Commercial Aviation & Transportation Systems
Business Plan

Senior Executive Vice President, President and CEO, Commercial Aviation & Transportation Systems

Yoichi KUJIRAI

6.8.2015

MITSUBISHI HEAVY INDUSTRIES, LTD.
1. Business Overview
2. Review of 2012 Medium-Term Business Plan
3. 2015 Medium-Term Business Plan
4. Business Strategies
5. Summary
1. Business Overview
1. Major Products & Production Bases / Positioning of Commercial Aviation & Transportation Systems

**Companywide Positioning (FY2014)**

- **Business Scale**: 18%

**Domain Breakdown (FY2014)**

- **Transportation System**
- **Commercial Airplane**
- **Commercial Ship**

<table>
<thead>
<tr>
<th>Location</th>
<th>Products/Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shimonoseki Shipyard &amp; Machinery Works</td>
<td>- Ferries, Special purpose vessels</td>
</tr>
<tr>
<td></td>
<td>- B787 (Stringers)</td>
</tr>
<tr>
<td>Hiroshima Machinery Works</td>
<td>- B777, B767 fuselage</td>
</tr>
<tr>
<td>Nagasaki Shipyard &amp; Machinery Works</td>
<td>- LNG carrier, Cruise ship, etc.</td>
</tr>
<tr>
<td>Mihara Machinery Works</td>
<td>- MRT</td>
</tr>
<tr>
<td></td>
<td>- Assembly of AGT</td>
</tr>
<tr>
<td></td>
<td>- LRT</td>
</tr>
<tr>
<td>Kobe Shipyard &amp; Machinery Works</td>
<td>- New transportation system engineering</td>
</tr>
<tr>
<td></td>
<td>- Underwater vehicle</td>
</tr>
<tr>
<td>Nagoya Guidance &amp; Propulsion Systems Works</td>
<td>- Commercial aero engines</td>
</tr>
<tr>
<td>Nagoya Aerospace Systems Works</td>
<td>- B777 fuselage, B787 main wings, etc.</td>
</tr>
<tr>
<td></td>
<td>- A380 (Door)/GX main wings, etc.</td>
</tr>
<tr>
<td></td>
<td>- MRJ</td>
</tr>
<tr>
<td>Companywide Positioning (FY2014)</td>
<td>Number of Employees (consolidated) 7,129</td>
</tr>
</tbody>
</table>

MRT: Mass Rail Transit, AGT: Automated Guideway Transit, LRT: Light Rail Transit

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
2. Review of 2012 Medium-Term Business Plan
2. Domain Achievement Level

Core Measures of 2012 Medium-Term Business Plan

- Measures to address core issues
- Formation of domain synergies

Strengthen Commercial Airplane Product Business

Preparation/review of MRJ development structures

Transportation systems: large-scale overseas orders

Measures for commercial vessels and cruise ships

Domain formation / Synergy configuration

Booking of special loss for cruise ships completed in FY2014; MRJ business development costs covered by other businesses

<table>
<thead>
<tr>
<th>FY2014</th>
<th>Achievement Level</th>
<th>Contributing factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>590.0</td>
<td>764.3</td>
<td>129%</td>
</tr>
<tr>
<td>Target</td>
<td>Actual</td>
<td>Increased orders for Transportation systems and MRJ</td>
</tr>
</tbody>
</table>

| Operating income |                   |                                          |
| 10.0             | 23.4              | 234%                                     |
| Target           | Actual            | MRJ development costs offset by currency exchange profit and growth in commercial airplane products |

- Commercial airplane products business is on the growth track. Strengthen the foundations for next production process reformation.
- A specific work and delivery schedule was drawn up for the MRJ's first unit.
- Large-scale overseas transportation system orders were received, expanding steady business field.
- In the commercial ships business, measures were taken with respect to cruise ship construction. Reforms were also carried out for commercial shipbuilding in Nagasaki.
- Three business areas were integrated, unified management was promoted, and domain synergies were developed.
3. 2015 Medium-Term Business Plan
3. Basic Policies & Business Strategies

Lay the foundations for growth to 1 trillion yen business by developing MRJ business and structurally reforming the commercial ships business.

