Smart Handling
AGV Solutions

SAM™

System Automation Manager

SAM is a robust, easily-configured control system for Automatic Guided Vehicles (AGVs) and SmartCart® Automatic Guided Carts (AGCs). Daifuku, with its subsidiary Daifuku Airport America, is one of the largest AGV manufacturers in the world. SAM is the result of more than 60 years of experience engineering, manufacturing and installing more than 20,000 vehicles. We developed SAM's framework so it can be easily customized to meet our customers' individual needs and improve the efficiency of our AGV and AGC systems.

Benefits Include:

Centralized Vehicle Management
A single controller manages movement of all vehicles providing traffic management, dynamic routing, transport, and assembly management.

Graphical User Interface (GUI)
All vehicles displayed on one screen allowing users to visually see when vehicles need attention.

Easy Integration
Interfaces with major PLCs, Warehouse Management Systems (WMS), and HMI displays.

Comprehensive Reports
Reports include historical data, vehicle status, alarms, activity logging, faults and customized production.

DAIFUKU

Centralized Vehicle Management

SAM talks to each vehicle every second via wireless Ethernet (Wi-Fi). Communication to the host (PLC or WMS) system is constantly maintained via a hardwire connection.

Traffic Management

SAM monitors the locations and destinations of all vehicles. It makes decisions at intersections to prevent collisions and improve system efficiency. Other plant automation can interface with SAM to affect vehicle movement. Also, SAM monitors a vehicle's battery level and directs it to battery charging or exchange station when needed.
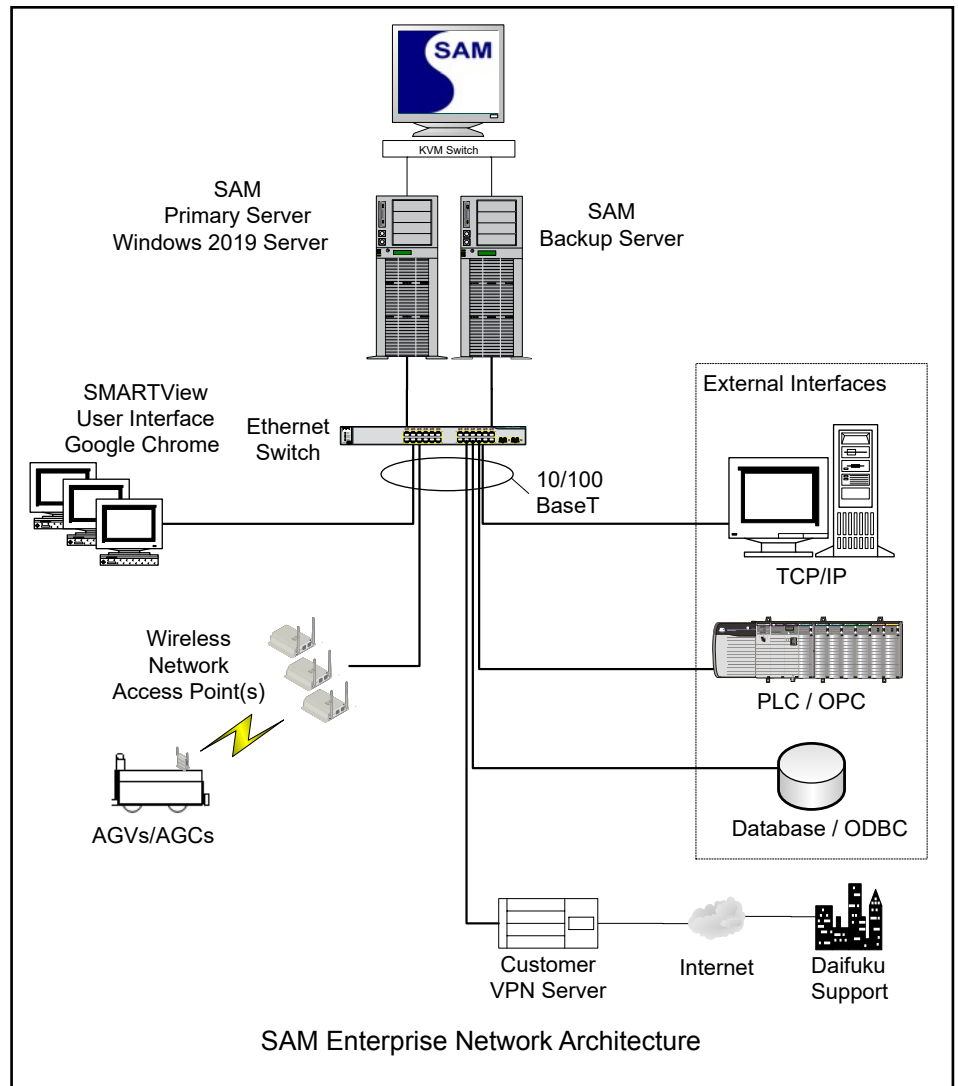
Dynamic Routing

SAM determines a vehicle's route by taking into consideration vehicle congestion and faulted vehicles.

