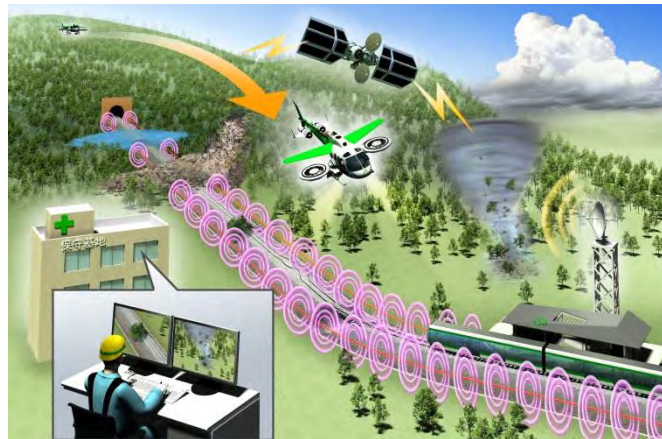


Visual Framework and Direction for Realizing the Mid-to-Long-term Vision for Technological Innovation

I. Safety and Security

Foreseeing Danger to Minimize Risk

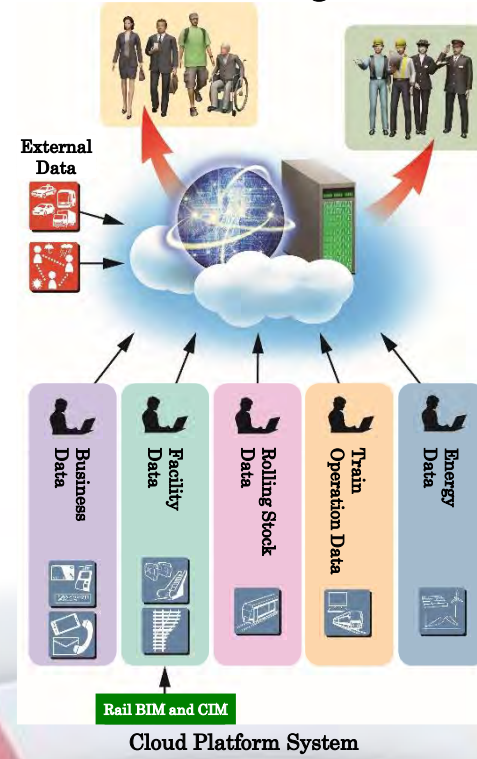


Utilizing sensors and other technology to reduce risk of disaster.



Utilizing robots and ITS to improve crossing and platform safety.

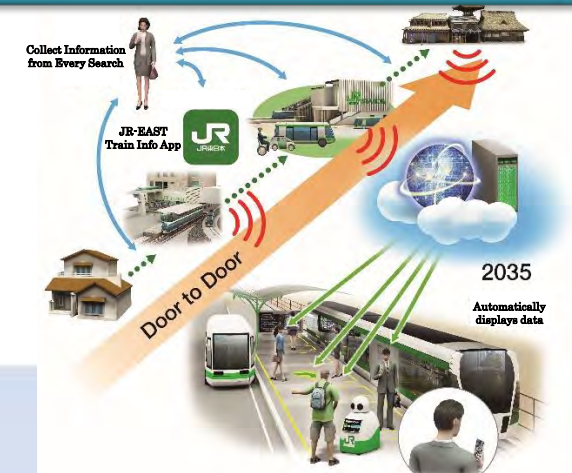
- Eliminate accidents resulting in a passenger or employee fatality
- Eliminate internal error resulting in accidents and re-occurring problem issues
- Predict natural disasters to ensure safety in advance
- Steadily reduce accidents harmful to pedestrians (crossings, platforms)
- Prepare for unknown risk (determine risk that cannot be avoided through experience and knowledge)