Basic Policies of 2015 Medium-Term Business Plan

- Improve profitability of commercial airplane products business
- Carry forward MRJ aircraft and business development
- Secure orders for large-scale urban transportation systems
- Cruise ships measures
  - Promote structural reforms of commercial ships business & restructure cruise ships business
- Create new businesses from domain synergies

Targeted Business Image

- Advanced airplane production system
- Achievement of finished aircraft business
- Comprehensive engineering business
- Advanced shipbuilding engineering business
- New infrastructure export model

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
3. Basic Policies & Business Strategies

Orders received
Projected business scale expansion to approx. 900 billion yen

<table>
<thead>
<tr>
<th></th>
<th>FY2013 (Actual)</th>
<th>FY2014 (Actual)</th>
<th>FY2015 (Forecast)</th>
<th>FY2016 (Target)</th>
<th>FY2017 (Target)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orders received</td>
<td>360.3</td>
<td>700.0</td>
<td>999.2</td>
<td>750.0</td>
<td>900.0</td>
</tr>
</tbody>
</table>

Net sales
Projected expansion to over 700 billion yen in FY2017

<table>
<thead>
<tr>
<th></th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>463.6</td>
<td>529.5</td>
<td>650.0</td>
<td>600.0</td>
<td>700.0</td>
</tr>
</tbody>
</table>

Operating income
Over 40 billion yen, with MRJ business development costs offset by other products

<table>
<thead>
<tr>
<th></th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating income</td>
<td>18.3</td>
<td>23.4</td>
<td>30.0</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Operating income ratio</td>
<td>3.9%</td>
<td>4.4%</td>
<td>4.6%</td>
<td>6.7%</td>
<td>5.7%</td>
</tr>
</tbody>
</table>
4. Business Strategies
4-1. Commercial Airplane

**Market Environment**

**Overall**
- Market expects to grow in double in next 20 years, as the scale of the business, 40,000 airplanes and US$5 trillion.

**Twin aisle airplane**
- For the time being, the B777X and A350 are in the development to sustaining phase; a new development phase is expected to begin in the 2020s.

**Single-aisle aircraft**
- The B737 and A320 are competing fiercely, driving volume production up and costs down. The B757X and B737X shall be considered the B737’s next generation.

**MHI's Position**
- Strategic partner with Boeing, P&W and R/R

**Business Strategies**

**Basic Policy**
- Improve profitability of commercial airplane products business through production innovations and SCM reforms

**Measures**
- (1) Reorganize production sites and strengthen production capacity
- (2) Reform manufacturing processes of airplane products
- (3) Lay the long-term growth foundations of the commercial aero engine business
- (4) SCM Reform and Create industrial clusters

**Business Scale**

<table>
<thead>
<tr>
<th>Year</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>200</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
</tr>
</tbody>
</table>

SCM: Supply Chain Management

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
Consolidate parts and components at Komaki, Oye-nishi and Hiroshima plants

Launch new parts factories in Kobe (integrated production of MRJ main wing parts) and Matsusaka (industrial cluster for manufacturing small parts; assembly of MRJ tail wings)

**Hiroshima Eba Plant**

**Consolidate production sites for B777/B767**
- Develop new B777X assembly line
- Facilities for machining core parts

**Komaki Minami New Plant**

Accommodate production of 10 MRJ units per month
- Final assembly
- Painting factory, heavy equipment hangar, etc.

**[Hiroshima]**
- Boeing Base

**[Komaki]**
- MRJ Base

**[Oye-nishi]**
- composite materials base

**Oye-nishi Plant**

Implementation of B787 production rate 12/14 shipsets per month
- Implement production rate up: building expansions of composite factory and assembly factory
- Automated facilities: painting robots, automated composite lay-up machines, etc.
4-1. (2) Reform manufacturing processes of airplane products

Production Process Management
Innovation ~ Timetable management
→ Shorten L/T, reduce inventories

Automated assembly through use of robots
→ Eliminate labor-intensive manufacturing

Global SCM employing IoT

Automated panel handling + automated riveting + robots

- Real-time monitoring of production/quality information
- Proactive use of AI

Quality stabilization and robust production through proactive use of massive data from production lines.

