Automatic Guided Vehicle System Overview

How the AGV

1. **Material Movement Request** – Initiated in the following ways:
   a. Customer host computer sends message through Factory LAN to SGV Manager Server.
   b. Manual request by facility personnel using pushbuttons, handheld PC, touch screens, etc.
   c. Automatic request from sensors at pick/drop locations, customer PLC or automated machinery.

2. **Assign & Control Movement** – SGV Manager Server receives material movement request and assigns the task to the vehicle that will most efficiently complete the work.

3. **Move Material** – Electric powered vehicles called SGVs receive tasks assigned by SGV Manager Server and navigate through facility by the most efficient pre-planned route created with Layout Wizard. Vehicles precisely navigate using laser triangulation, natural environment scanning, inertial, magnets, wire or optical.

4. **Equipment Interface Coordination** - SGV Manager Server coordinates the operation of external equipment (auto doors, fire doors, elevators, etc.) through I/O to facilitate efficient vehicle movement.

5. **Data Tracking** – SGV Manager Server continuously communicates with all vehicles and records all material pickups, deliveries, events and product data. This information can be used to historically track and verify material movement.

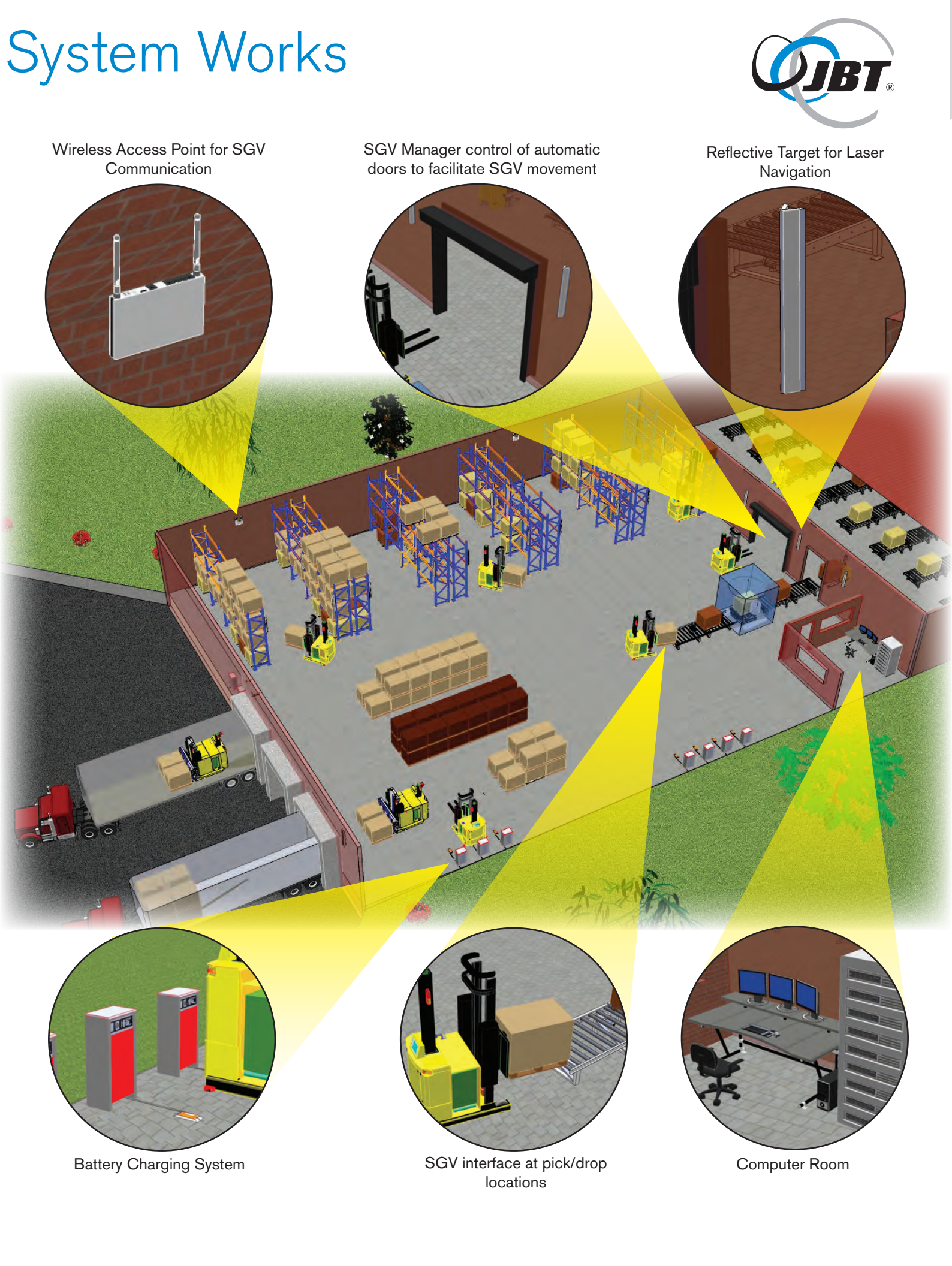
6. **Communications** – SGV Manager Server communicates to all vehicles via RF through a standard Wireless Network (802.11a, b, g, n, or ac). Communication to PLCs, client PCs, I/O modules, customer host computers, and handheld devices is through standard wireless or wired networks.

