

## DESCRIPTION

### TITLE OF THE INVENTION

MOBILE BODY PASSAGE MANAGEMENT SYSTEM AND MOBILE BODY  
PASSAGE MANAGEMENT METHOD

### TECHNICAL FIELD

[0001]

The present invention relates to a mobile body passage management system and a mobile body passage management method.

### BACKGROUND ART

[0002]

Conventionally, mobile bodies which travel autonomously have been used at factories, logistics warehouses, etc. As an example of such mobile bodies, there are automated guided vehicles which travel along designated traveling routes to carry components and perform cargo handling work. PTL 1 is disclosed regarding control of a mobile body which travels autonomously. This publication describes a “mobile body system having a flat plate sign located according to a preset traveling route and a mobile body which travels autonomously along the traveling route, the mobile body system comprising: a distance direction detection device that is provided in the mobile body and detects a distance and direction from the mobile body to an object existing in a specified search range by scanning the specified search range with detection light; and a travel direction determining means that determines a traveling direction of the mobile body based on a detection result of the distance direction detection device, wherein the flat plate sign includes a mirror surface and a diffuse reflector with a higher rate of diffuse-reflecting incident light than that of the mirror surface.”

### CITATION LIST

#### PATENT LITERATURE

[0003]

PTL 1: Japanese Patent Application Laid-Open (Kokai) Publication No. 2012-113765

### SUMMARY OF THE INVENTION

## PROBLEMS TO BE SOLVED BY THE INVENTION

[0004]

As in the above-described conventional technology, the traveling control of a mobile body/bodies designed for, for example, an unmanned factory has already been used. Under such a limited environment, it is possible to integrally manage the operation of a large number of mobile bodies collectively.

However, in recent years, there has been a demand for the operation of mobile bodies with much higher versatility against the background of, for example, a decrease in working population. For example, such operation is to cause carrying robots, cleaning robots, security robots, etc., to operate within a commercial facility building(s) where people exist. Regarding such operation, it is not realistic for a facility manager to integrally manage all the mobile bodies and it is assumed that the facility manager and a mobile body administrator are different entities.

[0005]

Regarding the above-described conventional technology, the mobile body performs the traveling control by recognizing a sign(s); however, for example, when different mobile body administrators exist by purpose and if specifications for signs vary for each mobile body administrator, each mobile body administrator will have to place signs. As a result, a large number of signs will be placed, which is irrational and will also spoil the scenery. Also, under the environment where various mobile bodies exist, there is also a problem of passage mediation. It is a heavy burden for the facility manager to integrally manage the passage of the various mobile bodies and it is also difficult to mediate the passage between different mobile body administrators.

Moreover, when a mobile body uses equipment of a facility such as elevators and automatic doors, it is required to realize the usage of the equipment by minimizing burdens on both the facility manager and the mobile body administrator(s).

It is an object of the present invention to efficiently manage the passage of the mobile body which moves autonomously even if the facility manager and the mobile body administrator are different entities.

## MEANS TO SOLVE THE PROBLEMS

[0006]

In order to achieve the above-described object, one of representative mobile body passage management systems according to the present invention is a mobile body

passage management system for managing passage of a mobile body that moves autonomously, wherein the mobile body passage management system includes: a storage unit that associates marker identification information for identifying a marker installed in a target facility, where the mobile body passes, with marker positional information indicating a position of the marker in the target facility and stores the marker positional information associated with the marker identification information; a communication unit that communicates with the mobile body; and a control unit that, when receiving the marker identification information from the mobile body, reads the marker positional information associated with the marker identification information from the storage unit and transmits the marker positional information to the mobile body.

Moreover, one of representative mobile body passage management methods according to the present invention is a mobile body passage management method for managing passage of a mobile body that moves autonomously, wherein the mobile body passage management method includes: a step executed by a server associating marker identification information for identifying a marker installed in a target facility, where the mobile body passes, with marker positional information indicating a position of the marker in the target facility, and storing the marker positional information associated with the marker identification information in a storage unit; a step executed by the server receiving the marker identification information from the mobile body; and a step executed by the server reading the marker positional information associated with the marker identification information from the storage unit and transmitting the marker positional information to the mobile body.

[0007]

The passage of the mobile body which moves autonomously can be managed efficiently according to the present invention. Any objects, configurations, and advantageous effects other than those described above will be made clear by the description of embodiments below.

