Rolling Stock Maintenance Information System

Seoul Metropolitan Subway Corp.

Table of Contents

Changing Circumstances

Comprehensive and Systematic
Rolling Stock Maintenance Information System

Outside		Inside
• 21 Best Leading Subway Corporation • Improve Customer Safety • Cost Savings by Systematic Maintenance	Predictive Maintenance IETM Standardization of Maintenance Process	• Improve level of Rolling Stock Maintenance Info. • Improve efficiency and sharing of info. by integrated Mgmt of Resources • Establish responsible maintenance system by automatic work order

Necessary

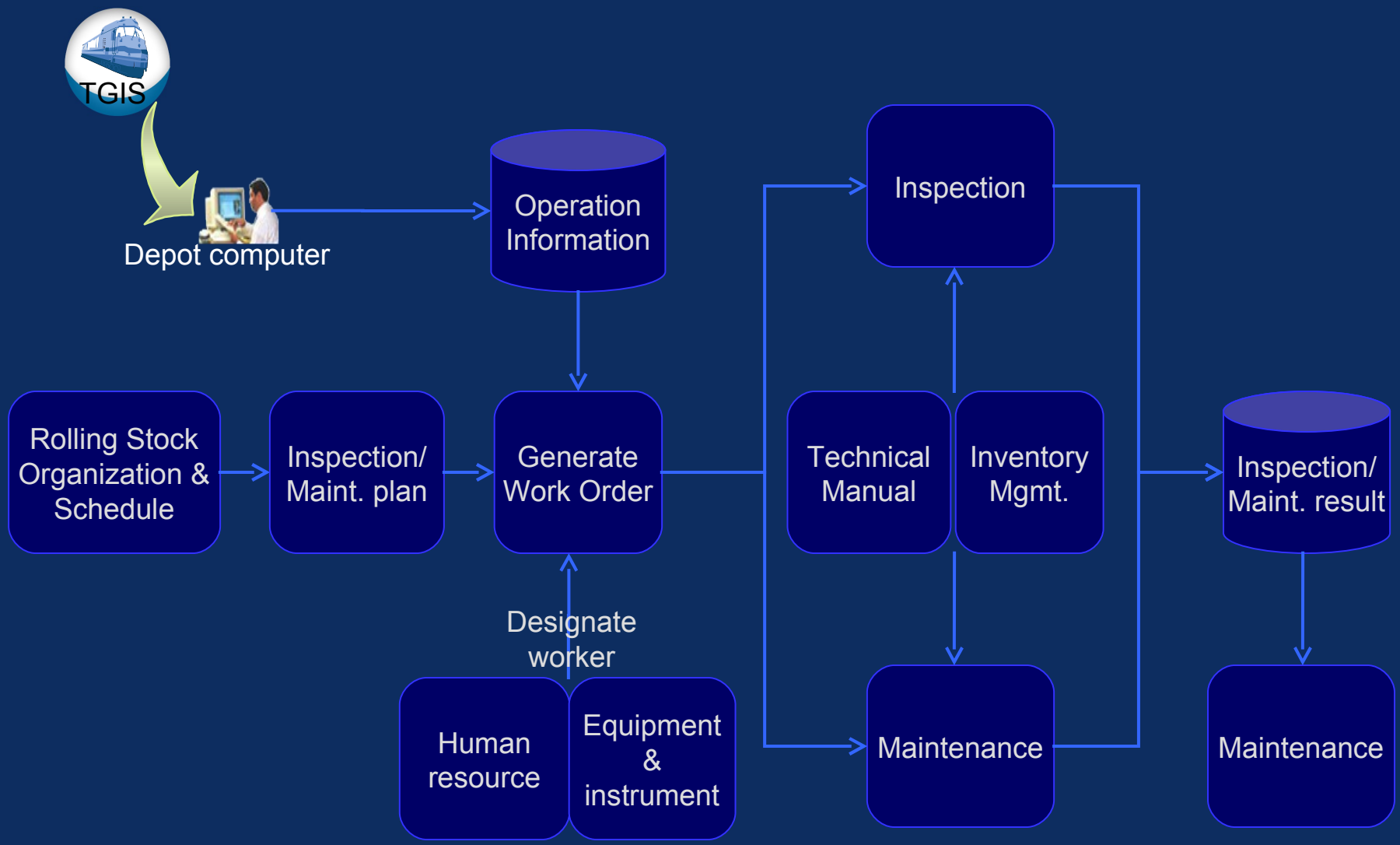
IMPROVING INTERNATIONAL COMPETITIVENESS AND SAFETY KOREA SUBWAY SYSTEMS

ROLLINGSTOCK MAINTENANCE INFORMATION SYSTEM

Standardization and systemization of subway maintenance process

Saving Maintenance costs

Concept of To-Be System



Automatic Collection of Train Data

- Collect important data using wireless interface
- Collect basic data for inspection/maintenance rolling stock with abstraction and saving necessary data
- Confirm all kinds of data rapidly and link to inspection/maintenance work

