

#### **Integrated Automation and Control Solution**

Our smart factory platform offers a range of packaged solutions for optimized factory automation, ensuring a smooth and reliable experience from installation to operation. By harnessing data from individual equipment and inter-equipment processes, our integrated solution streamlines production management, equipment maintenance, and real-time monitoring. With instant processing capabilities, it helps customers make better use of their resources and achieve maximum operational efficiency.



### **Material Control System**

### **Field-oriented Optimized service**



### What does it do?

**nexbe**+ MCS is the core control software for Automated Material Handling Systems (AMHS), designed to optimize the movement of materials and products in manufacturing. It functions as an online control system, using digital modeling based on the factory' s logistics layout and real-time monitoring to streamline operations. Instead of directly controlling logistics hardware, **nexbe+** MCS serves as a bridge between higher-level systems and lower-level equipment control systems. It tracks the location and status of materials through real-time monitoring while ensuring the efficient operation of transport equipment. With its modeling and monitoring capabilities, **nexbe+** MCS enables precise material supply in line with production schedules, optimizes transport routes, and prevents bottlenecks, thereby enhancing the overall efficiency and flexibility of the manufacturing process. In addition, its data analysis and decision-support features facilitate continuous process improvement.

# **Enjoy**!

Evolving solutions through seamless integration with various AMHS systems, based on proven industry experience in implementation and operation in semiconductor and FPD factories



# Intelligent Digital Modeling & Monitoring

- Accurate digital twin implementation based on factory logistics layout
- Optimized transport planning and adjustments
- Simulation and optimization for logistics transport
- Real-time tracking of material location and status
- Efficient operation and monitoring of transport equipment

# Flexible Online Control & System Integration

- Online control by acting as a bridge between logistics hardware and higher-level systems
- Highly flexible and scalable control architecture
- Seamless integration with higherlevel systems such as MES and ERP
- Compatibility with a wide range of logistics equipment and control systems

# Advanced Optimization & Decision Support

- Intelligent algorithms for optimizing transport routes and preventing bottlenecks
- Operational data collection and advanced analytics
- Real-time decision support for users

#### 02

We combine the stability of standardized functions with the flexibility of customized solutions, empowering users to manage and optimize their systems with ease.

- A core framework provided for all essential functions.
- Customizable and expandable services tailored to customer needs for an optimized solution.
- Includes all standard service features, ensuring a comprehensive offering.
- A custom extension module provided on top of the core framework to meet specific requirements.
- Adjustable settings for greater convenience and control.





## **Product Configuration**

Configuration Diagram - Intra Architecture



Main Server	<ul> <li>Serves as the core AMHS service, handling all transport operations and integrating with external business systems</li> <li>Manages transport jobs, transport resources, materials, and alarms</li> </ul>
AMHS interface Server	<ul> <li>Manages equipment interfaces, supporting SEMI standards and SECS/GEM protocols</li> <li>Separates interface functions from business logic with an Active-Active mechanism</li> </ul>
Host Interface Server	<ul> <li>Provides various middleware solutions and a universal transport messaging framework</li> <li>Supports multiple message data formats, including XML, JSON, String, and Object</li> </ul>
Scheduler Server	<ul> <li>Synchronizes inventory and monitors equipment resource status</li> <li>Re-adjusts transport jobs, enhances transport efficiency, and detects and resolves transport anomalies</li> </ul>
Application Server	<ul> <li>Manages applications and monitors the status of various server modules</li> <li>Displays real-time status of all applications and integrated external systems</li> </ul>
Web UI Server	<ul> <li>Manages user interfaces, controlling access and permissions based on user roles</li> <li>Delivers an optimized user experience (UX) based on factory best practices</li> </ul>
Layout Modeler	<ul> <li>Models and monitors factory logistics layouts in real time</li> <li>Enables users to update live data and modify equipment information with ease</li> </ul>

### **Configuration Diagram - Components**

<pre>ktended API/Service</pre>								
Service								
Alarm Material Resource Route Schedule Transport Reconcile Interface								
API								
Application         Material         Option         Resource         Route         Transport         Log								
Manager								
Alarm         Application         History         Material         Resource         Route         Transport								
Database Communication Workflow								



## **Field-oriented Optimized service**

#### <sup>01</sup> Actual Layout Modeling and Real-time Monitoring



#### **Defines in-factory transport equipment**

- Defines AMHS equipment
- Defines Port / Unit / Crane



#### **Real-time Monitoring**

- Transport job status monitoring
- AMHS online/offline status monitoring
- AMHS operational status monitoring
- Stocker Full status monitoring

#### 02 Transport Equipment Resource Management

#### AMHS & Process Equipment Status and Port Status Management

- Online/offline status management (Online Remote, Local, Offline)
- Connection status management (Connected, Disconnected)
- Service status management (In Service, Out of Service)
- SC/TSC status management (Auto, Init, Pause, Pausing)
- Zone and alternate stocker management
- Alternate Storage and Recovery Destination Setting Management
- Vehicle Location Tracking



#### **Process Modeling** 04

• Defines the information and management of equipment requiring materials, establishing operational strategies and processes through structured workflows and data-driven approaches.

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#### **05** Transport Optimization and Transport Job Management

- Priority-based Transport Management and Transport Route Optimization
  - Quick search function featuring departure and destination filtering
- Transport Command Queue and Status Monitoring

#### 06 Alarm Management

- Alarm Filtering and History Tracking
- Alarm-based AMHS Equipment Status Management
   Equipment & unit-level alarm management
- Various Alarm Control Functions (with built-in SEMI)
  - Alarm Report & Equipment / Unit Alarm
- User-defined Data Transmission and Management
   EES data management, FFU & FDC data bypass transfer

#### 07 Key History Management

- Carrier-specific Transport Commands and Unit Transport History Tracking
- Equipment-specific In/Out History Tracking
- Downloadable as Excel files

#### 08 Scheduling Service

- Periodic Inventory Requests and Synchronization
- Periodic AMHS Equipment Status Checks
- Management of resources, alternate storage, and recovery destinations
- Re-confirmation of Transport Commands and Synchronization of Higher-level System Commands/Information

#### (e.g., MES transport command management)

- MES transport command re-confirmation, AMHS transport anomaly handling, and user-defined operational strategy checks

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#### 09 Host Interface Service

- Various Message Sets for MES (Object, String, XML, etc.)
- \* Support for Multiple Middleware Solutions
- Message Middleware (TIBCO/RV, MQ, etc.)
- Optimized Transport Processing through the Separation of the MES Interface Server from the Main Server

#### 10 User Management Service

- User Group Classification Based on Class and Level
- Account Permission Settings to Restrict Menu Access
   Only Admin-class users can add, delete, or modify accounts
- Client Access Restriction