Living on Mars

We look at the challenges Martian colonies would face and the exciting possibility of making Mars a home

Mars is the easiest planet for us to visit, explore and colonise. It is the nearest planet to us and has a thin atmosphere composed of 95.3 per cent carbon dioxide. A Martian day is 39 minutes and 35 seconds longer than an Earth day and temperatures average about -65 degrees Celsius (-85 degrees Fahrenheit).

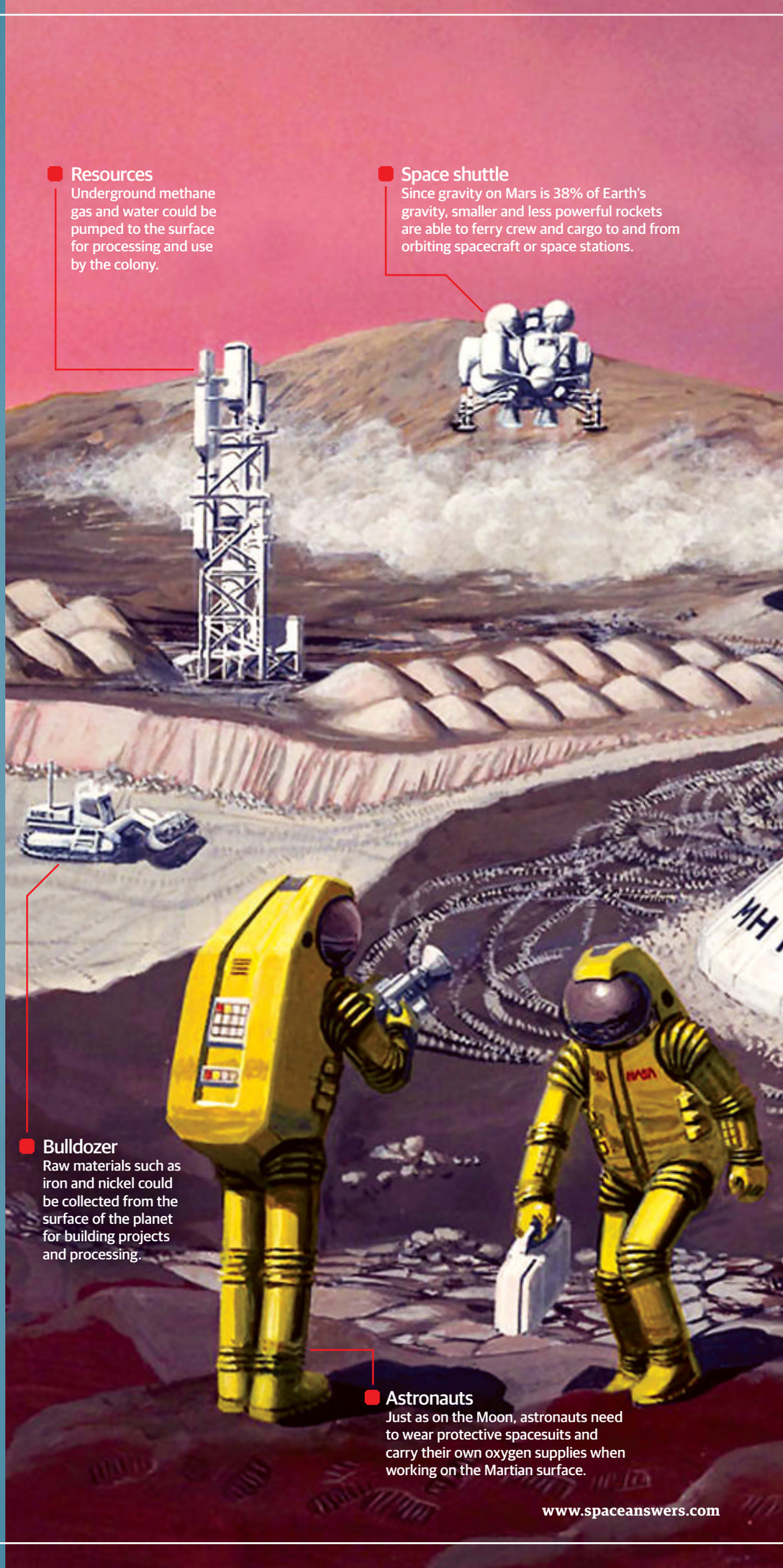
Besides the cold, the Martian surface receives twice the radiation levels experienced at the International Space Station (ISS). You'll feel lighter on Mars as its gravity is 0.38 of Earth's, which is likely to cause muscle wasting and brittle bones.

By any Earth standards, it is not a very hospitable place, however, it does have huge deposits of frozen water beneath its surface and there is the possibility of finding large quantities of raw materials such as iron ore, cobalt, copper, gold and tungsten. These natural resources could be processed by colonists to help build their bases and export back to Earth.

Bases could be built in caves to protect the colonists from the effects of radiation and the harsh Martian conditions. Another option is to build geodesic domes made from panels attached to a metal structure, which could be linked together. Any base will have to be pressurised, heated, supplied with oxygen and have radiation shielding.

The colony could obtain its power from solar panels, though a nuclear power plant would better serve the colony in the long-term. The colonists would have to learn how to grow bacteria and crops to produce food, and learn how to process the raw material available on Mars to manufacture new structures and technology needed to improve the life and expansion of the colony.

