Long Voyage Home

In 2003, Japanese scientists〔ハヤブサを、イトカワから土壌サンプルを持って帰る任務に、送り出した：s＿＿＿ Hayabusa ＿＿ a m＿＿＿＿＿n ＿＿ b＿＿＿g b＿＿＿ s＿＿l s＿＿＿＿＿s from Itokawa〕, a〔小さな小惑星：t＿＿＿ a＿＿＿＿＿d〕300 million kilometers away. This was an〔ほとんど不可能な任務：a＿＿＿＿t i＿＿＿＿＿＿＿＿＿ m＿＿＿＿＿n〕.

①

The Hayabusa Project was very〔野心的：a＿＿＿＿＿＿＿s〕. JAXA set very difficult goals for the mission: developing ion engines, developing an〔自立航行：a＿＿＿n＿＿＿＿s n＿＿＿g＿＿＿＿n〕system, collecting soil samples from Itokawa, and bringing them back. 〔～なので：S＿＿＿＿〕asteroids like Itokawa〔我々の太陽系の始まりに遡る：d＿＿＿ f＿＿＿ the b＿＿＿＿＿＿＿g of our s＿＿＿r s＿＿＿＿m〕, such samples will〔～を解決するのを助ける（原形不定詞）：h＿＿＿ s＿＿＿＿〕the mysteries of our system's〔起源：o＿＿＿＿n〕. This would be〔前代未聞：u＿p＿＿c＿＿＿＿＿＿d〕in the history of space exploration.

Developing ion engines for space exploration was one of the most important goals. Most rocket engines use〔気体：g＿＿＿s〕and〔液体：l＿＿＿＿＿s〕. An ion engine uses〔電場/電解：e＿＿＿＿r＿c fi＿＿＿s〕.〔その力はとても小さいので一枚の１円硬貨を持ち上げることしかできない：Its p＿＿＿＿ is ＿＿ s＿＿＿＿ t＿＿＿ i＿ c＿＿ only l＿＿＿ a one-yen coin〕.〔けれども：Y＿＿〕in space,〔重力と空気抵抗がないので（分詞構文）：t＿＿＿＿ b＿＿＿＿ n＿ g＿＿＿＿＿y and n＿ a＿＿ r＿＿＿＿＿＿＿＿e〕, even a small amount of energy can be powerful.

②

Developing an〔自立航行：a＿＿＿n＿＿＿＿s n＿＿＿＿＿＿＿＿n〕system was another goal.〔電波信号が３億キロを移動するのに16分を要する：＿＿ t＿＿＿s a ra＿＿＿ s＿＿＿＿l 16 m＿＿＿＿＿s ＿＿ t＿＿＿＿l 300 m＿＿＿＿＿n k＿＿＿m＿＿＿＿s〕between the Earth and Itokawa.〔緊急時には：＿＿ an e＿＿＿＿＿＿＿y〕, Hayabusa could not wait for〔命令：c＿＿＿＿＿＿s〕. It had to〔判断する：j＿＿＿＿〕the situation and decide what to do〔自力で：＿＿ its o＿＿〕.

The other two goals were even more difficult. Itokawa is a small〔ピーナッツ型の：p＿＿＿＿t-s＿＿＿＿＿〕asteroid only 535 meters long. Flying〔秒速34kmで：a＿ the s＿＿＿d ＿＿ 34 k＿＿＿m＿＿＿＿s p＿＿ s＿＿＿＿d〕, Hayabusa would be trying to hit a piece of “dust” in space. This would be like hitting a one-millimeter target in Brazil from Japan. One of the scientists〔述べた：o＿＿＿＿＿ed〕, “If Hayabusa〔～を達成する：ac＿＿＿＿＿＿s〕these goals, it will have done〔他のどんな宇宙船も今までにしなかったことを：w＿＿＿ ＿＿ o＿＿＿＿ s＿＿＿＿c＿＿＿t h＿＿ e＿＿＿ d＿＿＿〕.”

〔～に到達する事：G＿＿＿＿＿g ＿＿〕Itokawa was difficult, but touching down and collecting the soil samples was〔不可能に近い：n＿＿＿ ＿＿ i＿＿＿＿＿＿＿＿＿e〕. In its〔着地する最初の試み：f＿＿＿＿ a＿＿＿＿＿＿t ＿＿ l＿＿＿〕, Hayabusa was damaged. A week later, it tried again. This time it was able to land and collect the samples.

