

# Aircraft, Defense & Space

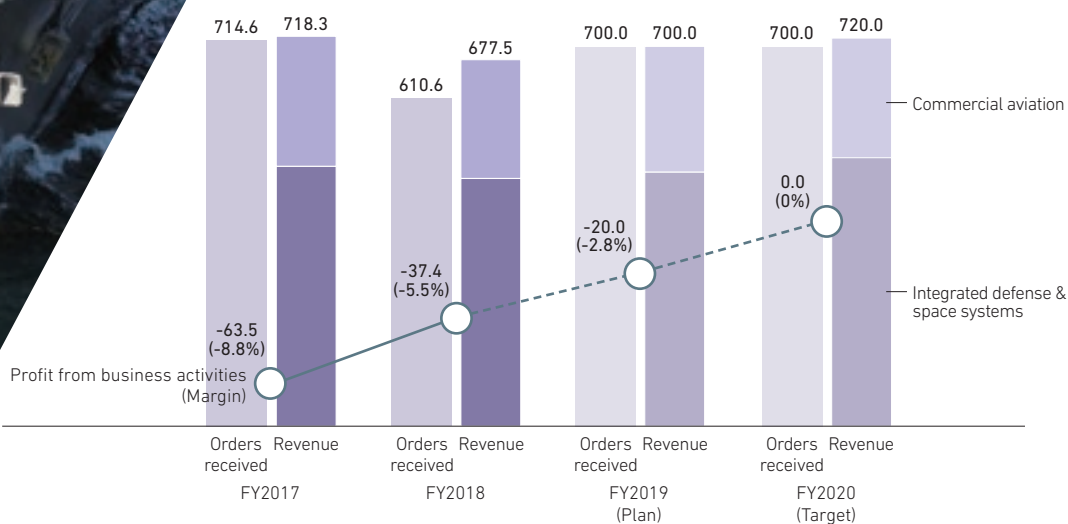
In the Aircraft, Defense & Space domain, we deal in structural parts, such as fuselage panels and main wings, for commercial aircraft, which are increasing their market presence as a means of transportation. At the same time, we are promoting the development of SpaceJet M90. These 70–90-seater regional jets are more environmentally friendly and comfortable. With the development of SpaceJet M90, we have entered into the final stage of test flights, and we are putting forth the utmost effort to deliver the first SpaceJet M90 by mid-2020. Furthermore, we contribute to safe and secure livelihoods through initiatives including development of defense equipment and launching space vehicles with payloads such as communication and observation satellites.

Main SDGs contributed to



## Operating Performance

(Billions of yen)



## Business Environment and Addressing Social Issues

In the commercial aircraft field, demand for the development of more fuel-efficient aircraft has surfaced in response to various factors, including the need to reduce environmental burden and deal with fluctuating oil prices, as well as the increase in long-distance travel and travel frequency due to globalization.

At the same time, as values diversify, world affairs are becoming increasingly complicated. In the defense and space field, by the request of our main customer, the Japanese government, we are doing our part to achieve and maintain societies in which people can live safely and securely.

## Areas of Focus under the 2018 Medium-Term Business Plan

In the commercial aircraft (Tier 1) business, we are working to improve productivity through such efforts as introducing automated equipment. We are also aiming to deliver the first SpaceJet M90 by mid-2020. For the Mitsubishi SpaceJet family, which is currently under development, we are receiving a high level of interest from the market, and we therefore anticipate that this aircraft will become a major pillar for profit in the future.

In the defense business, we are planning to expand into new business fields, such as command and control and unmanned aerial, ground, and maritime systems, while continuing to conduct stable business operations by offering world-class products. At the same time, we will utilize the technologies we have cultivated over the years to expand our peripheral fields, such as MRO,\* and our overseas business. In addition, we will promote the expansion into advanced security consumer products. In the space business, we are proceeding with the development of the H3 Launch Vehicle, which will realize low-cost, highly reliable launch services, aiming for the first launch in fiscal 2020.

\* Maintenance, Repair, and Overhaul

## Business Opportunities in the Near Future

For commercial aircraft, we anticipate market expansion over the next 20 years, with operating fleets doubling during that time. In particular, we expect to see demand for over 5,000 jets in the market for regional jets which have 100 seats or less.

