowed between a physical security system and an information system. This technology can easily be deployed at other business bases as well.

5. Operation after System Installation

The operation steps of this cooperative system are explained using Fig. 3:

- (1) The internal visitor emails or phones the host person to provide his/her name and the date of the business trip, and requests an application for entry using his/her ID card;
- (2) The host person uses the workflow on the website to enter the name of the visitor (if more than one visitor, the names of all visitors) and the date of the business trip, and to ask his/her manager for authorization;
- (3) The manager reviews the application on the workflow, and gives the authorization;
- (4) The authorization is notified to the visitor by email;
- (5) The visitor confirms the registration by email, and visits the headquarters with his/her ID card;
- (6) The visitor presents his/her ID card at the security

- gate located at the side of the headquarters reception, and then enters the offices (no check-in process is required at the reception desk); and
- (7) The visitor also presents his/her ID card to the reader when he/she enters any room in the headquarters offices.

Since the workflow entry screen in the above Step (2) is provided as a web page, the host person can enter the data from the PC on his/her desk. An example of the entry screen is shown in Fig. 4.

As described above, the introduction of this system allows an internal visitor, by communicating in advance, to enter any place within the headquarters using his/her own ID card, and eliminates the check-in process or the use of the guest card, resulting in improved convenience.

In addition, the guest cards that used to be manually handed out at the reception desk are now automatically distributed. The automated process eliminates mistakes in recognizing individuals, wrong distribution, or false recording, for improved security and traceability.

6. Effect of Introduced System

In February 2009, we started test operation of this system. About a month later, we conducted a questionnaire survey for the users. As a result, 97% of the users felt that “convenience was improved”, indicating the huge effect of the system’s introduction.

In addition, since introducing the system, Mitsubishi Electric employees no longer need to wait in a line at reception to receive their guest cards. As a result, external guest visitors have a shorter wait for their guest card. Figure 5 shows a photograph of the reception desk at Mitsubishi Electric headquarters after the introduction of this system.

7. Future Prospects

Our newly developed temporary ID card registration system, which was introduced at Mitsubishi Electric headquarters, makes it possible to temporarily register an employee ID card. We intend to introduce this system at all Mitsubishi Electric business bases in Japan, aiming at the improvement of both convenience and security throughout the company.

We also plan to improve the system not only for in-company use but to promote it as an optional product of the MELSAFETY access control system.

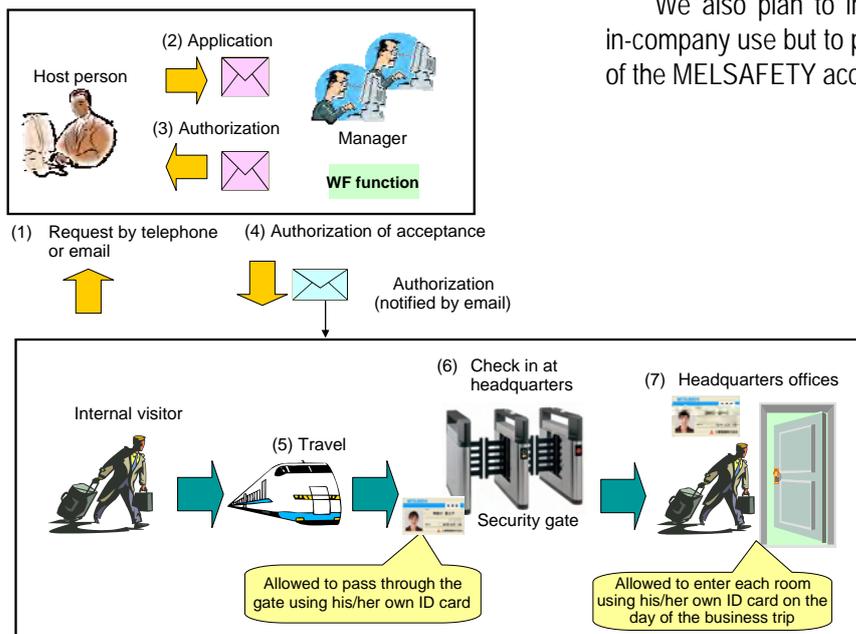


Fig. 3 Operation flow after introduction of the system



Fig. 4 Example of the workflow entry screen on the web page



Fig. 5 The reception desk at Mitsubishi Electric headquarters