## BRIEF DESCRIPTION OF DRAWINGS

[0008]

Fig. 1 is an explanatory drawing of passage management by a mobile body passage management system;

Fig. 2 is an explanatory drawing of building management and mobile body management;

Fig. 3 is a configuration diagram of a building management server;

Fig. 4 is a configuration diagram of a robot;

Fig. 5 is an explanatory drawing of marker data;

Fig. 6 is a flowchart of the building management server; and

Fig. 7 is a flowchart of the robot.

## DESCRIPTION OF EMBODIMENTS

[0009]

Embodiments will be described below with reference to the drawings.

[Embodiment 1]

[0010]

Fig. 1 is an explanatory drawing of passage management by a mobile body management system. A mobile body indicated in this embodiment is a robot 30 capable of traveling autonomously. In a building which is a target facility where the robot 30 passes, a marker(s) 20 is installed as appropriate. As the marker 20, a two-dimensional bar code indicating information with an optically readable binary code can be used. The marker 20 shows, as information, a marker ID which is identification information for uniquely identifying the relevant marker.

[0011]

A building management server 60 associates the marker ID with marker positional information, rules, and equipment usage information and manages them as marker data 64a. The marker positional information indicates the position of the relevant marker 20 in a building. The rules are rules about the passage in the vicinity of the marker 20 and indicates, for example, a speed limit and entry prohibition. The equipment usage information is necessary information when the robot 30 uses the building equipment such as elevators and automatic doors. The details of the marker positional information, the rules, and the equipment usage information will be described later in detail.

[0012]

The robot 30 reads a marker ID(s) from a marker(s) 20 around it (1). The robot 30 transmits the read marker ID to the building management server 60 (2). When the building management server 60 receives the marker ID from the robot 30, it reads the marker position, the rules, and the equipment usage information, which are associated with the received marker ID, from the marker data 64a and transmits them to the robot 30 (3). The robot 30 controls traveling by using the received information.

[0013]

Fig. 2 is an explanatory drawing of building management and mobile body management. The installation and maintenance of markers 20 and the registration and editing of the marker data 64a belong to building management. The operation of a robot(s) 30 belongs to mobile body management.

If a building manager who performs the building management and a mobile body administrator who performs the mobile body management are different entities, the building manager should only have to manage the markers 20 and the marker data 64a and does not have to be directly involved in the operation of individual mobile bodies.

[0014]

The robot 30 which is a mobile body uses the marker positional information, which it has received via the marker 20, for the purpose of self-position estimation. Moreover, as the robot 30 uses the equipment usage information received via the marker 20, it can use elevators and automatic doors. The robot 30 performs traveling control by using the results of the position estimation, following the rules received via the marker 20, and using the equipment.

Accordingly, the robot 30 can perform the traveling control based on the recognized marker(s) 20. So, when the mobile body administrator manages the operation of the robot 30, they do not have to be involved in the management of the markers 20 or the marker data 64a.

[0015]

Fig. 3 is a configuration diagram of the building management server 60. The building management server 60 includes, as illustrated in Fig. 4, a CPU (Central Processing Unit) 61, a memory 62, a communication unit 63, and a storage unit 64.

[0016]

The storage unit 64 is an auxiliary storage device for storing programs and various kinds of data. The storage unit 64 stores, for example, the marker data 64a and log data 64b. The marker data 64a is data which associates the marker ID with the marker positional information, the rules, and the equipment usage information.

The log data 64b is a history about the reception of the marker ID(s) from the robot 30 and is data which associates the identification information of the robot 30 and the marker ID with dates and times.

[0017]

The communication unit 63 is a communication interface used when wirelessly

communicating with the robot 30. The communication unit 63 is used to receive the marker ID from the robot 30, transmit the marker positional information to the robot 30, transmit the rules to the robot 30, and transmit the equipment usage information to the robot 30.

[0018]

The CPU 61 implements functions of a marker data management unit 61a, a marker data providing unit 61b, and a history management unit 61c by expanding programs, which have been read from the storage unit 64, in the memory 62 which is the main storage device, and sequentially executing the programs.

[0019]

The marker data management unit 61a is a processing unit which registers and edits the marker data 64a. For example, if a new marker 20 is placed in a building, the marker data management unit 61a registers data of the new marker 20 with the marker data 64a. Moreover, if the position of the marker 20 is changed, the marker data management unit 61a rewrites the marker positional information of the marker 20.