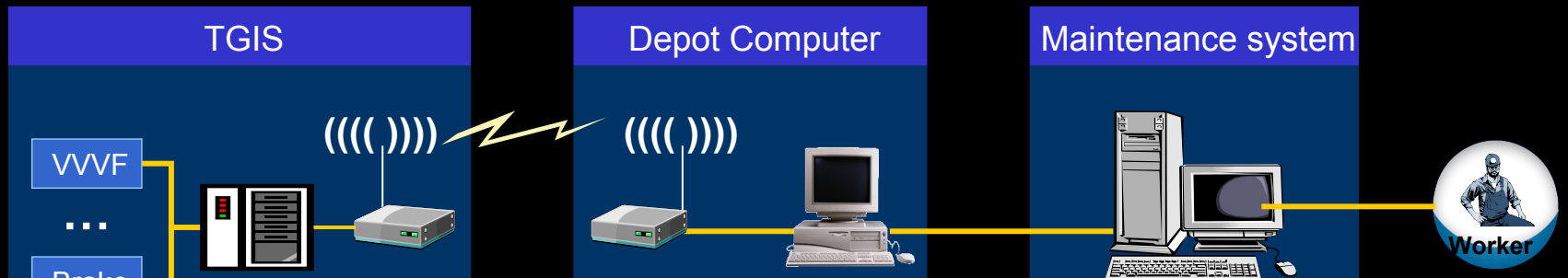
Status of As-Is

- Data download using Memory card
- Spends download data almost 6 hours
- Only use TGIS data when occur the trouble
- Loss important data of TGIS
- Trouble history, not including TGIS history

Effect of To-Be

- Rapid data download using wireless interface
- Increase usage of TGIS data
- save TGIS data eternally
- Correct management trouble history, including TGIS history

