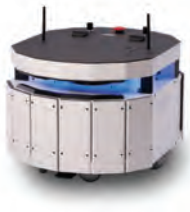
Adept Mobile Robots

Mobile Robots / Motivity Controller
Motivity Software / Fleet Appliance

adept®

YOUR INTELLIGENT ROBOTICS PARTNER

Adept MT490



Adept MT400

Adept Motivity Core

INDUSTRIAL USES FOR ADEPT MOBILE ROBOTS

Adept Technology, Inc. offers an exciting new solution to bridge the gap between the inflexibility of conveyors and the unacceptable variability and costs associated with more manual solutions. Mobile assets outfitted with Adept Motivity use natural feature navigation to deliver unprecedented levels of productivity to the movement of goods throughout a facility. Natural feature navigation permits vehicles to use an array of sensory input to determine the asset's location within a dynamic environment without the need to add additional infrastructure. The speed at which this technology is deployed is without equal in the industry. Productive operational use of Adept Motivity can be achieved in as little as a fraction of a day as users simply map their facility after a brief technical orientation. Assets deployed with Adept Motivity are capable of managing real-time changes in the environment, dynamically configurable, and intelligent enough to handle "exceptions" offering unparalleled flexibility previously unrealized with traditional material handling systems.

Today's global economy requires capital intensive companies to realize speed, flexibility, and value in every aspect of their manufacturing and delivery model. The proliferation of information available to buyers via the Internet has accelerated product trends and lifecycles, thereby creating a new set of challenges to existing production paradigms. Supply chain strategy is in a constant state of flux so companies must immediately react to their markets through the use of advanced equipment and methodologies.

Increasingly, industries are embracing automation in order to realize the benefits of flexible manufacturing to meet supply chain demands. The costs of moving and delivering goods account for more than two thirds of the cost to produce a variety of consumer goods. Subsequently, operations beyond the manufacturing line are beginning to seek productivity gains afforded by increased flexibility. For example, the use of flexible automation for offline operations such as line replenishment, intralogistics, and work in process (WIP) opens

tremendous opportunity to increase a company's efficiency and ultimately reduce the costs to deliver a product to market. As such, improving the transit and movement of goods through a facility can significantly impact a business's bottom line.

The automated guided vehicle (AGV) industry has long promised to deliver the high-throughput capabilities of conveyors while offering the flexibility of fork trucks. AGVs are schedule-driven vehicles, which follow a defined path to transport goods from numerous defined locations within a facility. These systems require the use of navigational aids such as wires in the floor or beacons installed throughout the operational area of a facility, which add to their overall cost. AGVs improve upon the costs and maintenance of a conveyor system but are met with two primary shortcomings which have slowed their adoption. The largest challenge faced by users of AGVs is the inability to handle "exceptions" or unexpected stops on a defined route. A disabled AGV leaves all subsequent vehicles on its route in an inoperable queue, unable to carry out their missions until a system operator intervenes. If an AGV's route is obstructed by anything ranging from a stray case or pallet, to a fork truck or piece of equipment, it does not contain the intelligence to circumnavigate the blockage. Likewise, AGVs may be rendered inoperable if its line of sight to a beacon suddenly becomes obstructed. These challenges have restricted the value delivered by AGVs and has resulted in a lower than anticipated adoption rate.

Efficient movement of goods within a facility has been equally challenged by the demand of collapsing product lifecycles. Traditionally, manufacturers would consider the use of conveyors or fork trucks to transport goods to and from locations. In today's environment, where product and its packaging configurations might change numerous times within a year, the expense required to modify fixed assets is proving too costly. Further, surveys of plant managers indicate that initial start-up and ongoing maintenance

costs of conveyor systems create challenges for project-based return on investment (ROI) objectives.

Alternative means of transporting goods have been employed to achieve the levels of flexibility required to meet expected supply chain dynamics. Fork trucks and hand carts reduce infrastructure costs and provide the ability to adapt to a near infinite level of logistical configurations. However, managing this type of equipment often comes with a higher total cost of ownership than anticipated. Companies often sacrifice productivity in exchange for flexible operation. Line-managers report high levels of dissatisfaction with having fork truck traffic near multimillion dollar capital equipment and line operators. Management would also prefer to deliver a smaller volume of WIP to the line in order to improve floor space utilization, and minimize WIP inventory, instead of having a full pallet delivered. Likewise, fork trucks and hand carts are subject to unacceptable variability due to scheduling and the nature of human operation, such as unanticipated breaks and interruptions.