Frame riveting
Residual riveting / sealing
Uniformly spreading of high-viscosity sealant

Skin wrapping
Automatic riveter
Inspection
Defect detection
Measuring technology advancement

- Automation of inspection for work shape, gap, etc.
- Automation of evaluation of sealing, detection of defects difficult to quantify

Automated assembly through collaborative control of robots

- Jig communization / minimization
- Handling of long/low-rigidity parts by multiple robots

L/T: Lead Time, IoT: Internet of Things, SCM: Supply Chain Management, AI: Artificial Intelligence
4-1. (2) Reform manufacturing processes of airplane products

Production Process Management Innovation ~ Timetable management → Shorten L/T, reduce inventories

Automated assembly through use of robots → Eliminate labor-intensive manufacturing

Global SCM employing IoT

- Delivery conditions
- Requirements specification

Customer

Maintenance

Operation

Customer support

Design

Procurement

Industrial cluster

Logistics

Manufacturing technology

MES (Manufacturing Execution System)

Test (During development)

Quality assurance

Finished aircraft

Delivery

CLOUD: DATA MANAGEMENT / HIGH-SPEED DATA PROCESSING

Scheduler (Production plan)

Big Data

ERP

AHMS (Aircraft Health Management System)

CS system (Customer portal)

Configuration management

Quality assurance system FRACAS Failure Analysis

Sensor information, Operation data

Data analyses AI applications

PS: Purchase arrangements, progress situation

Production, Assembly, Logistics, Operating instructions, Processing performance information

Facility operation information

Functional data, Performance data

Inspection date, Configuration data

4-1. (3) Lay the long-term growth foundations of the commercial aero engine business

Enhancement of long term business foundation

Strengthen business portfolio & competitive operations

- Combination of continuous & robust growing programs
  Trent1000/B787, TrentXWB/A350, PW1100G-JM/A320, PW1200G/MRJ, MRO, etc.

- Expansion of industrial cluster
  Low-pressure turbine blades - formed with Hoden Seimitsu Kako Kenkyusyo as core company
  Planning for combustor and casings also

Foothold for growth

Strengthen financial and production bases through establishment of company dedicated to engine business (Oct 2014)

- Readiness for further investment which require huge initial investment and long term recovery
- Cooperative and long term outsourcing to industrial cluster & IHI
4-1. (4) SCM Reform and Create industrial clusters

Production flow innovation and expanded production capacity from cluster formation

Aims of cluster formation

Current Status

Numerous specialized processes cause many repetitive come-and-go transaction in outsourcing. Longer L/T, loss costs.

Cluster formation

Radical reduction of L/T and management costs

Formation of industrial clusters

Backed up by government cooperation at national and local levels.

Cluster for aero engines, low-pressure turbine blades

Aircraft parts cluster

L/T: Lead Time

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
4-2. MRJ (Mitsubishi Regional Jet)

Market Environment

<Market scale>
- Over next 20 years, a market for 70-90 seat jets is projected around 3,500 units.

<Competitive status>
- Bombardier is focusing on the 100+ seat C-series; presence in the under-90 seat market is to weaken.
- Embraer plans to introduce its next-generation 90-seat class E175-E2 in 2020.

<Future outlook>
- 90-seat class: Competition between MRJ90 and E175-E2
- 70-seat class: MRJ will be the only next-generation aircraft

Business Strategies

Basic Policy

- Aircraft and business development to be advanced toward achieving airframe performance* and outstanding customer support above those of Embraer.

*MRJ superiority
- Cabin comfort, outstanding cost efficiency, durability, environmental performance
- Advanced aerodynamic design, noise analysis, structural technology
- More advanced structural design will extend the time frame from first flight to large-scale inspection from 40,000 to 60,000 flight cycles.
  ⇒ Substantial reduction in maintenance costs
- Development costs, which will peak in FY2017, have been fully factored into the 2015 Business Plan.
  ⇒ Efforts will focus on a selling price to recover these costs, and cost improvements.

