Due to the combination of replacement and new demand, during the next 20 years the size of the commercial aircraft market is forecast to double, adding nearly 40,000 aircraft and reaching a scale of US$5 trillion. Orders are expected to be particularly robust for single-aisle aircraft from low-cost carriers (LCC) operating mainly short flights and airlines in emerging countries.

The transportation systems business is estimated to have a current market scale of around ¥22 trillion, expanding at an annual rate of 2% to 3%. In particular, rail transportation is likely to be called upon to address increasingly serious traffic congestion in emerging countries experiencing rapid economic growth, including Asian countries and Brazil, as populations conglomerate in urban areas.

In the commercial ships business, the market is forecast to remain oversupplied for the foreseeable future, but North American shale gas development is engendering demand for gas carriers, an area where MHI excels. Also, the market for cruise ships is expected to grow steadily. In addition, in Japan we anticipate robust replacement demand for large-scale ferries and demand from the public sector for training ships and research vessels.

By commercializing the MRJ and promoting structural reforms in the commercial ships business, we are concentrating on building the foundations for growth to a business scale of ¥1 trillion.

Yoichi Kujirai
Domain CEO, Commercial Aviation & Transportation Systems

**Strengths**
- Commercial aircraft: Competitiveness through production innovations and supply chain management (SCM) reforms
- Design and manufacturing technologies for large composite main wings and other structural components
- Complete aircraft (MRJ) offering high levels of efficiency and reliability and outstanding economy
- Transportation systems: Strong system integration and project management capabilities
- Commercial ships: Proprietary environmental and energy-saving technologies unrivaled by other companies

**Opportunities**
- Commercial aircraft: New demand for nearly 40,000 aircraft over the next 20 years
- Transportation systems: Numerous infrastructure plans, including in urban transport
- Commercial ships: Growing demand for cruise ships, LNG carriers, energy-efficient vessels, and special-purpose ships for domestic use

**Weaknesses**
- Commercial aircraft: Lack of experience in customer support and other aspects of the finished aircraft business
- Transportation systems: Deficiencies in lineup of core products
- Commercial ships: Weak cost competitiveness relative to South Korean and Chinese manufacturers

**Threats**
- Commercial aircraft: Increasingly severe competition in regional markets
- Transportation systems: Competition from China and the Big Three
- Commercial ships: Decline in ship prices due to gap between global supply and demand

South Korean and Chinese manufacturers augmenting their shipbuilding capacity and product quality

Due to the combination of replacement and new demand, during the next 20 years the size of the commercial aircraft market is forecast to double, adding nearly 40,000 aircraft and reaching a scale of US$5 trillion. Orders are expected to be particularly robust for single-aisle aircraft from low-cost carriers (LCC) operating mainly short flights and airlines in emerging countries.

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**Sample Business Model: Transportation Systems**

- **Key Capital**
  - Extensive experience in delivering systems around the world
  - Sophisticated system integration and project management capabilities
  - Ability to make proposals to realize a lifecycle business

- **Business Activities**
  - Development
  - Design
  - Construction
  - Rolling stock production
  - Delivery
  - O&M
  - System integration
  - Lifecycle management
  - Cities in regions throughout the world

- **Value Created**
  - Urban transport improvements
    - Facilitation of smooth urban movement
    - Alleviation of traffic congestion
    - Reduction in environmental impact
Focus Strategies of the 2015 Medium-Term Business Plan

While increasing profitability, chiefly in the commercial aircraft products business, we will create new business models in the MRFJ, transportation systems, and commercial ships businesses. We are thus building the foundations for growth that we expect to boost this domain’s scale of operations to more than ¥1 trillion during the period of the next medium-term business plan, with operating income in excess of ¥100 billion.