[0020]

Furthermore, if a rule regarding the passage around the marker 20 is to be defined, the marker data management unit 61a registers the rule in association with the marker 20. Similarly, if there is equipment such as an elevator or an automatic door in the vicinity of the marker 20, the marker data management unit 61a registers the equipment usage information by associating it with the marker 20. The rules and the equipment usage information are registered as necessary and are not mandatory. Moreover, if there is any change of the rules or the equipment, it is possible to deal with the change dynamically by editing the marker data 64a.

[0021]

When the marker data providing unit 61b receives the marker ID from the robot 30, it refers to the marker data 64a, reads the marker positional information associated with the received marker ID, and transmits such marker positional information to the robot 30.

Moreover, if the marker ID received from the robot 30 is associated with a rule(s), the marker data providing unit 61b transmits that rule(s) together with the marker positional information to the robot 30.

Similarly, if the marker ID received from the robot 30 is associated with the equipment usage information, the marker data providing unit 61b transmits that equipment usage

information together with the marker positional information to the robot 30.

[0022]

The history management unit 61c associates the marker ID received from the robot 30 with a robot ID of a transmission source and date-and-time information of the reception and accumulates them in the log data 64b. With this log data 64b, it is possible to check how each robot 30 has moved inside the building.

[0023]

Fig. 4 is a configuration diagram of the robot 30. The robot 30 includes, as illustrated in Fig. 4, a CPU 31, a memory 32, a communication unit 33, a storage unit 34, a driving unit 35, and a camera 36.

[0024]

The camera 36 is a unit for capturing pictures of areas around the robot 30.

The driving unit 35 is a unit for driving the robot 30 and includes wheels, a motor, etc.

[0025]

The storage unit 34 is an auxiliary storage device that stores programs and various kinds of data. The storage unit 34 stores a robot ID 34a and route data 34b.

The robot ID 34a is identification information for uniquely identifying the robot 30.

The route data 34b indicates a route(s) where the robot 30 travels. The route data 34b may be given from outside or may be generated from, for example, map data by the robot 30.

[0026]

The communication unit 33 is a communication interface used when wirelessly communicating with the building management server 60. The communication unit 33 is used to transmit the marker ID to the building management server 60, receive the marker positional information from the building management server 60, receive the rules from the building management server 60, and receive the equipment usage information from the building management server 60.

[0027]

The CPU 31 implements functions of a position management unit 31a, a traveling control unit 31b, and an equipment usage unit 31c by expanding programs, which have been read from the storage unit 34, in the memory 32 which is the main storage device, and sequentially executing the programs.

[0028]

The position management unit 31a is a processing unit that manages the position of the

robot 30. The position management unit 31a extracts an image of the marker 20 from pictures captured by the camera 36, reads the marker ID from the image of the marker 20, and also calculates a relative relationship between a marker coordinate system and a camera coordinate system. The position management unit 31a transmits the read marker ID together with the robot ID 34a to the building management server 60 and receives the marker positional information, the rules, and the equipment usage information. The position management unit 31a performs self-position estimation for estimating the position of the robot 30 in a building coordinate system by using the marker positional information received from the building management server 60 and the relative relationship regarding the marker 20.

[0029]

The equipment usage unit 31c performs various kinds of processing to use the equipment such as elevators and automatic doors. Specifically, the equipment usage unit 31c identifies the type(s), position(s), and direction(s) of the equipment located around the robot 30 according to the equipment usage information. The equipment usage unit 31c acquires necessary data for the equipment usage by using a URI indicated in the equipment usage information. If there is a request from the traveling control unit 31b, the equipment usage unit 31c executes processing for using the equipment based on the necessary data for the equipment usage. For example, when using an automatic door, the equipment usage unit 31c requests a control device for the automatic door to open the door. Also, when using an elevator, the equipment usage unit 31c causes a control device for the elevator to call an elevator car to the current floor and set a destination floor.

[0030]

The traveling control unit 31b controls traveling of the robot 30 by outputting motion instructions to the driving unit 35 based on the position estimated by the position management unit 31a and the route data 34b. If the position management unit 31a has received the rules under this circumstance, it controls traveling so that the received rules would be satisfied. Moreover, if it is necessary to use the equipment, a request is made to the equipment usage unit 31c to use the facility.

[0031]

Incidentally, the self-position estimation may be performed by using not only the marker positional information, but also the marker positional information in combination with other information. Moreover, the correspondence relationship between the positions of

markers inside the building and the marker IDs may be retained as building data by the robot 30.