Measures

(1) Carry development forward
(2) Lay the foundations for finished aircraft business

MHI's Position

- MRJ's robust durability and airframe performance will foster high airframe value appraisal, giving MHI a solid position in the regional jet market.
4-2. (1) Carry development forward

Accelerate acquisition of flight test data and preparation of TC-related documents, toward TC acquisition and CS network formation.

<Latest status>

Flight Test Aircraft No.5 painted with ANA livery

Flight Test Aircraft No.1 and No.2

TC: Type Certification, CS: Customer Support
4-2. (2) Lay the foundations for finished aircraft business

**Mass Production Structure**

- Mass production plant will start sequentially from early 2016
  - Utilization and preparation of in-house factories
  - Participation of partner enterprises such as Matsusaka Industrial Cluster
- Maximum production rate: 10 units/month.
  - Production workers to be shifted by reforming production processes at Nagoya Aerospace Systems Works
- Creation of global logistics center

**Customer Support Structure**

- Collaboration with ANA (launch customer) toward targeted quality level
- Configuration of 400 staff structure at 1st unit delivery

---

- **Kobe Shipyard & Machinery Works**
  - Integrated production of main wing parts

- **Kitakyushu airport**
  - Flight test of mass production aircraft

- **Matsusaka plant**
  - Industrial cluster manufacturing small parts
  - Tail wing assembly

- **Nagoya airport**
  - Flight test
  - Delivery

- **Komaki Minami plant**
  - Final assembly

- **Mitsubishi Heavy Industries Aero Engines, Ltd.**
  - Engine final assembly

- **Tobishima plant**
  - Main wing and fuselage assembly

- **Oye plant**
  - Sheet metal working and machining of medium/large parts

---

**Customer Support Division**

- Maintenance support
- Spare parts
- Operation support
- Training
- ERP, etc.

**Collaboration with ANA**

- Maintenance technical support
- Maintenance manual preparation
- Provision of MRO services
- Spare parts business operation
- Operation technical support
- Operation manual preparation
- Preparation of equipment and programs for training
- Web service provision
- ERP system configuration, etc.

---

**Maintenance & operation manual preparation**

- CY2015: Demonstration/verification through flight test, Start of support provision
- CY2016: Structure formulation/Verification, Start of support provision
- CY2017: Development, Start of operation

**Development**

- CY2015: Start of operation
- CY2016: Start of training provision
- CY2017: Start of support provision

**Inventory data preparation, warehouse installation**

- CY2015: Start of support provision
- CY2016: Start of support provision
- CY2017: Start of support provision

**Partner selection**

- CY2015: Start of support provision
- CY2016: Start of support provision
- CY2017: Start of support provision

100 staff → 400 staff
4-2. (2) Lay the foundations for finished aircraft business

Mass Production Structure

- Configuration of global supplier & real time networks

Parts Production/Procurement

Logistic Center

Component Assembly

- Main Wings and Fuselage
- Tobishima Plant
- Mitsubishi Heavy Industries Aero Engines, Ltd.
- New Komaki Minami Plant
- Engine
- Tail wing
- Matsusaka plant

Direct Delivery to Plants

A/C: Aircraft

1 million parts per A/C X 10 A/Cs manufactured per month = 10mil. parts/month to be supplied to assembly plant, JUST-IN-TIME

Track & Manage Global Logistics Status
4-3. Transportation System

Market Environment

<Market scale>
Annual growth: 2-3%. Current scale: 22 trillion yen/year. Regions and business areas we can enter are limited.

<Market trends by area>
- North America
  Many airports have APM projects and/or high-speed railway plans.
- South America
  Urban traffic congestion in Brazil is becoming a political issue. Intercity transport projects have emerged.
- Middle East
  Specific large-scale urban transportation projects exist, and realization of plans is likely.
- South-Eastern Asia
  Traffic congestion is increasingly serious. High-speed railway plans are moving forward.

MHI's Position
- Entry into accessible market areas with total solutions business based on MHI’s strengths in system integration and AGT systems.

Business Strategies

Basic Policy
Secure orders for large-scale urban transportation systems in accessible market areas.