In the long-term, Mars could be terraformed to become an Earth-like planet. This would involve releasing the carbon dioxide locked under the polar caps by heating it with orbital mirrors. The creation of this 'greenhouse gas' would liberate water to fall as rain and raise the atmospheric pressure. Eventually, microbes and plants would grow and further transform the environment until it could sustain larger forms of life including humans.

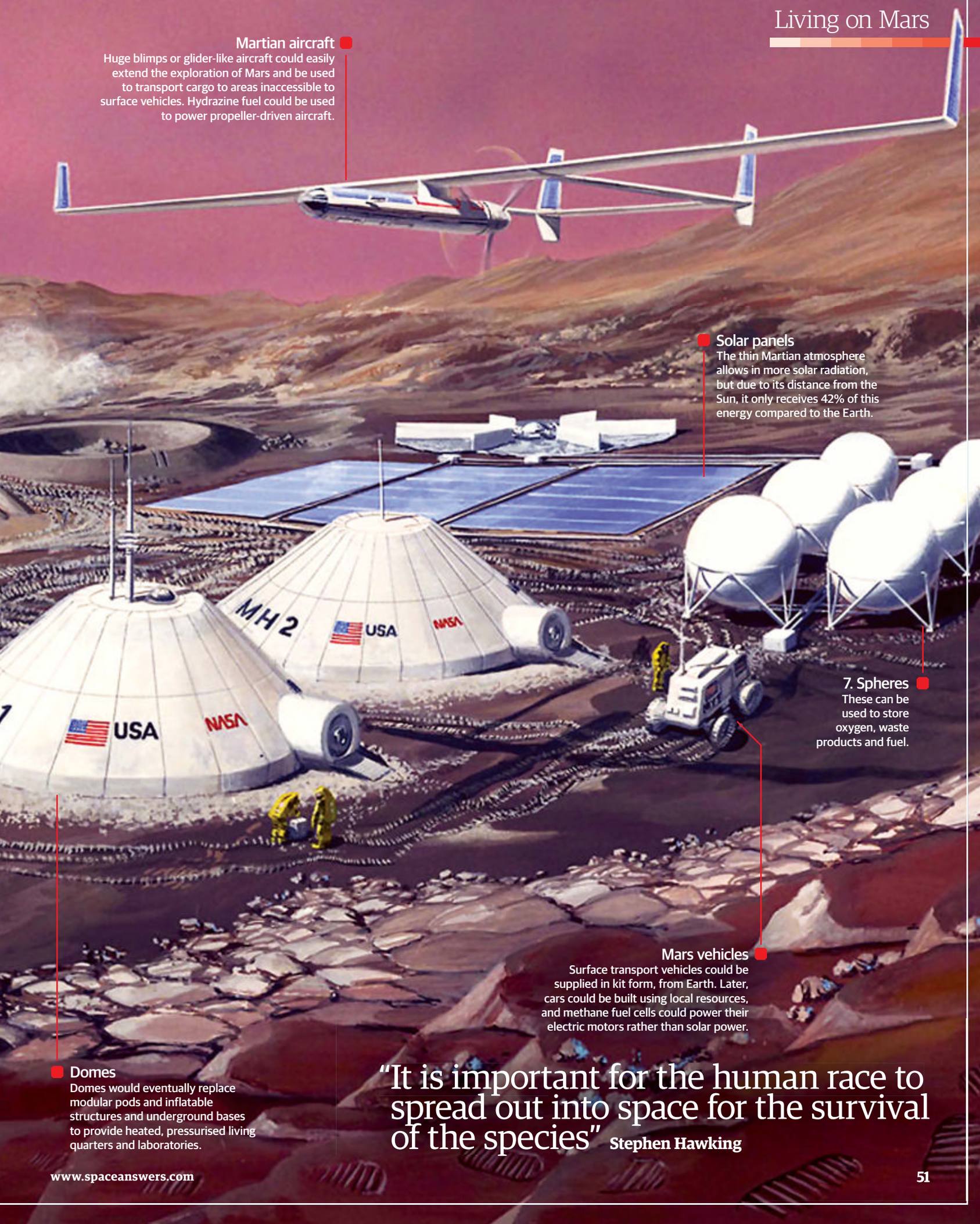


Resources
Underground methane gas and water could be pumped to the surface for processing and use by the colony.

Space shuttle
Since gravity on Mars is 38% of Earth's gravity, smaller and less powerful rockets are able to ferry crew and cargo to and from orbiting spacecraft or space stations.

Bulldozer
Raw materials such as iron and nickel could be collected from the surface of the planet for building projects and processing.

Astronauts
Just as on the Moon, astronauts need to wear protective spacesuits and carry their own oxygen supplies when working on the Martian surface.



Martian aircraft
Huge blimps or glider-like aircraft could easily extend the exploration of Mars and be used to transport cargo to areas inaccessible to surface vehicles. Hydrazine fuel could be used to power propeller-driven aircraft.

Solar panels
The thin Martian atmosphere allows in more solar radiation, but due to its distance from the Sun, it only receives 42% of this energy compared to the Earth.

7. Spheres
These can be used to store oxygen, waste products and fuel.

Mars vehicles
Surface transport vehicles could be supplied in kit form, from Earth. Later, cars could be built using local resources, and methane fuel cells could power their electric motors rather than solar power.

Domes
Domes would eventually replace modular pods and inflatable structures and underground bases to provide heated, pressurised living quarters and laboratories.

"It is important for the human race to spread out into space for the survival of the species" **Stephen Hawking**