

## A TINY HELICOPTER FOR MARS IN 2020

117 years ago the **Wright Brothers** proved that powered, sustained, and controlled flight was possible here on Earth. Now another group of American pioneers may prove the same can be done on another world.

Excitement has been building for NASA's next rover mission to Mars, scheduled to launch sometime in 2020. Although it looks a lot like the current Curiosity rover, its mission will be to search directly for possible evidence of past life. And now NASA has approved the inclusion of a tiny drone-like helicopter to accompany the rover! This is something never done before.

The Mars Helicopter will be a small, drone-like autonomous rotorcraft, designed specifically for Mars' very thin atmosphere; it will provide a unique and exciting new way to see the Martian landscape as never before – a bird's-eye view, if you will. NASA Administrator **Jim Bridenstine** commented:

*NASA has a proud history of firsts. The idea of a helicopter flying the skies of another planet is thrilling. The Mars Helicopter holds much promise for our future science, discovery, and exploration missions to Mars. Having a helicopter will be useful in scouting out sites for further investigation by the rover. Being up in the air is a definite advantage. You can get a better overall view than from the ground or even from orbit.*

The Mars Helicopter will be a first test of this kind of technology. Weighing under four pounds, and with a body the size of a softball, the concept has already gone through four years of design, testing and redesign. Operating in Mars' thin atmosphere isn't as easy as on Earth, so the twin, counter-rotating blades will need to spin at almost 3,000 rpm, 10 times faster than a conventional helicopter. On the Martian surface, the atmosphere is equivalent to an altitude of 30,000 metres on Earth, so the helicopter needs to be able to fly in those conditions. So far, the highest altitude record for a helicopter on Earth is 12,000 metres.

The helicopter includes solar cells to charge its lithium-ion batteries and a heater to keep it warm. The 2020 mission provides a perfect opportunity to test this first attempt at Mars aviation. **Thomas Zurbuchen**, Associate Administrator for NASA's Science Mission Directorate, said:

*Exploring the red planet with NASA's Mars Helicopter exemplifies a successful marriage of science and technology innovation and is a unique opportunity to advance Mars exploration for the future.*

*NASA will conduct a 30-day flight test campaign of the helicopter. For the first flight, it will climb to about 3 metres, and then hover for about 30 seconds. If all goes well, it will take gradually longer flights, up to a few hundred meters.*

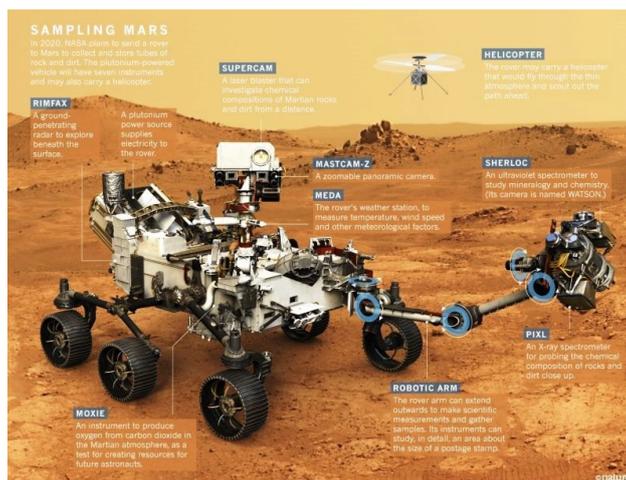
*The ability to see clearly what lies beyond the next hill is crucial for future explorers. We already have great views of Mars from the surface as well as from orbit. With the added dimension of a bird's-eye view from a "marscopter," we can only imagine what future missions will achieve.*

The 2020 rover itself will be the most sophisticated ever sent to Mars so far. While other rovers have focussed on geology and habitability, this one is designed to look directly for evidence of past microbial life on the red planet, with updated instruments, and will be the first life-focussed mission since the Viking landers in the 1970s. It will also take rock and soil samples which will be preserved in small tubes, to be sent back to Earth at a later date and test technologies which could be used for future human missions.

The rover will launch in 2020 and land in February 2021.



Artist's concept of the Mars Helicopter, which will be sent to Mars along with the 2020 rover.



Artist's concept of the helicopter at work on Mars. After deployment, it'll make a short first test flight, and then longer flights to different locations on Mars.

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