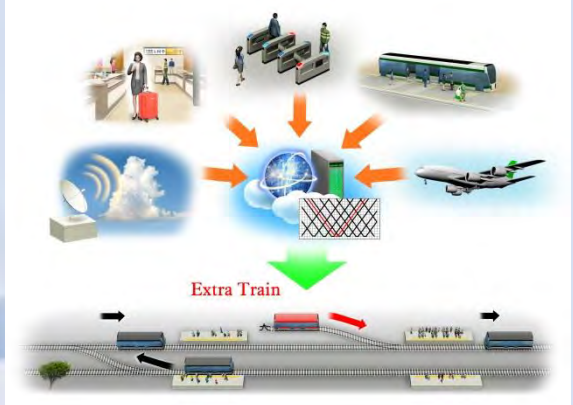
- Realize MaaS and provide seamless door to door transportation services
- Provide flexible service not tied to schedules and improved transportation quality
- Reduce stress by providing the information each passenger needs
- Implement guidance and transportation support robots
- Realize next-generation ticketing
- Provide products and services that exceed passenger expectations
- Create the next-generation Shinkansen

II. Service and Marketing

Offering our Customers Value that is for "Right Now, Right Here and Just for Me"



Door to Door Transportation and the "Right Now, Right Here and Just for Me" Information Service