In defense and space, we project growth in space, cyber, and electromagnetic domains resulting from the formulation of the National Defense Program Guidelines for FY2019 and beyond as well as the Medium-Term Defense Program. Additionally, to respond to threats such as cyberattacks targeting critical infrastructure and suspicious ships as well as the intensification of natural disasters, we believe we will see the increased utilization of safety and security technologies. These include cybersecurity technologies that protect control systems, situational awareness technologies using unmanned vehicles, and wide-area status observation technologies that analyze satellite images and other data.

## Cultivation of Key Technologies and Creation of Synergies

For the commercial aircraft (Tier 1) business, we will strengthen existing operations while expanding into new areas with differentiated competitive advantages through the development of advanced materials and advanced engineering and manufacturing processes. Furthermore, we will step up collaboration with the MRJ Business (SpaceJet). We will also aim to enter into high-value-added fields, such as components, and new business fields, such as aircraft operation support.

In the defense and space field, we will integrate our long-cultivated technologies to expand our business territory from land, sea, air, and space to cyberspace and provide total solutions for enabling safety and security.

<b>S</b> Strengths	Commercial Aviation	<ul style="list-style-type: none"> <li>• Long-term customer relationships, a long history of expertise in manufacturing aircraft, and the creation of relationships with parts suppliers based on the foundation of a domestic aircraft industry</li> <li>• Design and manufacturing technologies for large composite main wing boxes and other structural components</li> <li>• Development of SpaceJet with high levels of efficiency, reliability, and superior operational economics</li> </ul>
	Integrated Defense & Space Systems	<ul style="list-style-type: none"> <li>• Leading-edge technologies fostered through the development of defense and space products</li> <li>• Defense: Ability to make proposals for integrated defense systems, and expertise and channels cultivated through international joint collaboration</li> <li>• Space: Development capabilities in launch vehicles and launch vehicle engines and world-leading levels of reliability</li> </ul>
<b>W</b> Weaknesses	Commercial Aviation	<ul style="list-style-type: none"> <li>• High degree of reliance on specific customers</li> <li>• High sensitivity to foreign exchange fluctuations, as business is concentrated on overseas customers</li> <li>• Shortage of experience in commercial aircraft development</li> </ul>
	Integrated Defense & Space Systems	<ul style="list-style-type: none"> <li>• Defense: Limited experience in pursuing and leading export projects</li> <li>• Space: Inadequate cost competitiveness in global markets</li> </ul>
<b>O</b> Opportunities	Commercial Aviation	<ul style="list-style-type: none"> <li>• Doubling of operational fleet over the next 20 years</li> <li>• Anticipated demand for over 5,000 aircraft in market for regional jets with 100 seats or less</li> </ul>
	Integrated Defense & Space Systems	<ul style="list-style-type: none"> <li>• Defense: Cabinet approval of the Three Principles on Transfer of Defense Equipment and Technology</li> <li>• Growth in space, cyber, and electromagnetic domains resulting from the formulation of the National Defense Program Guidelines for FY2019 and beyond as well as the Medium-Term Defense Program</li> <li>• Space: Growing launch market in line with an expanding need for satellites, including the use of space in national security</li> </ul>
<b>T</b> Threats	Commercial Aviation	<ul style="list-style-type: none"> <li>• Globalization of aircraft production (business being promoted separately in developed countries and emerging countries)</li> <li>• Industry reorganization due to integration and resulting intensification of competition</li> </ul>
	Integrated Defense & Space Systems	<ul style="list-style-type: none"> <li>• Defense: Lower domestic budget for front-line combat equipment expenses due to increased overseas procurement</li> <li>• Space: Concern regarding price-cutting by new U.S. companies entering the market for overseas launch services</li> </ul>