Hayabusa〔家に向かった：h＿＿＿ed h＿＿＿〕, but almost〔すぐに：i＿＿＿d＿＿＿＿＿＿〕fuel began to〔漏れる：l＿＿＿〕and its batteries began to〔切れる：f＿＿l〕. The team〔なんとか解決した：m＿＿＿＿＿d ＿＿＿ s＿＿＿＿＿〕these problems, but〔数日後に事態はさらにより悪化した：d＿＿s la＿＿r t＿＿＿＿s g＿＿ m＿＿h w＿＿＿＿〕. All communication with Hayabusa was cut off.

③

〔明けても暮れても：D＿＿ i＿ and d＿＿ o＿＿〕, the team sent a message: “Hayabusa, we are waiting for your answer. Come in, please!” But no spacecraft in history had ever been able to start communication again after such a long〔停電：b＿＿＿＿o＿＿〕.

Hayabusa was lost in space for 43 days. Finally it answered, but the〔短時間の絶好の機会：w＿＿＿＿w＿＿ o＿＿＿＿t＿＿＿＿y〕for re-entry had already passed. Hayabusa had to remain in space for〔さらに３年：a＿＿＿＿＿r three years〕. Later, there was a new problem: all four engines stopped. It was almost impossible for Hayabusa to return to the Earth. However, by〔なんとか：s＿＿＿h＿＿〕fixing the engines, the team〔ハヤブサを再開することに成功した：s＿＿＿＿＿＿ed ＿＿ r＿a＿＿＿v＿＿＿＿g Hayabusa〕.

In June 2010, Hayabusa,〔酷(ひど)く破損させられて：b＿＿＿＿ d＿＿＿＿＿＿〕, was finally〔接近している：a＿＿＿＿＿＿＿＿ing〕the Earth. Hayabusa released the capsule successfully, and would soon burn up like a shooting star. It was not made to〔～耐える：w＿＿＿s＿＿＿d〕the heat of re-entry—about 3,000 degrees Celsius. Kawaguchi Junichiro, manager of the Hayabusa Project, sent one last〔命令：c＿＿＿＿＿d〕: “Take a photo of the Earth.” All the project members wanted to see〔地球がどのように見えるか：w＿＿＿＿ the Earth l＿＿＿ed l＿＿＿〕 to Hayabusa〔それが燃え尽きる直前に：j＿＿＿＿ b＿＿＿＿＿＿ it b＿＿＿ed u＿〕. Hayabusa tried to take the photo several times but failed. Finally,〔正に最後の瞬間に：a＿＿ the v＿＿＿＿ l＿＿＿＿ m＿＿＿＿＿t〕, it took this photo—Hayabusa's final〔さよなら：f＿＿＿＿w＿＿＿＿〕.

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The capsule with its soil samples landed safely in the Australian desert on June 13, 2010.

Kawaguchi says, “Many people said the Hayabusa Project was too〔野心的：a＿＿＿＿＿＿＿＿s〕and that there were too many risks. I knew it was true and I have to〔認める：a＿＿＿＿＿〕that the success of the project was the result of a lot of〔幸運：l＿＿＿＿〕. But we have always been ready to set high goals and〔リスクをとる：t＿＿＿＿r＿＿＿＿s〕. If you want to〔はるか先を見通す：s＿＿＿a l＿＿g w＿＿〕, you have to build a high tower.

“If we can get the necessary support, we will soon be working on a new spacecraft which will go〔20から30倍より遠くに：20 ＿＿ 30 t＿＿＿＿s f＿＿＿＿＿＿r〕than Hayabusa.”

In the 15th and 16th centuries, people like Magellan(マゼラン)〔航海に出発した：s＿＿＿ o＿＿＿ o＿＿ v＿＿＿＿＿＿s〕to the East〔～を探して：＿＿＿ s＿＿＿＿＿＿ ＿＿〕gold and spice. Now Kawaguchi believes we〔～に入ろうとしている：a＿＿＿ a＿＿＿＿＿ ＿＿＿ enter〕a “New Age of Exploration” into space〔～を探して：＿＿＿ s＿＿＿＿＿h ＿＿＿〕new〔知識：k＿＿＿＿l＿＿＿＿e〕and resources.

Kawaguchi〔締めくくる：c＿＿＿＿l＿＿＿＿s〕: “We'd like to be leaders in this new age. Setting high goals means〔大きな困難に直面すること：f＿＿＿＿＿g g＿＿＿＿t di＿＿＿＿c＿＿＿t＿es〕. We must be strong and build good teamwork. We must not〔落胆させられる／思い止まらせられる：g＿＿＿ d＿＿c＿＿r＿＿＿＿d〕by trouble and failure. Looking at Hayabusa's photo of the Earth, I seem to hear its voice: ‘Never give up! Forward into the future with hope and〔自信：c＿＿f＿＿＿＿＿＿e〕!’”