Transport Management

As an option, SAM can be configured to include a transport manager that creates jobs and puts them in a job queue. Job requests are entered at a terminal, sent from the host, or automatically generated by SAM. As vehicles become idle, SAM dispatches them to jobs in the queue. If there are no jobs, it directs vehicles towards work activity to reduce travel time when a job is assigned. Jobs are assigned in a FIFO order or based on a selection order defined at each dispatching station.

Assembly Management

SAM offers an assembly manager that includes two configurations - index & dwell, and continuous moving line. Each option uses Takt timers and an interface with workcell PLCs to coordinate releasing of vehicles.

SAM Enterprise Network Architecture

Remote Dispatching Feature Set

Provides a simple link to push-buttons to execute the following simple functions:
Vehicle Call, Send Vehicle, Release Vehicle, Smart Interlock

Automated Transports

Tie a signal to generate a managed transport of a load from predefined locations.

Easy Integration

SAM software is designed for use in integrated systems. The Kepware® OPC PLC interface can be integrated with any OPC platform. The SAM system also interfaces with major PLCs including: Mitsubishi, Siemens, Allen Bradley, and Omron. SAM software comes with a standardized TCP/IP interface that allows Warehouse Management Systems (WMS) to issue transport requests to the SAM system. SAM software keeps track of all requests, executes them and reports status through the process until completion.
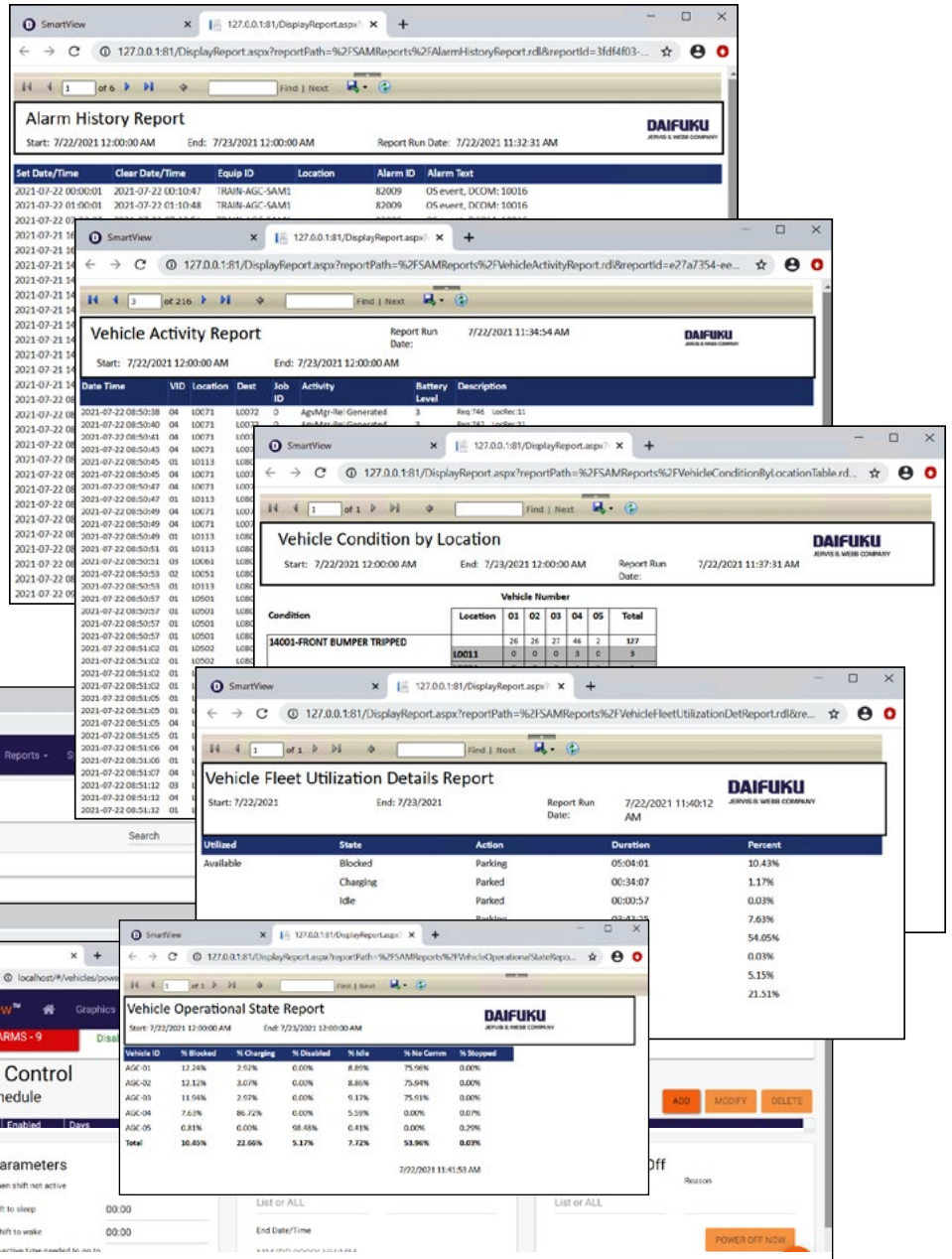
Comprehensive Reports