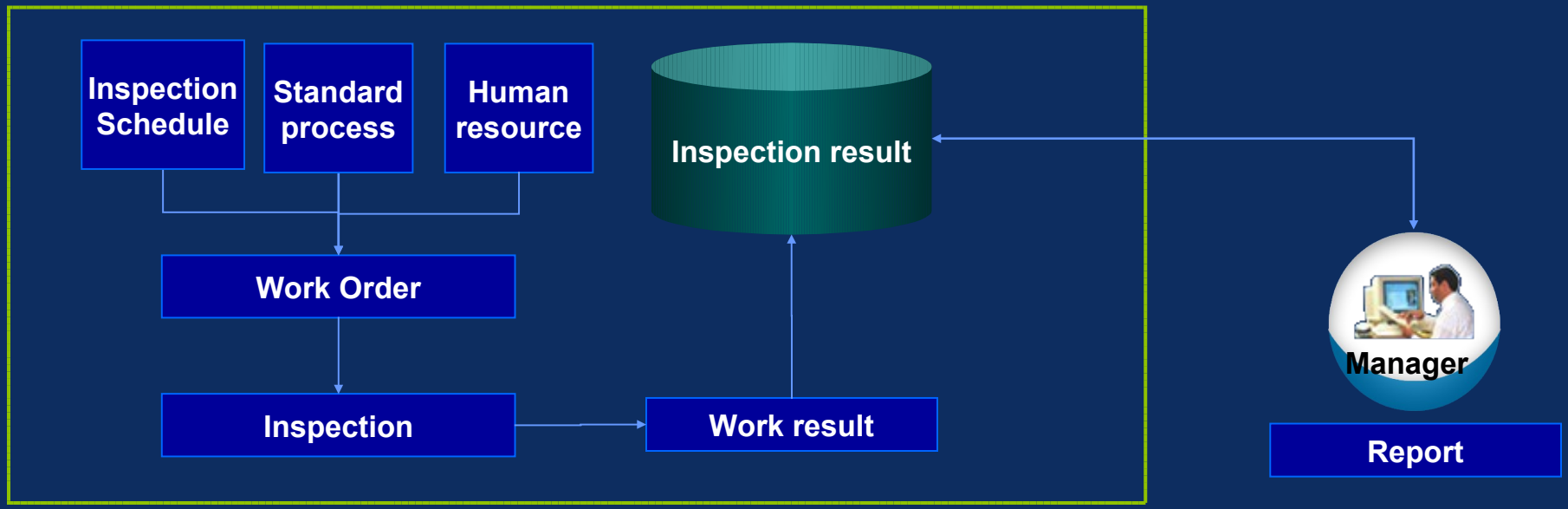
Architecture of To-Be



Work Order Generation

Automatic Work Order Generation and Responsible Inspection System

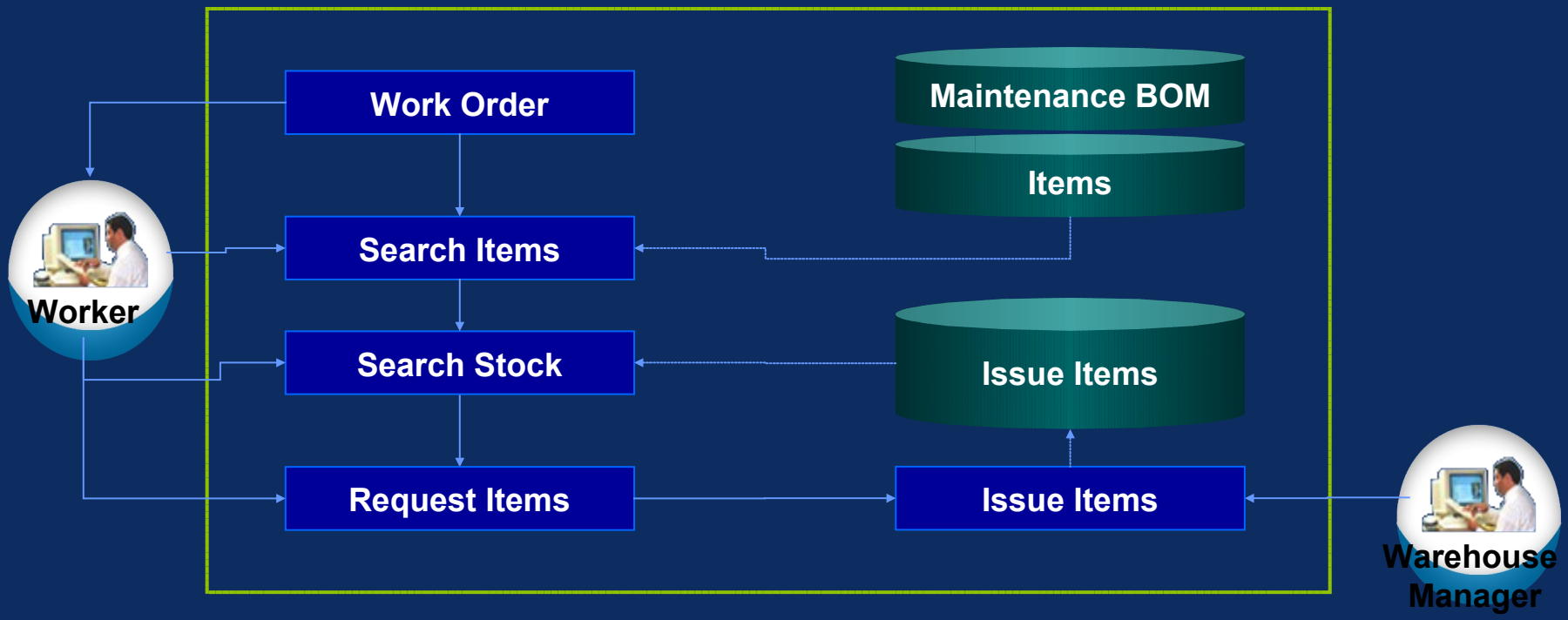
- Generate correct work order according to daily inspection/maintenance plan
- Perform inspection/maintenance correctly with generating specific work order process
- Establish responsible inspection system with generation of work order including the designated workers
- Save paperless work results conveniently and rapidly
- Increasing quality of inspection/maintenance



Support Maintenance Work (Item Distribution)