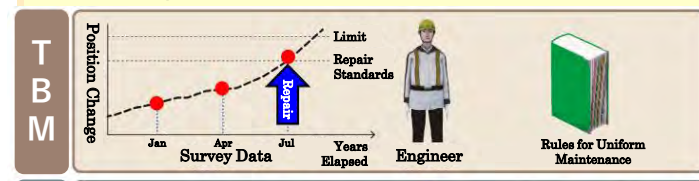


Train Service that Responds to a Passenger's Transportation Needs

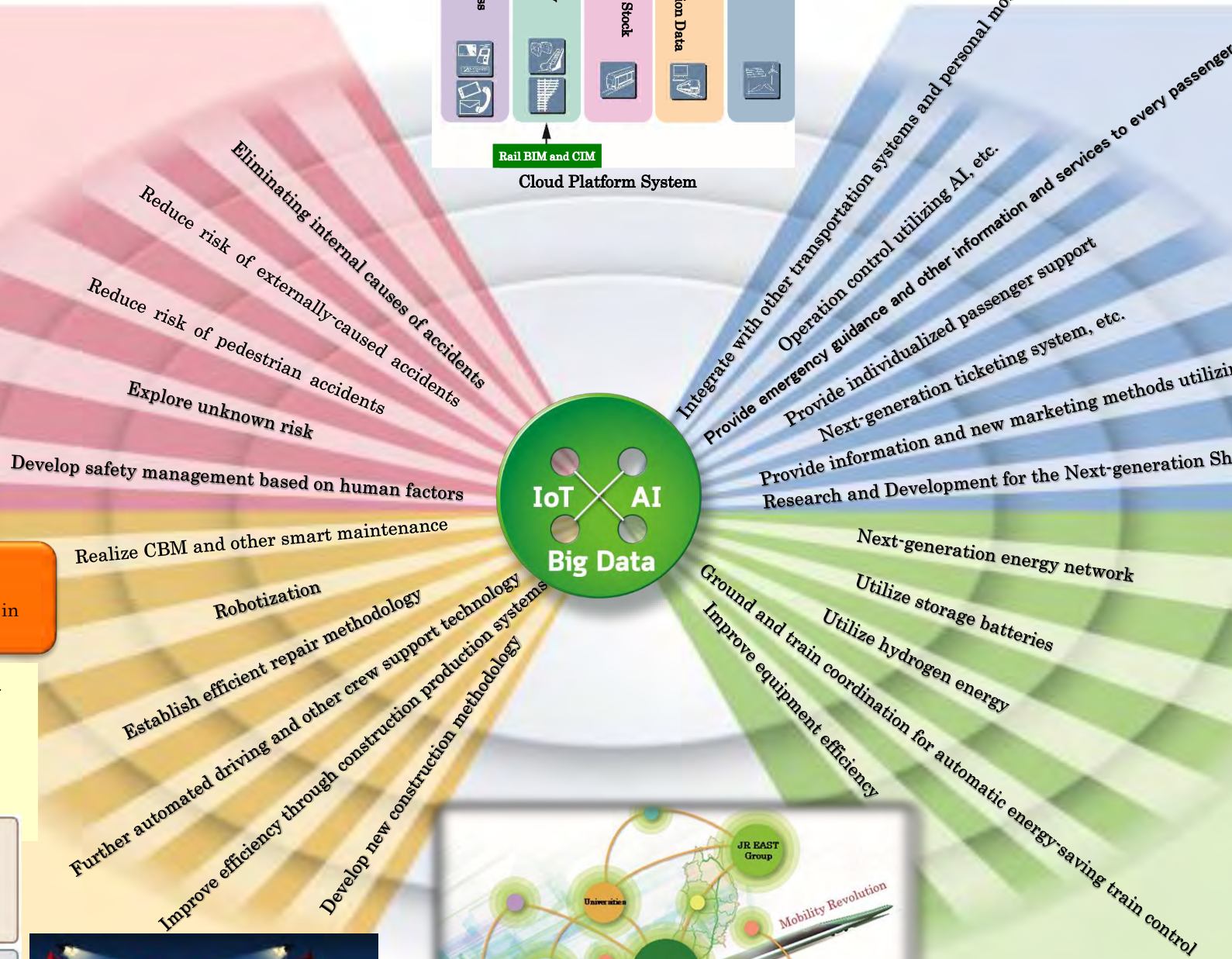
III. Operation and Maintenance

Reviewing Operations in Preparation for a 20% Reduction in the Working-age Population

- Creating a work style that is the best mix of people and systems
- Revising the cost structure through safe and effective construction and installation methods, CBM and automation (robotization) utilizing IoT, big data and AI technologies, etc.



From TBM (time-based management) to CBM (condition-based management)



- Eliminating internal causes of accidents
- Reduce risk of externally-caused accidents
- Reduce risk of pedestrian accidents
- Explore unknown risk
- Develop safety management based on human factors
- Realize CBM and other smart maintenance
- Robotization
- Establish efficient repair methodology
- Further automated driving and other crew support technology
- Improve efficiency through construction production systems
- Develop new construction methodology

- Integrate with other transportation systems and personal mobility
- Operation control utilizing AI, etc.
- Provide emergency guidance and other information and services to every passenger
- Provide individualized passenger support
- Next-generation ticketing system, etc.
- Provide information and new marketing methods utilizing data
- Research and Development for the Next-generation Shinkansen
- Next-generation energy network
- Utilize storage batteries
- Utilize hydrogen energy
- Improve equipment efficiency
- Ground and train coordination for automatic energy-saving train control

IV. Energy and Environment

Improving the energy "3E's" (Environment, Economic Efficiency and Energy Security) and linking them to C (Community development)

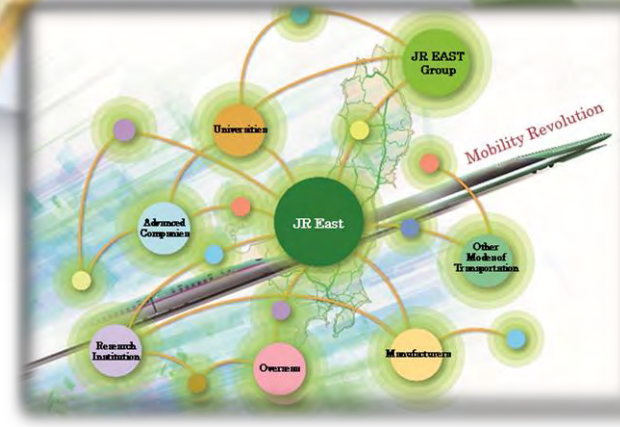
- Achievement of Zero Carbon Challenge 2050
- Reduce railway energy consumption and carbon emissions by 40% and 50%, respectively, by FY2030 (compared to FY2013)
- Taking on the challenge of decarbonization with the development of Hydrogen generation and renewable energy supply.
- Aiming for efficient use of energy through improving maintenance quality and R&D.
- Ensuring energy-saving and diversifying energy consumption towards decarbonization.



Next-generation Energy Network



Robotization of Operations



Construction of an "Innovation Ecosystem"