Adept delivers software, control, and platform solutions in support of next generation autonomous guided vehicle operation that will hasten industry's migration away from traditional forms of conveyance and movement of goods which have historically delivered little flexibility. Mobile assets equipped with Adept Motivity work safely in close proximity to people, have been deployed in existing facilities with minimal to no retrofits, logged over a million miles of autonomous navigation, and offer a near-infinite level of automated logistical configurations. Companies employing vehicles equipped with Adept Motivity experience a lower total cost of ownership and significant improvements in the areas of productivity, intelligence, and system start-up. Organizations who utilize technology from Adept are better positioned to meet the mass customization required by customers and are better able to compete in today's global economy.

BENEFITS OF NATURAL FEATURE NAVIGATION

RANDOM-IN, RANDOM-OUT (RIRO) picks up and delivers from anywhere to anywhere maximizing flexibility

QUICK SETUP TIME by using onboard sensors to generate a map of the facility; no need to install lines, magnets, or beacons

NAVIGATION OF LONG OR DIFFICULT PATHS that would be complex or expensive with traditional AGVs

ABILITY TO FOLLOW THE SHORTEST PATH during a linear process while handling exceptions when necessary

CONFIGURABLE BEHAVIORS to appropriately match responses during tasks, for instance, robots can drive slower while handling a payload or have different tolerances for material handling

OBSTACLE AVOIDANCE with laser guidance to ensure smooth operations in a crowded environment

DESIGNED TO WORK CLOSELY WITH PEOPLE by navigating around people and communicating with them as appropriate using Adept Motivity

IMPROVED UTILIZATION OF EQUIPMENT by predictably moving goods and supplies where required, on-time, every-time

MAXIMIZED ASSETS with re-deployable, interchangeable, and flexible mobile conveyance

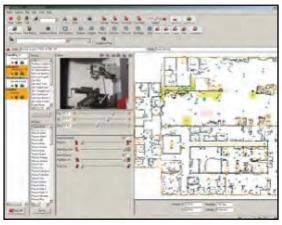
REDUCTION IN ASSOCIATED OVERHEAD by requiring less space than linear conveyors

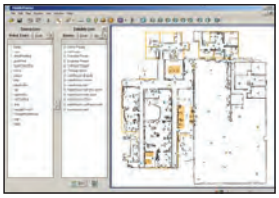
MINIMIZED INFRASTRUCTURE COSTS and reduced disruption with quick installation and minimal retrofitting

WHY CHOOSE ADEPT?

- the largest US-based robotics company with over 36,000 installations
- a global company, sourcing the highest quality components worldwide with operations in eight countries
- an economical robot provider, delivering attractive returns on investment
- the preferred robotics partner for leading international integrators
- a supplier of integrated platforms for laser-guided, autonomous, and intelligent robotic applications

ADEPT MOBILE ROBOT PRODUCT OVERVIEW





The Adept MT400 mobile robot base, driven by the Adept Motivity Core, combines good payload capability with a people-friendly size. It's ideal for the movement of payloads around offices and factories.

The Adept MT490 mobile robot base includes a camera and touchscreen for a people-friendly interface. Its ability for content delivery and data input is ideal for media and kiosk applications.

The Adept Motivity Core is an onboard controller that integrates third party hardware with Adept Motivity algorithms, laser-guidance for autonomous navigation, location-tracking, and obstacle management. A fleet of 38 robots using the Motivity Core has been in operation for over 3 years.

Adept MobileEyes is the primary Motivity real-time viewing and control software. MobileEyes allows for connection to multiple Motivity-based robots simultaneously providing a visualization tool for platform locations, map data, camera images, path-planning and obstacle avoidance information. It also provides an interface for configuration of runtime parameters.

Adept MobilePlanner plans mobile robot applications through the building of maps and the configuration of floor plans. The resulting map can be customized with traffic management and forbidden lines for safe operations. Adept MobilePlanner can assign tasks, goals, schedule routes, and program sensors for a variety of behaviors.

Adept Developer's Package provides extensive tools enabling users to develop basic single unit routing applications to complex integration solutions where platforms are called upon to interface with numerous external systems. The package's ease of use empowers users to quickly and robustly deploy applications using Motivity in a broad array of industries.

The Adept Motivity Fleet Appliance helps promote high-volume throughput by serving to facilitate robot-to-robot communication for inter-robot path negotiation and prioritization. It provides a central point of map configuration management and automatically pushes changes out to each robot in the fleet.

The Adept Motivity Fleet Simulator Appliance aids in the development of client software, such as custom GUIs or connections with back end process-management systems. The Simulator can be used to estimate fleet size and optimize fleet throughput.

For more information please visit: **www.adept.com**

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