Measures
(1) Optimal introduction of superior technologies and products
(2) Development of total solutions business
(3) Expansion of lifecycle management and services business

Business scale

APM: Automated People Mover, AGT: Automated Guideway Transit

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
4–3. (1) Optimal introduction of superior technologies and products

Winning of large-scale project orders on strength of superior technologies/products and project team formation matching local characteristics

<table>
<thead>
<tr>
<th>Target market</th>
<th>North America</th>
<th>South America</th>
<th>Middle East</th>
<th>South-Eastern Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHI stage</td>
<td>Status up</td>
<td>New market entry</td>
<td>Expansion</td>
<td>Expansion</td>
</tr>
<tr>
<td>System</td>
<td>APM</td>
<td>Rail Transit System EPC</td>
<td>Rail Transit System EPC</td>
<td>AGT</td>
</tr>
</tbody>
</table>

Main target projects:
- Abu Dhabi Metro (20km)
- Jeddah Metro (149km)
- Taoyuan (28km)
- Thai Red Line (41km)
- Malaysia KV (56km)
- Dubai Metro Extension (15km)

4-3. (2) Development of total solutions business

Development of business solution, collaborating with industrial/academic/government sectors and utilizing MIHARA Test Center

**Challenge in cities**
- Population concentration
- Traffic jam
- Noise problem
- Aerial pollution/CO2
- Accessibility

**Industry-academia-government collaboration**
- Traffic engineering
- Traffic economics
- Safety certification

**Transport solutions**
- Life cycle management
- EPC engineering
- AGT vehicles, air brakes

**Testing & Verification**
- MIHARA Test Center

**Traffic engineering**
- Multi-mode transportation simulator

**Traffic economics**
- CUE model

Forecast of road traffic volume changes after introduction of new transportation system: blue shows decrease

Forecast of population changes after introduction of transportation system: red shows increase

Accommodates testing, technology development, safety evaluation, specification verification and training for train operators, manufacturers, consultants and clients

CUE: Computable Urban Economic, AGT: Automated Guideway Transit
4-3. (2) Development of total solutions business

Evaluating the impact of the introduction of new transportation system on a city in Southeast Asia

- **Target**: urban area of Southeast Asia

- **Evaluation results**
  1. Changes in population density after the introduction of the planned rail transportation
     - Population density increases along the planned rail transportation line
  2. Changes in land value after the introduction of the planned rail transportation
     - Increased land value centering on the planned rail transportation line to the suburbs

- **Collaboration with academic sector**
  - Central or local government agency in the country
  - MHI
  - KOBE Univ.
  - TOHOKU Univ.
  - YOKOHAMA National Univ.

- **Traffic economics**
- **Traffic engineering**
Global operation monitoring and maintenance networks

4-3. (3) Expansion of lifecycle management and servicing businesses

[Diagram showing the integration of development, service, and feedback processes]

**[Operation]**
- Big data processing of operational information
- Enhanced availability and safety
- New developments and solutions
  - Application of domestic railway operators' knowledge and experience
  - Use of MTC as training center for overseas operators
  - Feedback from CMS (North America) expertise

**[Maintenance]**
- Optimize repair timing and parts supply
- Presentation of maintenance menu based on status diagnosis
  - Global network by IoT
  - Establishment of global platform enabling remote monitoring and big data usage
  - Parts factories → Promotion of local industries

**Parts • Components**
- Feedback of AGT development knowhow; development of maintenance parts (machinery/equipment unification, use of general-purpose machinery/equipment, etc.)
- Collaboration with parts manufacturers
- Certification of standards, Verification using demonstration rolling stock at MTC

[Map showing global network connections with cities like Macau, Virtual service center, Doha, Singapore, CMS, and MTC]

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
4-4. Commercial Ship

Market Environment

Supply/demand gap expected to remain wide, with overall drops in order volume and prices

- Bulk carriers: New orders already sluggish
- Container ships: Robust growth projected to continue
- Cruise ships: Steady growth; market relatively immune to fluctuations
- Gas carriers: After shale gas development projects in North America, projects in east Africa and Canadian west coast to emerge, along with demand for LNG carrier replacements
- Domestic: Existing demand for domestic ferry replacements; demand to emerge for training ships, research vessels, etc., especially from public sector

MHI's Position

- Relatively immune to overall market trends; focus to be on gas carriers, special-purpose domestic ships and cruise ships -- products capable of technical differentiation

Business Strategies

Basic Policy

Promotion of structural reforms of commercial ships business; restructuring of cruise ships business.