Convenient Searching and Rapid Item Issue

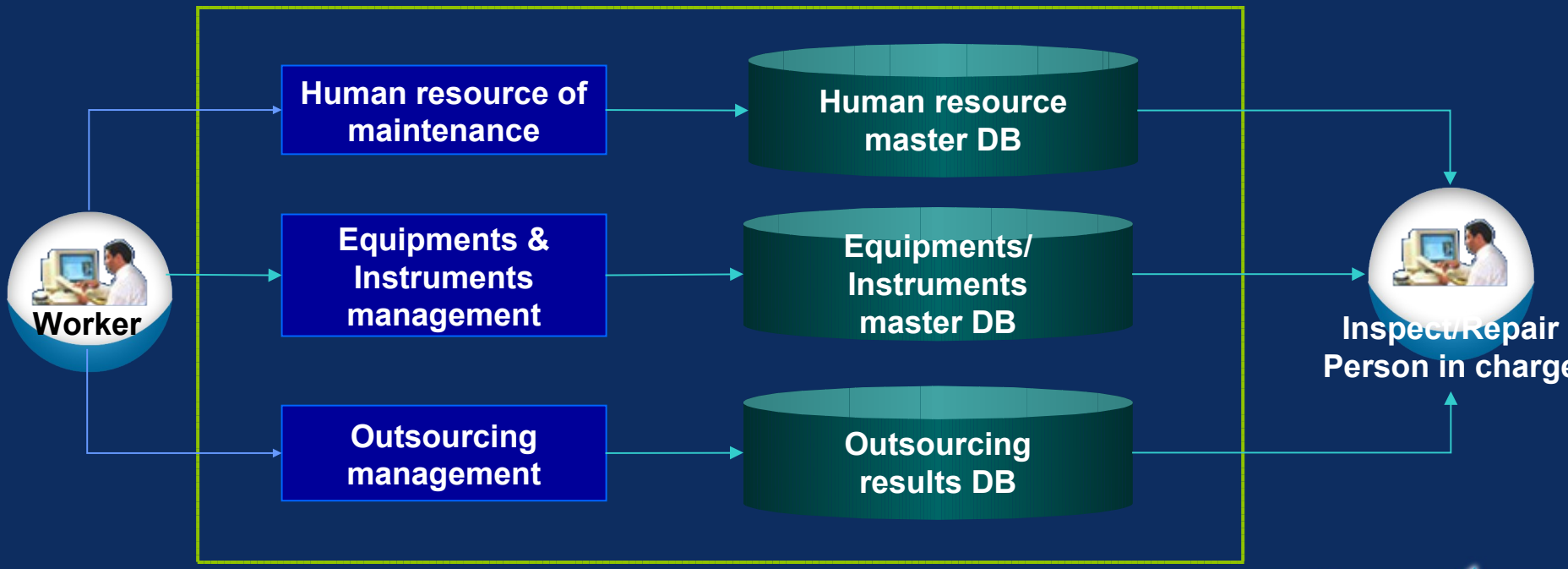
- Provide convenient searching items with linking maintenance BOM and item information
- Provide real-time stock status of each warehouse
- Request items rapidly at the field, using PDA
- Issue item rapidly with electronic approval system