In the commercial aircraft business, we will restructure manufacturing bases and promote production process reforms. In the aircraft engines segment, we established Mitsubishi Heavy Industries Aero Engines, Ltd., in October 2014 to reinforce our financial and manufacturing bases. The new company will drive our efforts to form a manufacturing cluster that we expect to dramatically reduce administrative expenses and fixed costs by making use of partners’ factories and facilities. We will also bolster our manufacturing capabilities and profitability through a cooperative production effort with IHI Corporation. The MRJ business is in a period of up-front investment as we work toward our first delivery. In addition to development, we will build our mass production and customer support systems in this business.

R&D Case Study: High-Speed AGT

MHI has developed a high-speed automated guideway transit (AGT) system with a maximum speed of 120 km/h, approximately twice as fast as existing AGT systems. To date, AGT systems using rubber tires have been introduced around the world because of the advantages they offer in terms of flexible route planning, short construction periods, low costs, and low vibration and noise. These systems are expected to help alleviate urban congestion in emerging countries experiencing rapid economic growth, such as Southeast Asian countries. The new high-speed system has been developed to expand the market beyond urban transport to include suburban lines requiring no transfers, increasing convenience to commuters and numerous other passengers, and providing an effective solution to urban crowding.

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Main Projects

<table>
<thead>
<tr>
<th>Announcement</th>
<th>Delivery</th>
<th>Project</th>
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</thead>
<tbody>
<tr>
<td>June 2015</td>
<td></td>
<td>Participation in the joint development of a new Rolls-Royce jet engine for Airbus aircraft</td>
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<tr>
<td>May 2015</td>
<td>2018</td>
<td>Order received for two Sayanango StAGE next-generation LNG carriers</td>
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<tr>
<td>February 2015</td>
<td>2019</td>
<td>Order received by five-member consortium including MHI for Qatar’s first metro system</td>
</tr>
<tr>
<td>January 2015</td>
<td>2019</td>
<td>Order received from Mitsubishi Corporation for two next-generation LNG carriers to export shale gas from fields in North America</td>
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<tr>
<td>January 2015</td>
<td>2021</td>
<td>Order received from Japan Airlines for 32 MRJ aircraft</td>
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<tr>
<td>August 2014</td>
<td>2020</td>
<td>Received first order from Latin America to construct an automated unmanned railway system for the São Paulo Metro</td>
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<tr>
<td>July 2014</td>
<td>2018</td>
<td>Order received to supply an AGT system, including 18 train cars, for Orlando International Airport in the United States</td>
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<tr>
<td>July 2014</td>
<td>2018</td>
<td>Order received to supply up to 10 MRJ90 aircraft to Air Mandalay Limited in Myanmar</td>
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<tr>
<td>July 2014</td>
<td>2019</td>
<td>Signing of memorandum of understanding on delivery of up to 40 MRJ90 aircraft to Eastern Air Lines Group, Inc., of the United States</td>
</tr>
<tr>
<td>June 2014</td>
<td></td>
<td>Signing of memorandum with The Boeing Company to participate in development and production of 777X aircraft</td>
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ONE HIGHLIGHT

Introducing Structural Reforms in the Commercial Ships Business in the Nagasaki Region

On October 1, 2015, MHI established two new wholly owned Group companies at the Koyagi Plant of its Nagasaki Shipyard & Machinery Works—one to undertake ship construction and the other to manufacture hull blocks. The construction of cruise ships will be operated within the Commercial Aviation & Transportation Systems domain’s newly launched Engineering Department. Of the two new entities, the ship construction company will undertake sales, engineering, procurement, manufacture, and repair services. New ship construction will focus on gas carriers, an area in which medium-term demand is expected to be strong and where MHI excels. The overarching goals are to strengthen cost competitiveness by streamlining production through continuous construction, enhancing efficiency through organizational down sizing, and rationalizing administrative processes.

The second company will specialize in large-scale hull blocks, an area of expertise for the Koyagi Plant, and will pursue enhanced productivity primarily through continuous construction and refurbishing of its physical plant. In addition to supplying blocks to the new ship construction company, the second company will promote their sale to customers outside the MHI Group. Plans also call for annual production volume to be progressively expanded.