Measures

(1) Formation of new shipbuilding business scheme
(2) Structural reform of business in Nagasaki district
(3) Creation of new cruise ships business model

Business Scale

(In billion yen)

Bar chart showing business scale from FY2012 to FY2017.
4-4. (1) Formation of new shipbuilding business scheme

Formation of shipbuilding business focused on ship construction engineering, and not exclusively dependent on in-house construction

Overview of MHI's shipbuilding business

**Oil & Gas**
- Special high-performance ships; national projects
- GTCC barge
  - GTCC: Gas Turbine Combined Cycle
- Offshore system

**Leisure**
- Commercial Aviation & Transportation Systems engineering organization
- Cruise ship
- Leisure concept

**Energy logistics**
- Ship construction company in Nagasaki
- Hull block manufacturing company in Nagasaki

**Other shipyards**
- Engineering
- Design cooperation
- Construction consignment
- Hull block

**Overview of MHI’s shipbuilding business**

- **Oil & Gas**
  - Energy & Environment domain
  - GTCC barge
  - Offshore system

- **Leisure**
  - Commercial Aviation & Transportation Systems engineering organization
  - Cruise ship

- **Energy logistics**
  - Ship construction company in Nagasaki
  - Hull block manufacturing company in Nagasaki

**Shipbuilding engineering organization**
- Technology development, basic design, advanced design, analysis

**Special high-performance ships; national projects**
- Commercial ships in Shimonoseki
  - Energy savings; high-speed/high-performance design and construction technologies
  - Response to national science projects, etc. on system integration strength

- JAMSTEC for Wide-area Seabed Research Vessel "KAIMEI"
- Hankyu Ferry "IZUMI"

- "Sayaendo" New-generation LNG Carrier
4-4. (2) Structural reform of business in Nagasaki district

**Basic Policy**

- **Focus on superior ship types and technology areas**
  - Energy and logistics fields (LNG/LPG carriers, etc.)
  - Large-scale hull block manufacturing capability

- **Formation of resilient organization and strengthening of cost structure**
  - Streamlined organization
  - Organization downsizing
  - Manufacturing process reforms

- **Organizational reforms, transition to business companies**

- **Streamlining; reforms of manufacturing processes**
  - Through successive construction of 13 LNG carriers, improvement of management structure and achievement of stable profit structure
  - Streamlining through business spinoffs
  - Expansion of order of hull block work and production rationalization
  - Radical review of operational management system

**Strengthening of relatively superior technologies**

Promotion linked with shipbuilding engineering organization

- "Sayaringo" LNG carrier for shale gas, accommodating new Panamax needs

---

**Production of LNG/LPG carriers**

- Units: 5, 5, 5, 5, 5
- FY: 2015, 2016, 2017, 2018

**Production of hull block**

- Production Volume (1,000t)

**Ship construction business firm (Number of personnel)**

- Present status
- New company: Δ40%

**Diagram**

- Nagasaki Shipyard
- Hull block manufacturing company
- Shipbuilding engineering organization
- Commercial Aviation & Transportation Systems engineering organization
- Cruise ship
4-4. (3) Creation of new cruise ships business model

**Completion of AIDA project construction**
- Completion of AIDA ships No.1 and No.2
  - Completion of ship No.1 applying all means available
  - Thorough improvement for ship No.2
- Review of shortcomings of AIDA ship No.1
  - Activities to prototype construction
    → Inadequate basic design owing to insufficient knowledge
  - Vast quantity of materials; work volume management
    → Insufficiency of shipbuilding production management
  - Cutting-edge technology; demand for compacting
    → Unprecedented density, complex systems
  - Inadequate global SCM development
    → Bottleneck from insistence on in-house reliance