SAM maintains production information including:

- Vehicle status information
- Vehicle events
- Transport information
- Transport events
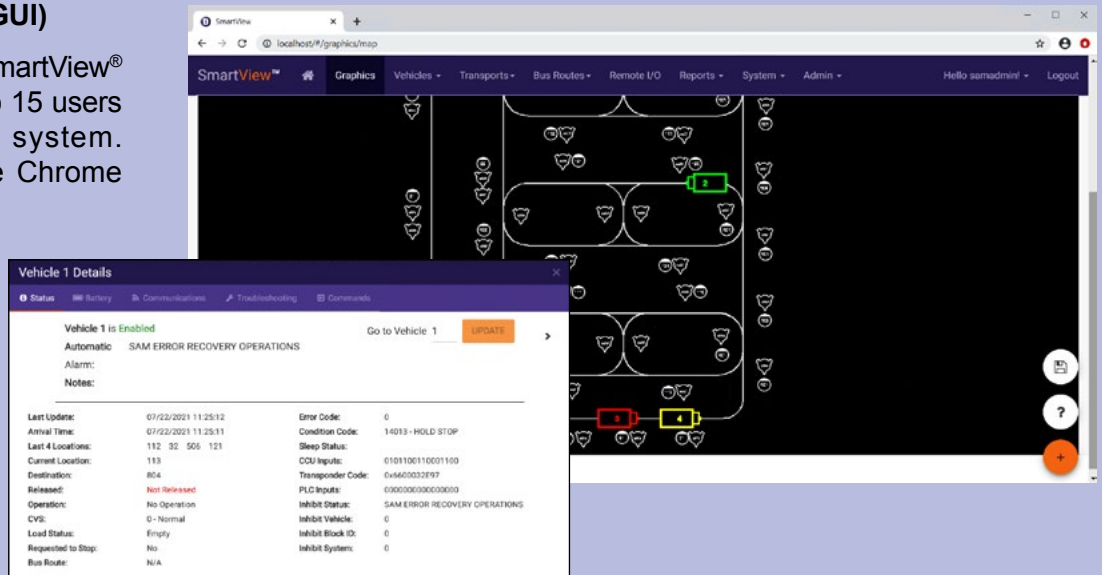- Operator activity
- Customized production reports

SAM features a Microsoft® SQL server database for historical logs of production information. This provides SAM with a data repository to log all system and vehicle events. SAM also keeps historical alarm data tables.

Graphical User Interface (GUI)

SAM includes a GUI called SmartView® that can be licensed to up to 15 users to interact with the SAM system. SmartView runs on Google Chrome browser.

SmartView shows vehicles at their reported locations on the displayed path. The color of the vehicle changes when the vehicle's status changes.

Technical Considerations

SAM Enterprise runs on the hardware platform in the chart below.

Also available to install as a virtual machine using Hyper V and VMware.

FEATURES	SAM ENTERPRISE
Operating System	W 2022 Server
SQL Server 2019	Standard Edition
OPC Interface to PLC	Yes
Interface to WMS or Other Automation	Yes
Data Logging	Yes
System Reports	Standard Set
Custom Reports	Optional
Communicates with AGV & AGC on Single System	Yes
SmartView License	Yes
AGV/AGC Licenses Included in Base System	10
Industrial Hardware	Yes
Redundant Hard Drives	Yes
Hot Swappable Hard Drives	Yes
Dual Power Supply	Yes
Hot Backup Available	Yes

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