



Launch of the Epsilon rocket

1) The Japan Aerospace Exploration Agency on Sept. 14 launched the Epsilon, Japan's first new rocket in 12 years, putting the SPRINT-A planet-observation telescope into orbit some 1,000 km above the Earth. The telescope uses **extreme ultraviolet rays** to observe the atmosphere of planets.

2) The successful rocket launch represents the **culmination** of Japan's solid-fuel rocket technology, which dates back to the tiny

"pencil" rocket in the 1950s developed by the late Dr. Hideo Itokawa and his team. But JAXA and Japan's rocket industry have a long way to go to make the Epsilon rocket competitive enough in the international market of commercial satellite launches.

3) In developing the Epsilon rocket, the JAXA team aimed at smaller size, lower costs and higher capabilities.

4) The three-stage rocket, which is 24.4 meters high and 2.6 meters across and weighs 91 tons, is about half the height of JAXA's **mainstay** H-IIA rocket and is smaller than its **predecessor** M-5 rocket, which was retired in 2006 due to its high cost.

5) To lower the production cost, no new engines were designed. Instead, the Epsilon utilizes the H-IIA's solid-fuel booster and parts of the M-5. But it makes full use of advanced IT technology.

6) About 100 people used to work in a large room to control the launch of a rocket. But in the launch of the Epsilon, only three were required to inspect the rocket with two personal computers. Artificial intelligence carried out **autonomous** pre-launch checks of the vehicle composed of numerous parts. This is an application of technology used in the machinery industry. The "mobile control" of a rocket launch was the first attempt in the world. The traditional control room near a **launchpad** became unnecessary.

7) In the past, it took JAXA 42 days from the time of setting up a rocket in a launchpad to the removal of related equipment after a launch. In the launch of the Epsilon, the period was shortened to seven days. Simplifying the procedure needed for a rocket launch is an important factor for facilitating a successful launch.

8) To reduce the weight of the Epsilon, light materials including **carbon fiber** was used in parts. JAXA successfully launched the rocket after three years of development. Thus Japan's solid-fuel rocket technology was revived seven years after the M-5 rocket was retired. Seven M-5 rockets were launched from 1997 to 2006.

9) From now on, solid-fuel rockets will be launched from the Uchinoura Space Center and liquid-fuel rockets from the Tanegashima Space Center, both in Kagoshima Prefecture.

10) At ¥5.3 billion, the cost of the first Epsilon was about 70 percent of the cost of the M-5 rocket. JAXA hopes to reduce the cost to ¥3 billion by 2017. But it is not easy to compete in the international market.

11) At the very least, JAXA will need to prove the reliability of the Epsilon rocket by increasing the number of launches. JAXA and Japan's rocket industry must further improve the technology for easy-to-launch rockets. 【09/23/2013/The Japan Times】

1. extreme ultraviolet rays 極端紫外線 2. culmination 最高点[絶頂]に達すること, 成就, 完成

4. mainstay 主力の predecessor ある物の)前にあった[使われていた]物 6. autonomous 自律の, 自律的な launchpad 発射台 (誘導弾・ロケットなどの) 8. carbon fiber 炭素繊維

★Ice breaker for active discussion★

1. If you were asked by kids what a satellite is, how would you respond? How about "what is a rocket?"

2. What is the purpose of the launch this time? What is the satellite going to do?

3. What's the difference between the latest satellite and its predecessors? How were they able to differentiate it from the others?

4. Do you know about the failed launch of the Epsilon? Please tell something about it.

5. What does Epsilon mean? What does it signify and what do you think is the reason why they chose that name for the rocket?

6. Why do you think people keep on launching rockets and satellites in the space? What is its significance to the humankind? Do you think it is a worthy cause?

7. Have you ever watched rocket launch first hand before?

Are you interested in going to a space exploration? Why do you say so?

8. Please identify the meaning of the following words or use it in a sentence: telescope, orbit, culmination, mainstay, predecessor, autonomous, carbon fiber and reliability.

Tips on News: 信号中継装置の配線の誤りと、自動点検装置の姿勢制御をエラー誤検知により二度打ち上げが延期になったイプシロンでしたが3度目の正直で無事に成功！世界初の惑星分光観測衛星SPRINT-Aに、惑星の磁気圏や大気流出の解明といった期待が寄せられています。epsilonはギリシャ語の第5字で英語のeにあたります。excellence(卓越)やevolution(進化)と言った意味も込められているとのことです。今後も日本では宇宙ビジネスでの国際競争力を高める取り組みが官民一体で続きます。