**Acquired knowledge and direction**
- Design/manufacturing improvements; understanding of cost structure
- EPC engineering, design management method
- Engineering design technology for tight space
- Departure from in-house reliance; globalization

**Formation of new cruise ships business model**
- Correspond with scheme fusing EPC and shipbuilding

**EPC technology**
- Management approach
  - Project management
  - Space 3D design
  - Primavera
  - V & V, etc.

**Common technology**
- Electricity / System
- Procurement, etc.

Towards new business model of cruise shipbuilding through further advances in management and design methods

EPC: Engineering Procurement Construction
V&V: Verification and Validation

SCM: Supply Chain Management
Formation of new business models integrating 3 business areas and core domain functions

**Achievement**

- B777X development; new production process
- Doha Metro order received
- MRJ development support
- Cruise ships business support

**Formation of new business models**

- New infrastructure export model
- Domestic new transportation system projects
- Overseas urban transportation support projects
- New cruise ships business model
- Oil & Gas offshore business

---

* Financing, technical oversight, operational oversight, cooperation between industrial/academic/government sectors
New business model for infrastructure export

Example: Indonesia air traffic network in Eastern Indonesia = Broad-Band/Regional-Hub (BB/RH)

**<Concept>**
New air traffic network (BB/RH) combining Twin aisle airplanes and regional jets (MRJ)
- Alleviate Jakarta airport congestion
- Promote eastern development

**<New infrastructure projects>**
- Makassar airport development as a regional-hub airport
- Infrastructure exports bundling airport facilities, airplanes and urban transportation
- Collaboration with industrial/academic/government sectors (METI, MLIT, Tokyo Tech, etc.)

**<Roadmap (Assumption)>**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>METI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(FY)</td>
</tr>
<tr>
<td>Study on Economic Partnership Projects</td>
<td>JICA PPP F/S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BB/RH Introduction</td>
</tr>
</tbody>
</table>
4–6. Operational structure

Application of domain horizontal functions to business entities; respond to important issues

Domain CEO Office
Management supporting important issues

Strategic Planning Dept.
Finance, New business model, M&A

Commercial Airplane Programs Management Dept.
Comprehensive management of overall airplane business

Engineering Steering Dept.
IoT, Robotics, industry-academia-government collaboration

Engineering organization
System integration, Project management

Commercial Airplane
Mitsubishi Aircraft Corporation
Mitsubishi Heavy Industries Aero Engines, Ltd.
Transportation System
Commercial Ship

New infrastructure export
Measures for cruise ships
Structural reform of business in Nagasaki district
Formation of new finance scheme

MRJ business development
Reform of airplane production processes
Commercial Aviation & Transportation Systems engineering organization

M&A : Mergers and Acquisitions, IoT : Internet of Things

© 2015 MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.
5. Summary
Focus on building foundations for growth

New business models for finished aircraft, transportation systems, commercial ships, etc.

Toward growth track

- Business scale exceeding 1 trillion yen
- Operating income exceeding 100 trillion yen

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Airplane foundations for growth</td>
<td>● Growth phase in transportation systems</td>
<td>● Resolution of AIDA cruise ships issue</td>
<td>● Large-scale urban transportation systems order received</td>
<td>● High-speed AGT order received</td>
<td>● Delivery of MRJ’s 1st unit</td>
<td>● Beginning full-scale volume production of Boeing 777X</td>
<td>● Beginning full-scale volume production of MRJ</td>
<td>● Full-scale growth in commercial aero engines</td>
</tr>
</tbody>
</table>
Forecasts regarding future performance in these materials are based on judgment made in accordance with information available at the time this presentation was prepared. As such, those projections involve risks and insecurity. For this reason, investors are recommended not to depend solely on these projections for making investment decision. It is possible that actual results may change significantly from these projections for a number of factors. Such factors include, but are not limited to, economic trends affecting the Company’s operating environment, currency movement of the yen value to the U.S. dollar and other foreign currencies, and trends of stock markets in Japan. Also, the results projected here should not be construed in any way as being guaranteed by the company.