Human resource for Maintenance/ Equipment & Instruments/Outsourcing management

Inspection/Maint. Scheduling & Enhancing for Availability of Work order

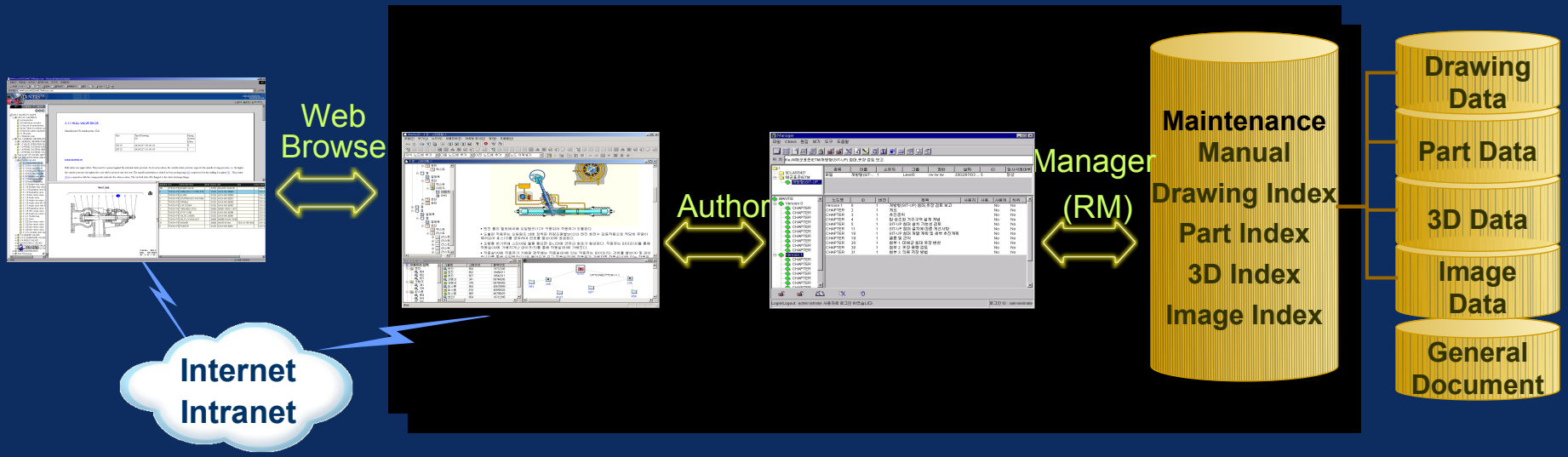
- Providing Equipments & Instruments information for Maintenance of Rolling Stock
- Increasing the availability by issue of Equipments & Instruments and inventory management
- Providing the Human resource information available for Maintenance plan and supply-demand plan for Human resource
- Human resource information Management system available for Establishment for trouble countermeasure and expert search related with maintenance
- Establishment of Outsourcing management structure through systematic outsourcing management



The Image of Technical Data Supporting System

Establishment as IETM (Interactive Electronic Technical Manual) System

- Establishment as IETM Basis for Maintenance manual, Part, 3D shape data and other maintenance documents
- Function for document management Used by the API of IETM
- Easy Accessible and Available System
- Working efficiency optimization related with Inspection/Maintenance System
- Grasping the inventory in field using inventory management system



Utilizing the Mobile

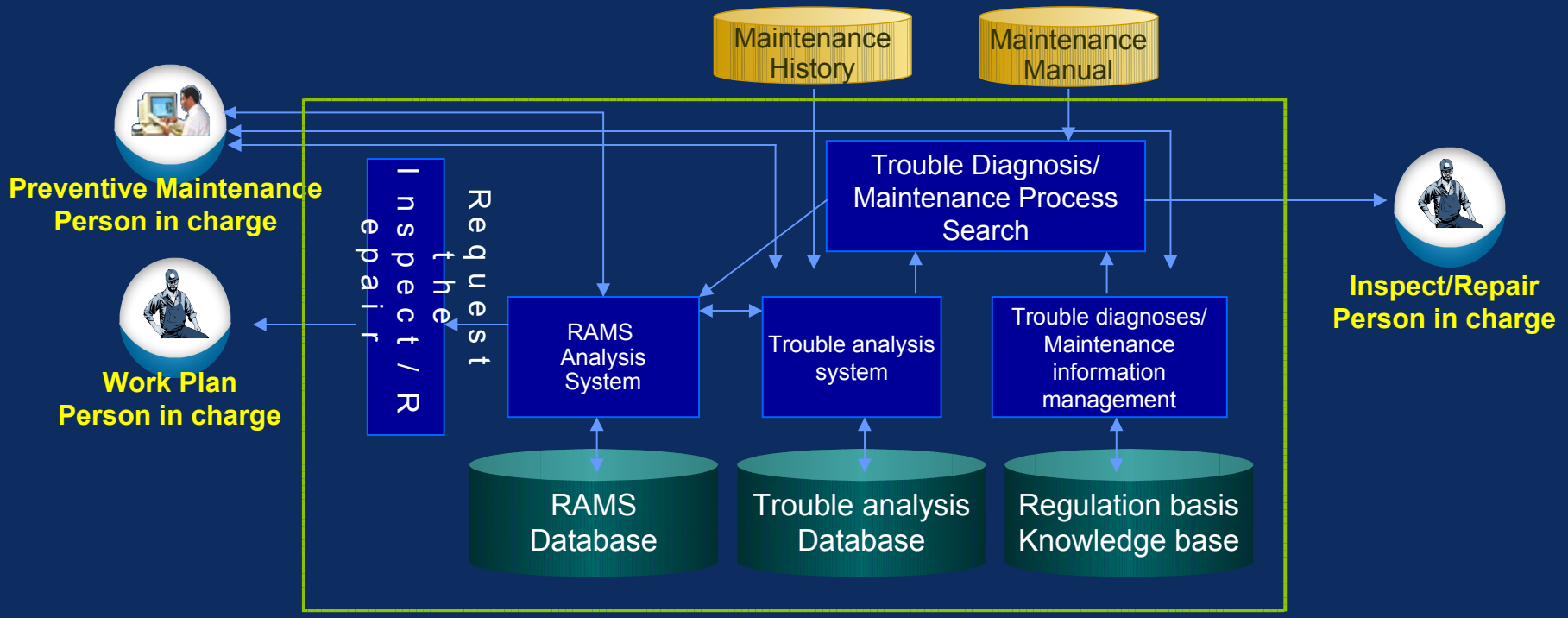
Utilizing Webpad at Inspection/Maintenance Work