7. **System Monitoring** – The SGV Manager Client has the look and feel of a web browser that allows personnel to initiate orders, monitor system status, perform diagnostics, etc. Graphics in 3D provide a virtual window into the system and intuitive user interface allows basic system operation with minimal training.

8. **Battery System** – SGV Manager Server continuously monitors the battery power level. When a battery is low, vehicles are automatically sent to a battery charging location. Batteries may be either automatically charged while in vehicles or manually or automatically swapped with fully charged spare batteries.

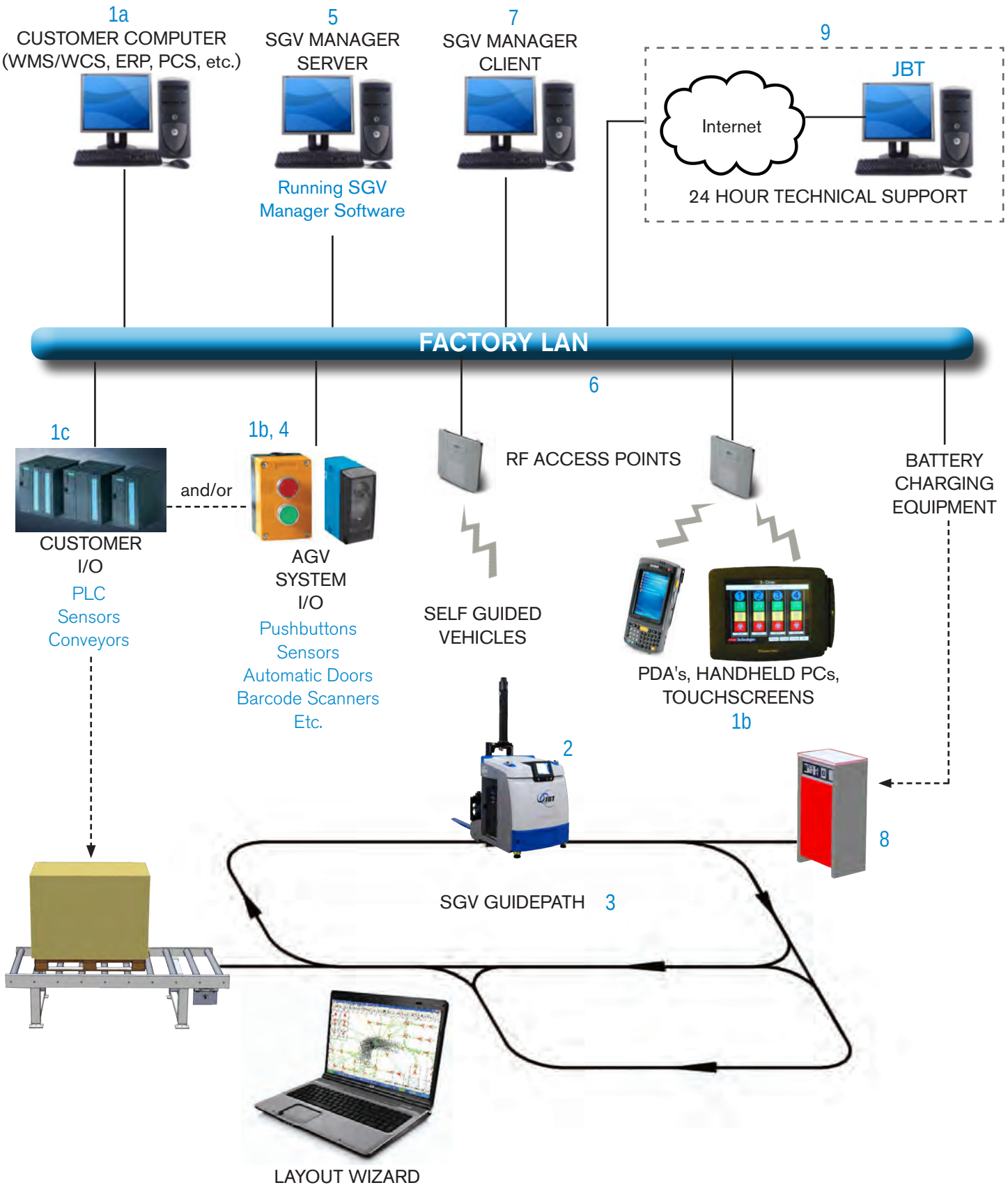
9. **System Support** – Product support is provided through a secure VPN connection. JBT technicians can directly access the SGV Manager Server and all vehicles to allow for fast 24/7/365 response, troubleshooting, and recovery.

