Chippewa Valley Astronomy Update *March 17, 2023 LeaderTelegram*

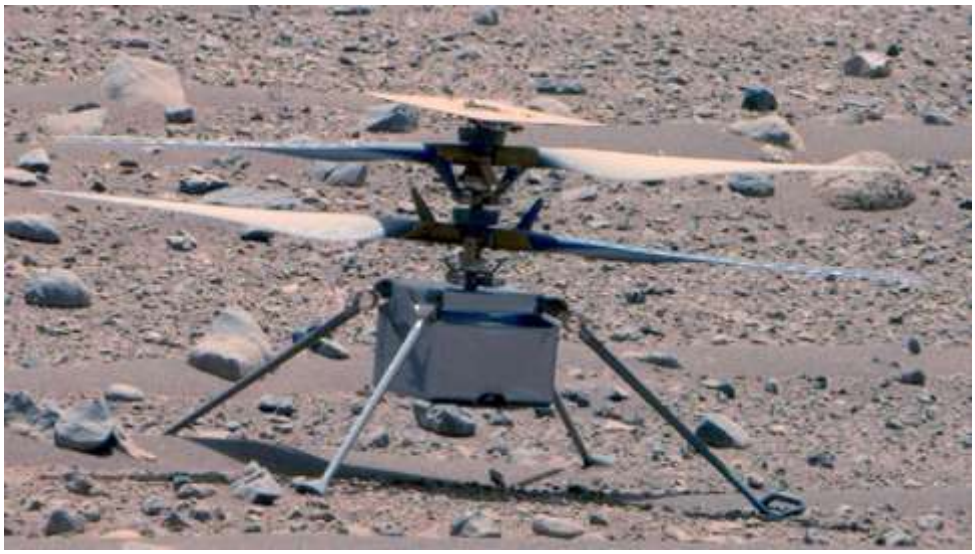

Figure Caption below

INGENUITY – THE LITTLE HELICOPTER THAT COULD - essay By Bert Moritz

Orville and Wilber Wright completed mankind's dream of powered flight at Kitty Hawk, North Carolina in 1903. But in their wildest dreams could they have ever imagined humans flying a vehicle on another planet in our solar system?

Named Ingenuity, a 4 pound, drone-like, mini helicopter with two 4-foot long blades was attached to the belly of the new Mars Perseverance Rover. On July 30, 2020 they were shot into space. Seven months later, after screaming through the atmosphere of Mars, in a maneuver engineers call "seven minutes of terror", they successfully landed and began exploring the Martian surface.

Ingenuity's only job was to demonstrate powered flight in the Martian atmosphere. Not an easy task. You see, the "air" on Mars is only 1% as thick as the air on Earth. The little helicopter needed to generate tremendous lift and careful control. There was no pilot on Mars to watch and guide its flight. Every command was given remotely from 140 million miles away!

Its first flight was only ten feet straight up, turn around once and then land. It worked! After two longer flights, its mission was accomplished – humans had actually flown on another planet!

NASA engineers and scientists pride themselves on adjusting to changing situations. With the proven success of Ingenuity's flight ability it was time to transition to a new phase of the mission.

Remember, while Ingenuity was learning to fly, the Perseverance Rover was slowly chugging along the surface exploring the Martian geology. NASA controllers must go through a very difficult and time-consuming process of deciding where the rover should go next.

How about sending the helicopter ahead to make videos of the terrain to help plot the safest and quickest course for the rover? And also study the rock formations to help choose the best targets to be tested? Great ideas!

In the past year and a half little Ingenuity has completed 38 flights! It has flown as high as 46 feet and far as 704 feet at a time. In fact, it has flown a total of almost five miles! And it is still going strong.

This little helicopter proved powered flight on another planet is possible and it is guiding Perseverance Rover across the Martian surface. Ingenuity – the well-named helicopter that could!

-- Bert Moritz is a member of the Chippewa Valley Astronomical Society

Figure Caption: This small helicopter landed on Mars with the Perseverance Rover to test out flight on Mars. It was an amazing success. This is an artist's drawing, but you can see actual images of the helicopter taken by Perseverance on Mars (and images taken by Ingenuity itself!) at mars.nasa.gov/technology/helicopter/ . Image credit: NASA/JPL-Caltech