- Checking Inspect/Repair work items through the Mobile
- Checking the work order in field, Inspect/Repair input
- Searching the technical documents (Maintenance manual, drawings and etc) through wireless LAN
- Inputting Characters with pen into 10.4 inch LCD Screen
- Stick to 3 ~ 4 Kiosk at each inspection point and Connecting with Wireless access point
- Providing the Potable type using easily by Person in charge and Inspector

Reinforcing Solution for Preventive Maintenance (RAMS, Expert System)

Utilizing Maintenance Application System

- Preventive Maintenance through Maintenance planning using parts life time cycle
- Trouble diagnoses about the present state of trouble, Providing expert system for Maintenance process
- Systemize the Information related with troubles and co-ownership
- Reporting the Inspect/Repair planning in trouble situation
- Settlement of Diagnoses & Maintenance process using trouble history



Expectations

Quantitative Effects

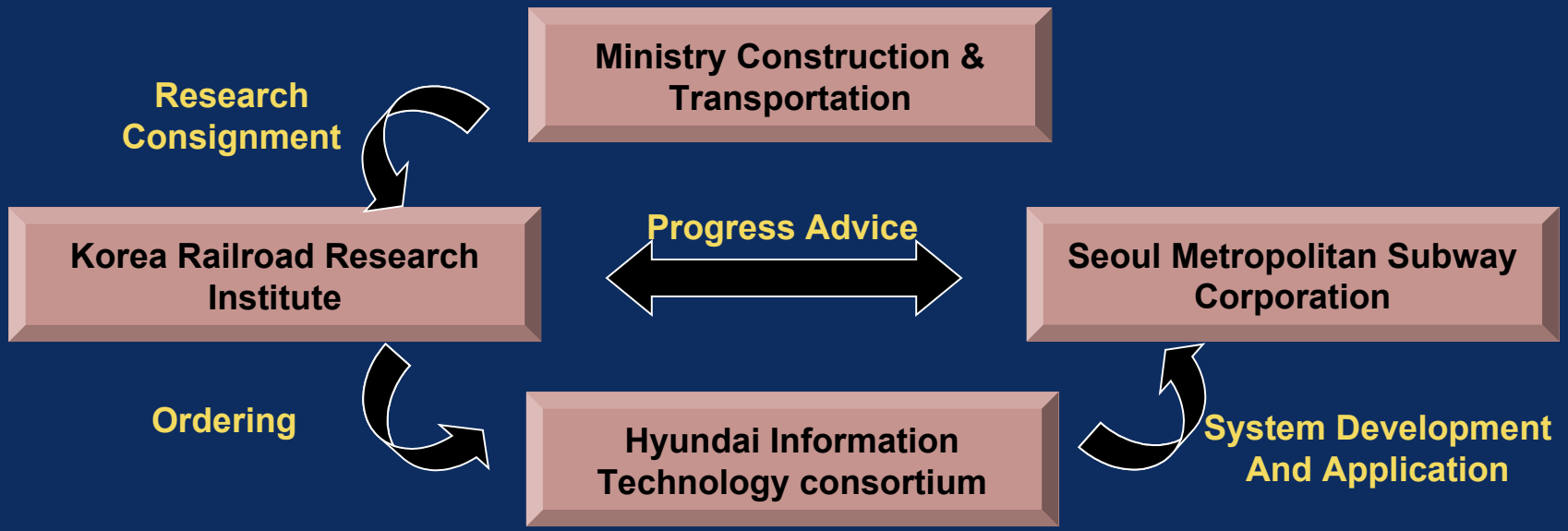
- Work Time of inspect and maintenance : over 20% reduce
- Cost of Maintenance and repair : over 30% reduce
- Product Cost : over 30% reduce
- Sharing of industry information and reuse : over 90% elevation
- Documentation remake : over 95% reduce