System Works



System Works

Typical System Architecture



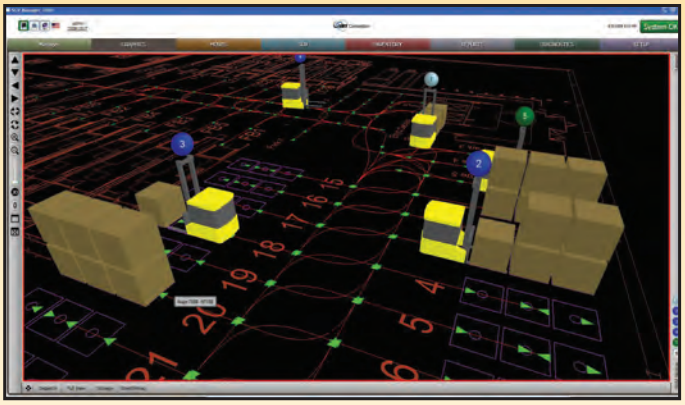
Software Overview

SGV Manager

SGV Manager Server is the software that is responsible for controlling, coordinating and monitoring all elements of an integrated automated material handling system. SGV Manager Client software, similar to a web browser, that is the user interface with SGV Manager Server. SGV Manager Client can run on the same PC as SGV Manager Server or any PC with wired or wireless LAN access to SGV Manager Server. Features include:

SGV Manager Server

- Controls, coordinates and monitors all vehicles
- Interface to external I/O for system operation
- Client / server configuration
- SQL Server database
- System inventory monitoring and control
- Historical system data tracking
- Standard or custom external host computer interfaces
- Management of wireless vehicle communications
- Hot backup for automatic recovery



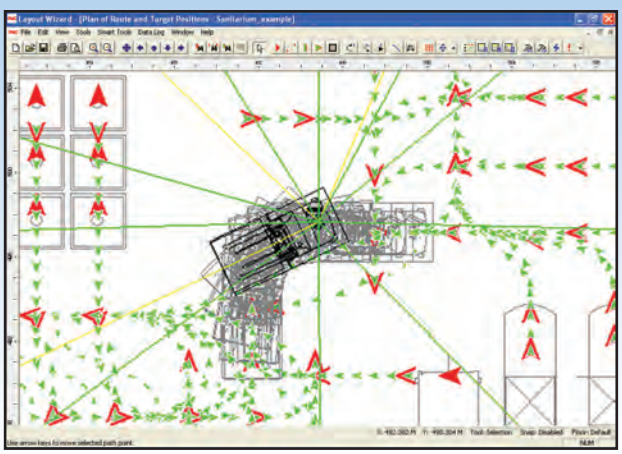
SGV Manager Client

- Web browser like software
- Real-time 3D graphics
- Customizable management dashboard
- User configurable screens
- Extensive system diagnostics
- Exportable reports embedded in Excel make generating reports easy and repeatable
- Multiple language support

Layout Wizard

Layout Wizard a software tool to design, program and edit the path that a vehicle follows and the operations it performs as it moves throughout the facility. Features include:

- Graphically create & edit vehicle path
- Application software creation & editing
- Obstacle and feature management
- Laser navigation target locations optimization
- Automatic blocking & collision avoidance
- System configuration utilities
- Wireless transfer of data to vehicles
- CAD compatible file import and export



Self Guided Vehicles

Self Guided Vehicles (SGV) are the work horse of the AGV System. These mobile robots receive material movement commands from SGV Manager Server and then autonomously navigate throughout a facility along a virtual path to move material. Vehicle features include:

- Robust mechanical & electrical design
- Custom load handling configurations
- 360 degree safety protection
- Laser, magnet, inertial & optional navigation
- Graphical color touch screen display
- User-friendly diagnostics
- PC mobile onboard controller
- Easy maintenance access
- Manual control pendant
- Backwards compatible design
- Standard, configurable software

System Safety

A systems approach to safety is taken to guarantee ongoing safe operation. This includes a strict design process, and monitoring software that insures all safety devices are in operation while a vehicle moves throughout a facility. In addition, all vehicle safety devices are routinely and automatically tested and meet or exceed CAT 3 and Performance Level PLd specifications.

John Bean Technologies Corp.
400 Highpoint Drive
Chalfont, PA 18914 USA
Phone: 215-822-4600
Fax: 215-822-4553
sgv.sales@jbtc.com

John Bean Technologies Ltd.
Unit VI Winchester Avenue
Blaby Industrial Park
Blaby Leicester, UK, LE8 4GZ
Phone: +44 116 264 2250
Fax: +44 116 264 2279
uksgvsales@jbtc.com