[0032]

If the building data is retained in advance, the traveling control unit 31b can perform the control to, for example, travel in accordance with the marker positional information and then lowers a certainty level of the self-position estimation when visually senses a marker which should not be seen. When the certainty level of the self-position estimation decreases, it is only necessary to slow down a moving speed and spend calculation time for the self-position estimation. Moreover, if the certainty level becomes lower than a threshold value, it is desirable to take a return action. When the marker can be seen, the return action is to generate a candidate for the self-position from the marker positional information and perform the self-position estimation by, for example, spinning at that position. If the marker cannot be seen, the return action is to: move around a certain travelable range at a low speed to search for the marker; and stop as an error stop if the marker cannot still be found. Incidentally, if a collision happens or the robot 30 gets stuck, the traveling control unit 31b takes the return action.

[0033]

Fig. 5 is an explanatory drawing of a specific example of the marker data 64a. The marker data 64a is, as illustrated in Fig. 5, data regarding which the marker positional information, the rules, and the equipment usage information are associated with the marker ID. Accordingly, the marker data 64a is managed in a unified manner by associating a plurality of types of data for different uses with the marker ID.

[0034]

The marker positional information of the marker data 64a includes, for example, a building ID, a floor ID, a marker size, coordinates of a marker origin in a building coordinate system, and the marker's posture in the building coordinate system.

The building ID is identification information for uniquely identifying the relevant building.

The floor ID is identification information for uniquely identifying the relevant floor.

The marker size indicates a physical size of the relevant marker 20.

The coordinates of the marker origin in the building coordinate system indicates at which position the origin which is a reference position of the marker 20 is located with reference to the building.

The marker's posture in the building coordinate system indicates in which direction the marker 20 faces with reference to the building, by means of, for example, a quaternion.

[0035]

The position management unit 31a identifies a relative position of the robot 30 relative to the marker based on how the marker 20 looks in pictures captured by the camera 36, and the marker size. The relative position of the robot 30 in the building coordinate system can be estimated by combining this relative position with the coordinates of the marker origin in the building coordinate system and the marker's posture in the building coordinate system.

[0036]

The rules of the marker data 64a include a speed limit, a sound volume limit, a light quantity limit, commands, command area information, and so on.

The speed limit indicates a limit for a traveling speed of the robot 30.

When the robot 30 has a task of emitting some kind of sound, the sound volume limit indicates a limit for its sound volume.

The light quantity limit is used for the purpose of reducing illumination of a screen or an LED mounted in the robot 30.

The commands are restrictions on traveling, such as entry prohibition and immediate stop, which are designated regarding the relative positional relationship with the marker 20.

The command area information defines the shape and size of a target area of the relevant command.

[0037]

The equipment usage information of the marker data 64a includes an equipment type, coordinates of an equipment origin in the marker coordinate system, the equipment's posture in the marker coordinate system, a URI of necessary data for the equipment usage, and so on.

The equipment type is, for example, elevators or automatic doors.

The coordinates of the equipment origin in the marker coordinate system indicate at which position the origin which is a reference position of the equipment is located with reference to the marker 20.

The equipment's posture in the marker coordinate system indicates in which direction the equipment faces with reference to the marker 20, by means of, for example, a quaternion.

The URI of the necessary data for the equipment usage indicates, for example, storage locations and file names of various kinds of configuration files.

[0038]

Fig. 6 is a flowchart illustrating a processing sequence of the building management server 60. Incidentally, prior to the processing in Fig. 6, the marker data management unit 61a has executed a step of registering the marker data 64a.

In the processing sequence in Fig. 6, the marker data providing unit 61b firstly receives the marker ID from the robot 30 (step S101). The marker data providing unit 61b searches the marker data 64a by using the received marker ID as a key (step S102).

[0039]

As a result of the search, specifically speaking, the marker data providing unit 61b reads the marker positional information, the rules, and the equipment usage information corresponding to the marker ID from the marker data 64a and transmits them to the robot 30 (step S103). Then, the history management unit 61c associates the marker ID received from the robot 30 with a robot ID of a transmission source and reception-date-and-time information, accumulates them in the log data 64b (step S104), and terminates the processing.

