

including, for example, being equipped with a variety of different conveyor belts, handlers, manipulators, support platforms, payload carriers, trailers or totes. The job management system and the mobile robots also may be configured to process a request to deliver a “digital payload” to a specified job location in the physical environment. For instance, if the job request calls for selecting a mobile robot having certain types of equipment (e.g., a sensor, camera, projector, x-ray machine, LCD display and/or speaker), then the job operation may include tasks such as recording or projecting light, sound or video data, or detecting and sampling wireless signals, toxic gases or liquids.

In preferred embodiments, for each job request received, the job management system selects an appropriate mobile robot from the fleet based the job request and the current statuses and configurations of the mobile robots in the fleet, and sends a command instruction to the selected mobile robot that causes the selected mobile robot to automatically drive to the appropriate job location, if necessary, and in some cases, automatically perform the specified job operation. In some scenarios, the fleet of mobile robots may be configured, for example, to perform one or more tasks according to the physical location where the mobile robot is summoned or sent. For example, in a security application, the system may be programmed such that when a robot outfitted with motion detection capability is sent to a certain location, the robot will plot a route to that location, travel to that location, and then turn on its motion detection equipment to start monitoring motion in that area.

In some embodiments, the job management system of the present invention may be used to manage, control and monitor job requests for a fleet of mobile robots comprising tens, hundreds or even thousands of individual autonomously-navigating robotic units. However, it should be understood that the “fleet” may also comprise a single autonomously-navigating mobile robot. Therefore, unless stated or otherwise dictated by context, the term “fleet of mobile robots,” as used throughout this disclosure, should be construed as encompassing a fleet of any number of mobile robots, including a fleet of only one mobile robot. Autonomously-navigating mobile robotic units suitable for adaptation and use with embodiments of the present invention are manufactured and sold by Adept Technologies, Inc., of Pleasanton, California, USA.

~~In one aspect of the present invention, there~~ There is provided a job management system for processing job requests in a physical environment, such as a laboratory,

manufacturing plant, order processing facility, distribution center, hospital or office building.
In general, the job

request and, in that case, automatically delay selecting a mobile robot from the fleet to handle the job request until a mobile robot from the fleet becomes available. Additionally, in specific embodiments of the method, the queue manager could receive a signal indicating that the selected mobile robot failed to handle the job request and, in that case, automatically
5 select a different mobile robot from the fleet to handle the job request based on the status profile and the configuration profile stored in the memory for the different mobile robot.

~~In another aspect of the present invention, There is provided~~ a method for processing job requests on a job management system in a physical environment is provided. The first step in the method comprises the step of storing in a memory a map defining a floor plan for
10 the physical environment, a virtual job location in respect to the floor plan, the virtual job location representing an actual job location in the physical environment, and associating one or more virtual job operations with the virtual job location, each virtual job operation representing an actual job operation in the physical environment. Next, the method stores in the memory a status profile and a configuration profile for each mobile robot in the fleet, and
15 receives a job request by the queue manager, the job request comprising a specified job operation, a specified job location, or both. In the next step of the method, the queue manager automatically selects a mobile robot from the fleet to handle the received job request based on a status profile and a configuration profile stored in the memory for the selected mobile robot. And finally, in the last step, a network interface is used to automatically
20 transmit over a command instruction to the selected mobile robot to cause the selected mobile robot to automatically drive to the actual job location in accordance with the floor plan, to automatically perform the actual job operation, or both drive to the actual job location and perform the actual job operation.

In accordance with one aspect of the present invention, there is provided a method of
25 processing job requests on a job management system in a physical environment comprising the job management system and a fleet of mobile robots, the job management system including a queue manager, a memory and a network interface, the method comprising: a)
storing in the memory a map that (i) defines a floor plan corresponding to the physical environment, (ii) defines a virtual job location in respect to the floor plan, the virtual job
30 location representing an actual job location in the physical environment, and (iii) associates a virtual job operation with the virtual job location, the virtual job operation representing an actual job operation in the physical environment; b) receiving a job request by the queue

manager, the job request including the virtual job location on the map, the virtual job operation on the map, or both; c) with the queue manager, automatically selecting a mobile robot from the fleet to handle the received job request; and d) transmitting one or more commands to the selected mobile robot via the network interface to cause the selected mobile robot (A) to automatically drive to the actual job location represented by the virtual job location, (B) to automatically execute the actual job operation represented by the virtual job operation, or (C) to automatically carry out both (A) and (B); e) wherein, if the job request does not include the virtual job location, then the queue manager determines the actual job location based on the map and the virtual job operation, and f) if the job request does not include the virtual job operation, then the queue manager determines the actual job operation based on the map and the virtual job location.

In accordance with another aspect of the present invention, there is provided a job management system for processing job requests in a physical environment comprising a fleet of mobile robots, the job management system comprising: a) a memory; b) a microprocessor coupled to the memory; c) a queue manager, operable with the microprocessor and the memory to: (i) store in the memory a map that (A) defines a floor plan corresponding to the physical environment, (B) defines a virtual job location in respect to the floor plan, the virtual job location representing an actual job location in the physical environment, and (C) associates a virtual job operation with the virtual job location, the virtual job operation representing an actual job operation in the physical environment, (ii) receive a job request, the job request including the virtual job operation on the map, the virtual job location on the map, or both, (iii) automatically select a mobile robot from the fleet to handle the received job request, (iv) automatically determine the actual job location based on the map and the virtual job operation if the job request does not include the virtual job location, and (v) automatically determine the actual job operation based on the map and the virtual job location if the job request does not include the virtual job operation; and d) a network interface to transmit one or more commands from the queue manager to the selected mobile robot to cause the selected mobile robot to (i) automatically drive to the actual job location represented by the virtual job location, (ii) automatically execute the actual job operation represented by the virtual job operation, or (iii) automatically carry out both d)(i) and d)(ii).

In still another aspect of the present invention, there is provided a non-transitory computer-readable storage medium, such as a hard drive, flash memory device, CDROM or

other memory-storage device, the storage medium having an executable program for processing job requests in a physical environment comprising a fleet of mobile robots. The executable program includes a collection of program instructions that, when executed by one or more microprocessors on a computer system, will cause the microprocessors to: (a) store
5 in a memory device on the computer system a map that (i) defines a floor plan corresponding to the physical environment, (ii) defines a virtual job location in respect to the floor plan, the virtual job location representing an actual job location in the physical environment, and (iii)