Qualitative Effects

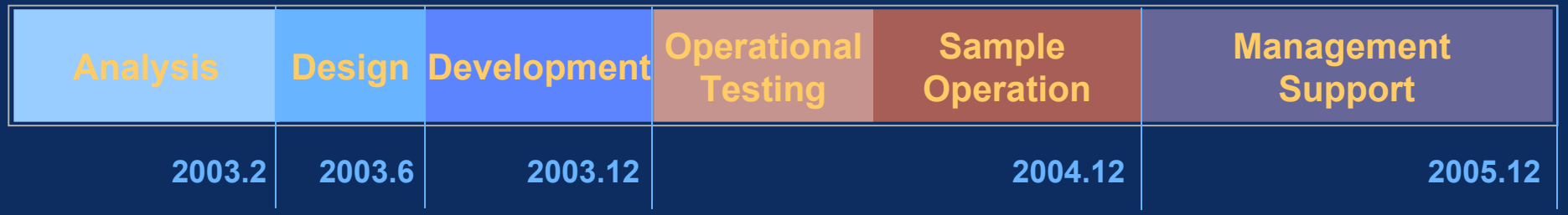
- Offer a safe and comfortable environment, Good quality to a Citizen
- Management benefit of Operation organ
- Prevention of a sudden accident related to rolling stock
- Perpetuity guarantee through maintenance database management

Related Organizations

Driving	Ministry Construction & Transportation
Ordering	Korea Railroad Research Institute
Development	Hyundai Information Technology consortium (Hyundai Information Technology, LG Hitachi, GDS)
Application Site	Seoul Metropolitan Subway Corporation



Schedule

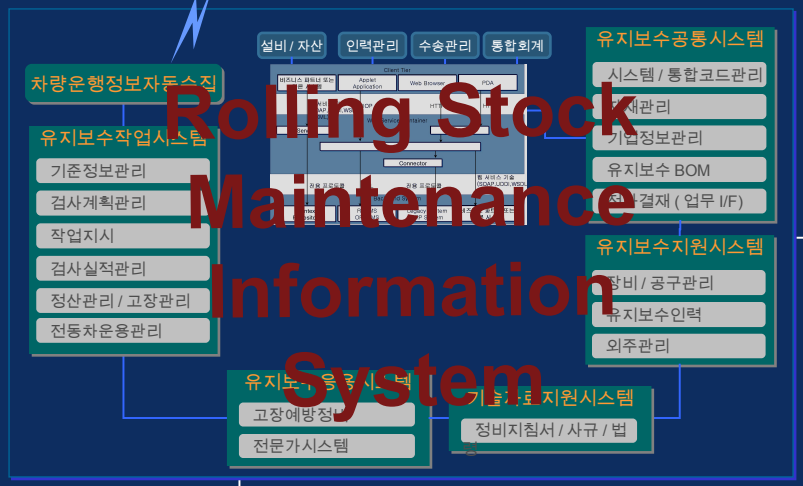


◆ 2002.9	Project start	
◆ 2003.2	Request Analysis	Task force team(TFT) organize
◆ 2003.6	Detailed Design	
◆ 2003.12	Development	
◆ 2004.3	Operational TFT Test	H/W introduce : 2004.3 (suitable)
◆ 2004.12	Sample Operation	Extended application
◆ 2005~	Management Support	

Image of Future System

Application technology

- DST
- Third web service
- EDI/XML/SOAP
- J2EE / EJB
- EAI / B2Bi
- CBD
- UDDI/WSDL



internet

E-Procurement

- E-Procurement
- E-Marketplace

Management Support System

- Balanced Scorecard
- Activity Based Cost
- Value Based Management

Management system
Operating system
Business system
Etc.

Operation data
Maintenance data
.....
Legacy data

Data Warehouse Building/ Predictive maintenance system

Extraction .
Transformation .
Load .

Data warehouse

Data mart

Mining
OLAP

- Predict of appropriative life cycle
- A point of time new rolling stock introduction
- Decision value of maintenance cost
- Decision value of MTBF
- The lowest point of maintenance cost
- .....

Q & A