

THE INTERNATIONAL DEVELOPMENT AND PRODUCTION OF THE F-2 FIGHTER

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Keywords: *Fighter, International Development, International Production, Composite Wing, Digital Flight Control*

Abstract

The Japanese F-2 fighter is the successor of the former Mitsubishi F-1 fighter for Japan Defense Agency (JDA). The development began in 1988 under an international agreement between Japanese government and the United States counterpart. The aircraft made the first flight in 1995. The development was a success and the production aircraft have been procured annually by the JDA since 2000.

For over fifteen years, Japan and U.S. governments and industries have worked cooperatively and tirelessly to overcome, often complex, cultural, technical and business differences to deliver F-2 aircraft that meet the needs of the JDA. As a result, the high-technology F-2 is now a valuable part of the Japan Air Self Defense Forces' strategic inventory.

1 Introduction

The fleet of Mitsubishi Heavy Industries (MHI) F-2 fighter aircraft, which are in operation in Japan, is the result of the unique, joint Japan/United States design and development. The program is the first of its kind between Japan and the United States to jointly develop and manufacture a major, advanced defense system sharing technology and one that is fully funded by the Government of Japan. Because of the efforts of both the governments and industries of each country in overcoming significant differences in their cultures and historic approaches to technical and business solutions, the program has set a standard for international cooperation. The success is also evidenced by the deployment of the new F-2

fighter aircraft to air bases in Japan as planned since the year of 2000.

2 Aircraft Overview

Although based on F-16C/D, the F-2 aircraft is designed to satisfy unique requirements of the JDA. (Fig.1)

	F-2A/B	F-16C/D Blk40
W X L X H	11 ^m X 16 ^m X 5 ^m	9 ^m X 15 ^m X 5 ^m
ENGINE	F110-GE-129	F110-GE-100 or F100-PW-220
Max.TOGW	22,000Kg	19,000Kg

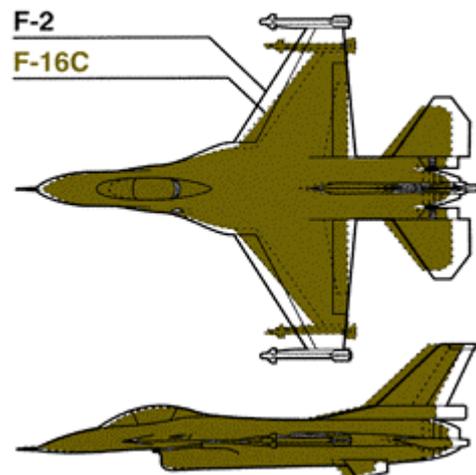


Fig.1 Comparison between F-2 and F-16C

The following major features (Fig.2) are adopted:

- The F-2 wing box was the first mass-produced large scale major structure in the world made of co-cured composite materials.
- The Japanese indigenous digital flight control system with triple-redundancy and self-check function was adopted to achieve high maneuverability and excellent flight characteristics.
- Advanced avionics system was adopted, such as active phased array radar that was the first application to fighter aircraft in the world.
- The wing, fuselage and horizontal tail area were enlarged compared to the F-16 to enhance the maneuverability. The engine and air inlet system were also upgraded.
- Radar absorbing material was adopted to improve the stealth characteristics.
- Refined windshield and canopy system was applied. The bird-strike endurance capability and through canopy ejection system were adopted .



Fig2. Features of F-2

3 International Cooperative Efforts

Over 300 engineers from various Japanese and U.S. defense companies participated in a design team at MHI aerospace facility in Nagoya, Japan. Over 70 engineers of Lockheed Martin were assigned in Nagoya, many with their families. This team system lead the program to the success, enabling the speedy and accurate essential studies.

Development and production of the co-cured wing-box (Fig.3) was the primary technology transferred to the U.S. Continued activities to improve the manufacturing process by the collaboration between MHI and Lockheed Martin evidenced the successful technology transfer.

4 Lessons Learned

The experience in the F-2 program provides valuable lessons – both positive and negative.

The primary lessons learned here are,

- Firstly, the key to lead the international collaboration to the success is whether or not there is a mutual benefit can be expected from the program such as a technology transfer to each other.
- Secondly, a work package of key design area should be kept at a partner who takes a leading role and not to be shared. F-2 design team was assured with a high level of design freedom by the adoption of indigenously developed flight control system.
- Thirdly, the approach of the U.S. defense industry to the fighter program accumulated and validated by the development and production of its own proved to be costly for the Japanese F-2 program. Although only one hundred and thirty of F-2 was to be procured in the original JDA plan, the U.S. industry had thought of the approach that could have produced much larger number of aircraft. One tends to think its practice is a matter of course, but optimal approach should be sought according to the characteristic of subject program.

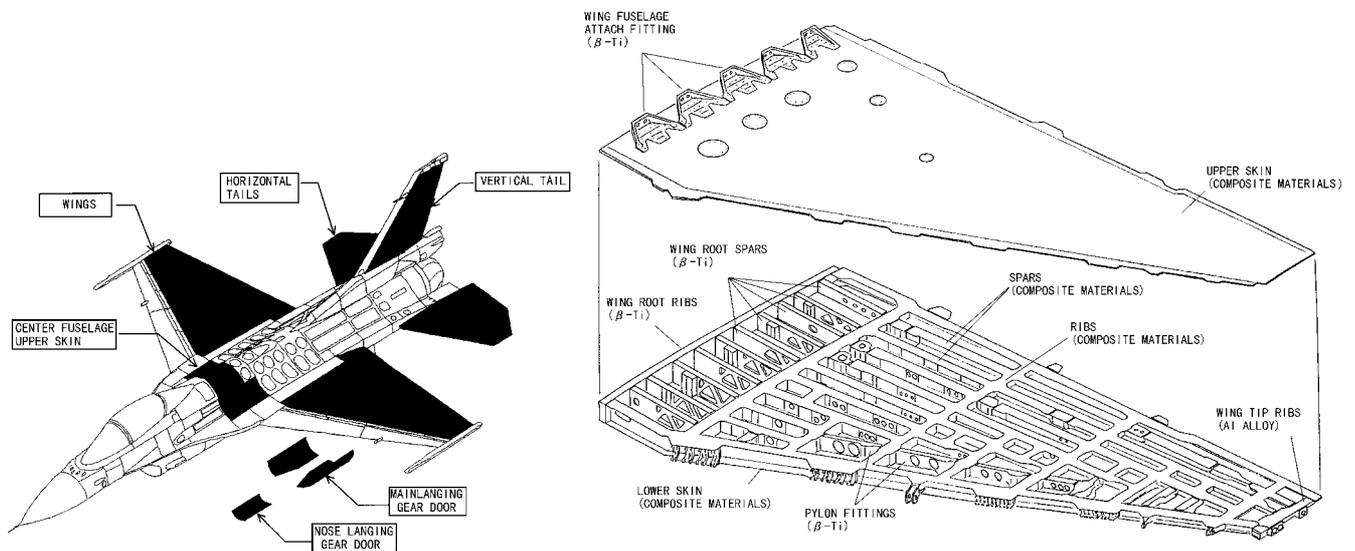


Fig.3 Composite structure and Co-cured Wing-box

5 Overall Benefits Achieved

The F-2 program has been a great success from the standpoint of the involvement of the governments and industries of both countries. It was a good arrangement in terms of working-together and technology exchange from the phase of development through production. The experiences and knowledge gained offers the industries of the two countries near-term benefits and opportunities to collaborate in the future. Last but not least, the program strengthens the two countries' mutual security interests in the region through the introduction of an advanced support fighter that meets the needs of JDA.

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