

CHEAP ACCESS TO SPACE

'Cheap' is an important word in space technology nowadays and re-usable rockets will be a key way of controlling costs. They will deliver things, bring stuff back to Earth and then go up again, perhaps with machinery for a space factory, or even carrying tourists. In the future, these space vehicles will be orbiting the Earth as efficiently as air freight carriers. There could be a billion-dollar market in taking packages from one side of the planet to the other in an hour.

NASA, the government-owned space program, once aimed to develop a re-usable rocket. **1** It plans to launch a manned expedition to an asteroid by 2025 and since this will require different technology, it is more likely that people outside the NASA program will develop reusable rocket design.

Rick Tumlinson, co-founder of the Space Frontier Foundation (SFF), has spent the past two decades pushing for human exploration and settlement of the solar system. Space News magazine described him as one of the 100 most influential people in the space industry. Tumlinson has always maintained that businesses should get involved, and views NASA as a bit of a dinosaur.

2 '25 years after the Wright brothers flew a plane for the first time, people could buy a commercial plane ticket, but 25 years after landing on the Moon, we sat around watching old astronauts on TV talking about the good old days.'

Using his high profile, Tumlinson is going to try to prove a point. Space is our destiny, he says, so why not get on with it? He and his colleagues encourage any business that shares this aim. **3** For example, in December 2010, SpaceX (Space Exploration Technologies) launched their re-usable space capsule Dragon. After circling the planet twice, it returned with parachutes, landing as planned in the Pacific Ocean. Tumlinson immediately congratulated the company on successfully completing the world's first commercial orbital space flight and recovery, saying, 'This flight will go down in history as a turning point for the opening of space to regular people.'

While it was a significant technical achievement for SpaceX as a company, the flight was also highly significant for the American taxpayer. With the retirement of

the Space Shuttle, the United States has an urgent need for commercial manned space flight. Until that happens, NASA will be totally dependent on the Russian Soyuz to carry astronauts to and from the International Space Station, at a price of over \$50 million per seat. **4** They submitted their proposal to NASA just days after Dragon returned to Earth.

At one point, the SFF ran a survey on the internet called 'Cheap Access to Space', where it asked American taxpayers for their opinions on the US space program and future priorities for space transportation. Their own view has always been that it is impossible for NASA to offer an 'open frontier'. NASA is 'elitist and exclusive', whereas the SFF believes in opportunities for everyone: 'a future of endlessly expanding new choices'. The SFF wants to see 'irreversible human settlement' in space as soon as possible and maintains that this is only going to happen through free enterprise. It is inappropriate for government-sponsored astronauts to be constructing buildings and driving trucks. **5** SpaceX's achievements to date demonstrate a willingness to make this happen.

Once space transportation becomes affordable, mass space travel will be possible. Many people believe that by 2025 space tourism will have become a viable industry. However, US government officials don't really see a future for space tourism.

6 David Ashford, Managing Director of the British company Bristol Spaceplanes Limited, once said that space tourism would begin ten years after people stopped laughing at the concept. People have already stopped laughing.

Six sentences have been removed from the article.

Choose from the sentences A-G (on the following page) the one which fits each gap.

There is one extra sentence, which you do not need to use.

- A At the same time, the SFF accepts that NASA's missions could bring other scientific benefits.
- B More than one such firm has developed impressive solutions for getting into space and back cheaply.
- C Commercial activity such as this is what the private sector should be doing.
- D However, the USA's priorities have changed in the 21st century.
- E Here again, private companies may well prove them wrong in the very near future.
- F SpaceX is prepared to meet this need – and at less than half the cost.
- G In an early article he wrote about the government-owned space program, he made the following observation.