Incidentally, an explanation is given here by taking an example of the configuration where the marker ID is stored in association with the rules and the equipment usage information; however, the rules and the equipment usage information corresponding to the marker may be generated in real time. Specifically, map data in which the rules and the equipment usage information are embedded on an area basis in advance may be prepared, the relevant area may be identified based on the marker positional information, and the rules and the equipment usage information which should be transmitted to the robot 30 may be generated on demand in real time.

[0040]

Fig. 7 is a flowchart illustrating a processing sequence relating to the traveling control of the robot 30.

The traveling control unit 31b firstly reads the route data 34b (step S201). The position management unit 31a identifies the marker 20 from pictures captured by the camera 36 (step S202) and transmits the marker ID and the robot ID 34a to the building management server 60 (step S203).

[0041]

After step S203, the position management unit 31a receives the marker positional information, the rules, and the equipment usage information from the building management server 60 (step S204). The position management unit 31a performs the

self-position estimation by using the marker positional information received from the building management server 60 (step S205).

[0042]

The traveling control unit 31b controls the traveling based on the position estimated by the position management unit 31a and the route data 34b (step S206). If the position management unit 31a has received the rules under this circumstance, it performs the control so that the received rules would be satisfied. If it is necessary to use the equipment, the equipment usage unit 31c executes necessary processing to use the facility.

The robot 30 repeatedly executes steps S201 to S206.

[0043]

The system disclosed in the embodiment as described above is the mobile body passage management system for managing the passage of the robot 30 which is the mobile body that moves autonomously, wherein the mobile body passage management system includes: the storage unit 64 that associates the marker identification information for identifying a marker 20 installed in a target facility, where the mobile body passes, with the marker positional information indicating the position of the marker 20 in the target facility and stores the marker positional information associated with the marker identification information; the communication unit 63 that communicates with the mobile body; and the control unit (the CPU 61) that, when receiving the marker identification information from the mobile body, reads the marker positional information associated with the marker identification information from the storage unit and transmits the marker positional information to the mobile body.

Because of this configuration and motions, the mobile body passage management system can efficiently manage the passage of the mobile body which moves autonomously, even if the facility manager and the mobile body administrator are different entities.

[0044]

Moreover, the storage unit 64 stores a rule(s) about passage in the vicinity of the relevant marker by associating the rule with the marker identification information; and when the rule(s) is associated with the marker identification information received from the mobile body, the control unit transmits the rule(s) together with the marker positional information to the mobile body. Alternatively, the control unit may generate a rule(s) to be transmitted to the mobile body based on the marker positional information by

referring to map data in which the rule(s) is associated with the relevant area.

As an example, the rules include any one of a speed limit, a light quantity limit, a sound volume limit, entry prohibition, and a stop request.

Moreover, the storage unit 64 stores area information for defining a target area to which the rule should apply, by further associating the area information with the marker identification information.

Because of this configuration and motions, the mobile body passage management system can manage the passage of the mobile body around the marker 20.

[0045]

Furthermore, the storage unit 64 stores the equipment usage information required when using the equipment in the target facility, by associating the equipment usage information with the marker identification information; and when the equipment usage information is associated with the marker identification information received from the mobile body, the control unit transmits the equipment usage information together with the marker positional information to the mobile body. Alternatively, the control unit may generate the equipment usage information to be transmitted to the mobile body based on the marker positional information by referring to map data in which the equipment usage information is associated with the relevant area.

As an example, the equipment usage information includes an equipment type and a position and direction of the target facility with reference to the marker.

Because of this configuration and motions, the mobile body passage management system can cause the mobile body to use the equipment such as elevators and automatic doors.

[0046]

Furthermore, with the disclosed system, the marker positional information includes information for identifying the target facility, information for identifying a floor within the target facility, and a position and direction of the marker with reference to the target facility.

Since these pieces of information are provided, it is possible to manage the passage of the mobile body without being directly involved with operations of the mobile body.

[0047]

Incidentally, an optically readable binary code which indicates the marker identification information can be used as the marker 20.

With this configuration, it is easy to keep costs of the marker(s) 20 down and change

the placement of the marker(s) 20.

Moreover, it is easy to maintain the marker(s) 20. For example, if any marker 20 is lost, even a person in charge of the facility management, etc., who does not have specialized knowledge about the marker(s) 20 can notice it immediately.

[0048]

Moreover, the control unit accumulates a history regarding the reception of the marker identification information from the mobile body.

With this configuration, the history of the passage of the mobile body can be analyzed later.