## Strategies

Commercial Aviation	Tier 1	<p>Improve productivity</p> <ul style="list-style-type: none"> <li>• Accelerate labor savings by introducing automated equipment</li> <li>• Automate indirect operations through AI/IoT</li> <li>• Concentrate production capacities to achieve highly efficient parts manufacturing</li> </ul> <p>Reduce fixed costs</p> <ul style="list-style-type: none"> <li>• Replace auxiliary/routine man-work with IT systems to reduce labor costs</li> <li>• Upgrade and diversify personnel skills, reallocate and equalize deployment of resources</li> </ul> <p>Control external expenses</p> <ul style="list-style-type: none"> <li>• Reduce working capital and generate cash flow with advanced procurement processes*1</li> <li>• Internalize outsourced operations using upskilled human resources</li> </ul>
	MRJ Business (SpaceJet) (secure a long-term, sustainable business)	<p>Strengthen ties with Tier 1 businesses</p> <ul style="list-style-type: none"> <li>• Expand profitability through business synergy and entry into high-value-added markets</li> </ul> <p>Strengthen sales and customer support structures</p> <ul style="list-style-type: none"> <li>• Enhance human resources and consider partnerships with outside agencies</li> </ul> <p>Develop a mainstream product for the North American market and enhance our service system</p> <ul style="list-style-type: none"> <li>• Build a business foundation by promptly establishing a position in the largest regional jet market</li> </ul>
	Expansion of existing domestic and peripheral fields	<p>Existing business</p> <ul style="list-style-type: none"> <li>• Steadily get next core businesses up and running (future fighter, H3 Launch Vehicle)</li> <li>• Expand business scope such as command and control, M&amp;S*2, etc.</li> </ul> <p>Peripheral fields</p> <ul style="list-style-type: none"> <li>• Expand MRO business in maintenance and servicing fields</li> <li>• Expand into new peripheral fields (space [including satellite information usage], cybersecurity, unmanned vehicles, etc.)</li> </ul>
	Overseas business expansion	<p>Adapting MHI components for use in overseas equipment</p> <ul style="list-style-type: none"> <li>• Utilize channels with overseas manufacturers cultivated through existing businesses</li> <li>• Collaborate with Japanese government in parallel with inter-company consultations</li> </ul> <p>Potential international joint development projects</p> <ul style="list-style-type: none"> <li>• Start international joint development projects with alliance countries (MHI support for Japanese government)</li> <li>• Enter joint development projects</li> </ul>
Integrated Defense & Space Systems	Establishment of dual-use development businesses	<ul style="list-style-type: none"> <li>• Utilize core technologies of defense and space business</li> <li>• Meet private-sector demand particularly in safety and security field (cybersecurity, situational awareness, wide-area status observation)</li> </ul>

\*1 Introduce systems for acquisition of specialist skills, including information systems such as AI/IoT/RPA, production processes, procurement operations, CAD/NC programs, etc.

\*2 Modeling and simulation

## Developing and Establishing a Business Structure for the Mitsubishi SpaceJet Family

We are focusing our efforts on pursuing type certificate (TC) acquisition for SpaceJet M90, Japan's first domestically produced passenger jet, with the aim of delivering the first SpaceJet M90 by 2020. Additionally, we are working to establish a structure for the mass production of this jet. At the same time, we are striving to develop a mainstream product for the North American market and enhance our service system.



In June 2019, we presented our new brand, Mitsubishi SpaceJet family, at the Paris Air Show. We chose to rename our Mitsubishi Regional Jet (MRJ) as "SpaceJet" to place emphasis not on a "regional" market segment, but rather on the product value of the SpaceJet brand, which includes its spacious and wide cabin and overhead bins, ultimate comfort, environment-friendliness, and excellent economic performance. We are focusing on the TC acquisition for the MRJ90, now SpaceJet M90, and are striving to establish a customer support network and an optimal mass production structure that allows us to leverage synergies.

Additionally, we announced SpaceJet M100 as a new concept for aircraft. With 65–76 seats, SpaceJet M100 will have either three-class or two-class cabin configuration and will comply with scope clauses\* in the United States. For the global market, we will also be able to expand SpaceJet M100 to a single-class configuration with 88 seats, thereby meeting a wide range of customer needs. Additionally, SpaceJet M100 will boast industry-leading operational economics. We anticipate that the market for jets with 100 seats or less will see demand for over 5,000 regional jets in the next 20 years. We therefore believe there will be strong and stable replacement demand for existing jets throughout the 2020s. Going forward, we will strongly push forward with the development of SpaceJet M100 as an aircraft that

perfectly matches the U.S. and global markets.

Also, we concluded a business transfer contract to acquire the Canadair Regional Jet (CRJ) program from Canada-based Bombardier Inc. Bombardier has been involved in the CRJ program for many years, which focuses on small passenger jets. This business acquisition will help us complement our existing commercial aircraft business, particularly functions for the development, manufacture, sale, and customer support for the Mitsubishi SpaceJet family. By combining the infrastructure and resources that the Group possesses in Japan, Canada, and around the world, this business acquisition will be an effective means for ensuring the future success of the Mitsubishi SpaceJet family. We also believe this acquisition is an important step within the Group's growth strategy to establish a robust global commercial aircraft business.

\* Scope clauses are a part of a contract between a major airline and the trade union of its pilots. Scope clauses establish limits on number of seats, aircraft sizes, take-off weight, etc., for regional airlines.