[0049]

Incidentally, the present invention is not limited to the aforementioned embodiment and includes various variations. For example, the aforementioned embodiment has been described in detail in order to explain the invention in an easily comprehensible manner and is not necessarily limited to the one having all the configurations explained above. Furthermore, without limitation to deletion of such configuration, it is also possible to replace or add a configuration.

For example, in the aforementioned embodiment, a robot which performs work inside a building is indicated as an example, but the present invention can be also applied to a mobile body which moves outdoors. Moreover, a mode of movement is not limited to traveling, and may be flying or sailing.

## REFERENCE SIGNS LIST

[0050]

- 20: marker
- 30: robot
- 31: CPU
- 31a: position management unit
- 31b: traveling control unit
- 31c: equipment usage unit
- 32: memory
- 33: communication unit
- 34: storage unit
- 34a: robot ID
- 34b: route data

35: driving unit  
36: camera  
60: building management server  
61: CPU  
61a: marker data management unit  
61b: marker data providing unit  
61c: history management unit  
62: memory  
63: communication unit  
64: storage unit  
64a: marker data  
64b: log data

## CLAIMS

### [Claim 1]

A mobile body passage management system for managing passage of a mobile body that moves autonomously, comprising:

a storage unit that associates marker identification information for identifying a marker installed in a target facility, where the mobile body passes, with marker positional information indicating a position of the marker in the target facility and stores the marker positional information associated with the marker identification information;

a communication unit that communicates with the mobile body; and

a control unit that, when receiving the marker identification information from the mobile body, reads the marker positional information associated with the marker identification information from the storage unit and transmits the marker positional information to the mobile body.

### [Claim 2]

The mobile body passage management system according to claim 1, wherein the storage unit stores a rule about passage in vicinity of a relevant marker by associating the rule with the marker identification information; and wherein when the rule is associated with the marker identification information received from the mobile body, the control unit transmits the rule together with the marker positional information to the mobile body.

### [Claim 3]

The mobile body passage management system according to claim 1, wherein the storage unit stores map data associated with the rule about the passage; and wherein the control unit generates a rule to be reported to the mobile body based on the marker positional information and the map data and transmits the rule together with the marker positional information to the mobile body.

### [Claim 4]

The mobile body passage management system according to claim 2 or 3, wherein the rule includes any one of a speed limit, a sound volume limit, a light quantity limit, entry prohibition, and a stop request.

### [Claim 5]

The mobile body passage management system according to claim 2 or 3,

wherein the storage unit stores area information for defining a target area to which the rule should apply, by further associating the area information with the marker identification information.

[Claim 6]

The mobile body passage management system according to claim 1, wherein the storage unit stores equipment usage information required when using equipment in the target facility, by associating the equipment usage information with the marker identification information; and

wherein when the equipment usage information is associated with the marker identification information received from the mobile body, the control unit transmits the equipment usage information together with the marker positional information to the mobile body.

[Claim 7]

The mobile body passage management system according to claim 1, wherein the storage unit stores map data associated with equipment usage information required when using equipment in the target facility; and

wherein the control unit generates equipment usage information to be reported to the mobile body based on the marker positional information and the map data and transmits the equipment usage information together with the marker positional information to the mobile body.

[Claim 8]

The mobile body passage management system according to claim 6 or 7, wherein the equipment usage information includes an equipment type and a position and direction of the target facility with reference to the marker.

[Claim 9]

The mobile body passage management system according to claim 1, wherein the marker positional information includes information for identifying the target facility, information for identifying a floor within the target facility, and a position and direction of the marker with reference to the target facility.

[Claim 10]

The mobile body passage management system according to claim 1, wherein the marker is an optically readable binary code and indicates the marker identification information.

[Claim 11]

The mobile body passage management system according to claim 1,  
wherein the control unit accumulates a history regarding reception of the marker  
identification information from the mobile body.

[Claim 12]

A mobile body passage management method for managing passage of a mobile body  
that moves autonomously, comprising:

a step executed by a server associating marker identification information for identifying  
a marker installed in a target facility, where the mobile body passes, with marker  
positional information indicating a position of the marker in the target facility, and storing  
the marker positional information associated with the marker identification information  
in a storage unit;

a step executed by the server receiving the marker identification information from the  
mobile body; and

a step executed by the server reading the marker positional information associated with  
the marker identification information from the storage unit and transmitting the marker  
positional information to the mobile body.