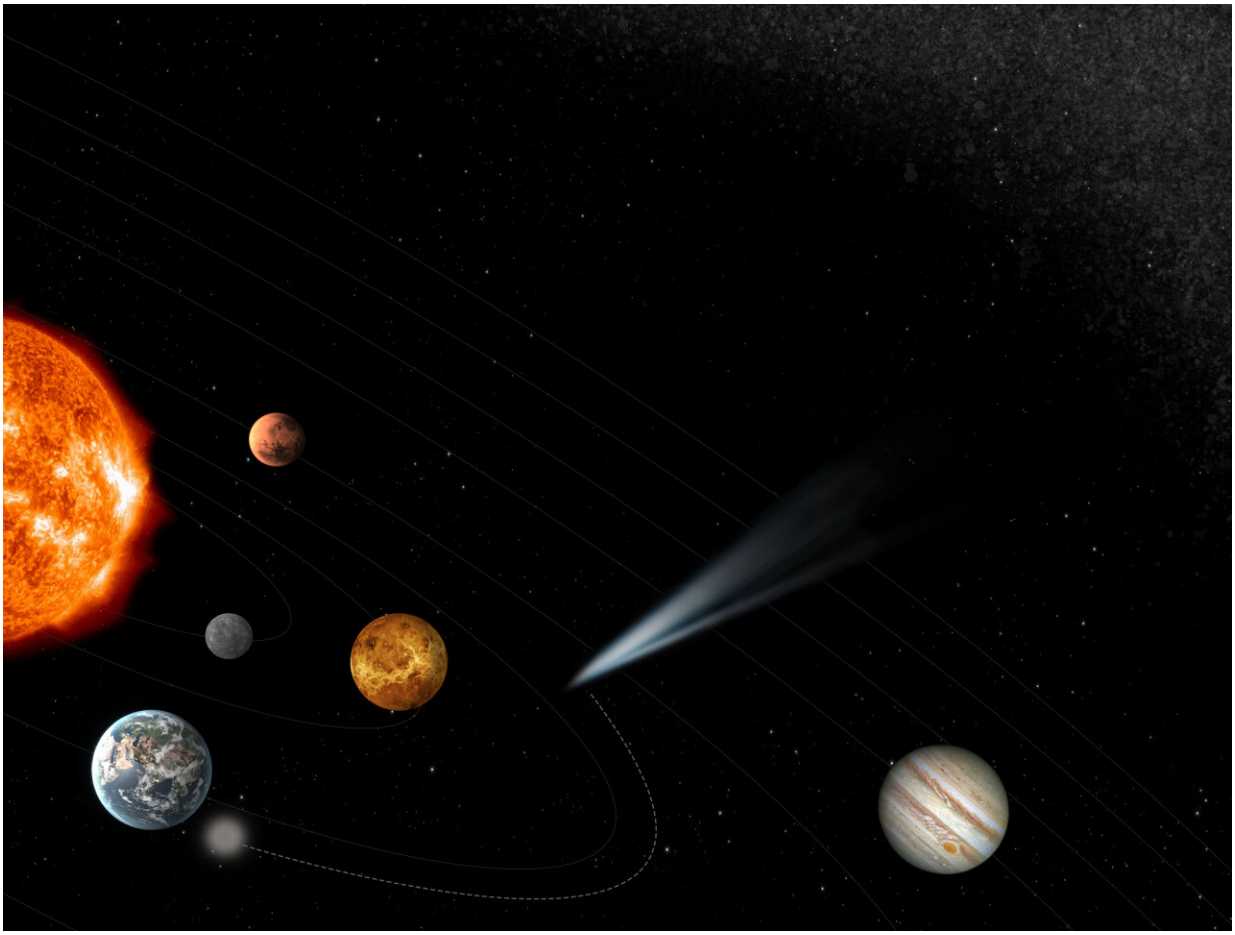
Comet Interceptor construction moves forward

December 16 2022



Comet Interceptor has been selected as ESA's new fast-class mission. It will be the first spacecraft to visit a truly pristine comet or other interstellar object that is only just starting its journey into the inner Solar System. The spacecraft will wait at the Sun-Earth Lagrange point L2, which is 1.5 million kilometres 'behind' Earth as viewed from the Sun. It will travel to an as-yet undiscovered comet, making a flyby of the chosen target when it is on the approach to Earth's orbit.

The mission comprises three spacecraft that will perform simultaneous observations from multiple points around the comet, creating a 3D profile of a 'dynamically new' object that contains unprocessed material surviving from the dawn of the Solar System. This graphic is not to scale. Credit: European Space Agency

ESA and OHB have signed a contract to move forward with the design and construction of ESA's ambitious Comet Interceptor spacecraft, planned for launch in 2029.

Unlike other missions, Comet Interceptor's target has not yet been discovered. That's because it would take too long to build a mission on the short timeframe of a potential target entering the solar system for a spacecraft to reach in time.

Instead, Comet Interceptor will be ready and, unless a suitable target is identified before launch, waiting 1.5 million km "behind" Earth as viewed from the sun (at the gravitationally stable Lagrange point 2) for a suitable comet or even an interstellar object to enter the inner solar system for the first time.

Perhaps hailing from the vast Oort Cloud of comets that surround the solar system, Comet Interceptor's target will not have undergone the same "processing" as comets on shorter orbits such as those visited by ESA's pioneering Giotto and Rosetta missions. As such the target may contain precious material surviving from the time when the sun and planets formed 4.6 billion years ago.

"Comet Interceptor's ground-breaking aims include characterizing the surface composition, shape and structure of a pristine comet for the first time ever and sampling the composition of its gas and dust coma," says

Michael Kueppers, ESA's Comet Interceptor study scientist. "Having access to this material is vital for understanding our origins, in terms of how our solar system formed and evolved over time."

Once a suitable comet or interstellar object is identified, Comet Interceptor will be deployed from its parking orbit to intersect its trajectory. The mission comprises three modules: a main spacecraft and two probes. They will separate several days prior to intercepting the comet to perform simultaneous observations from multiple angles, creating an exceptional 3D profile of the comet or interstellar object.

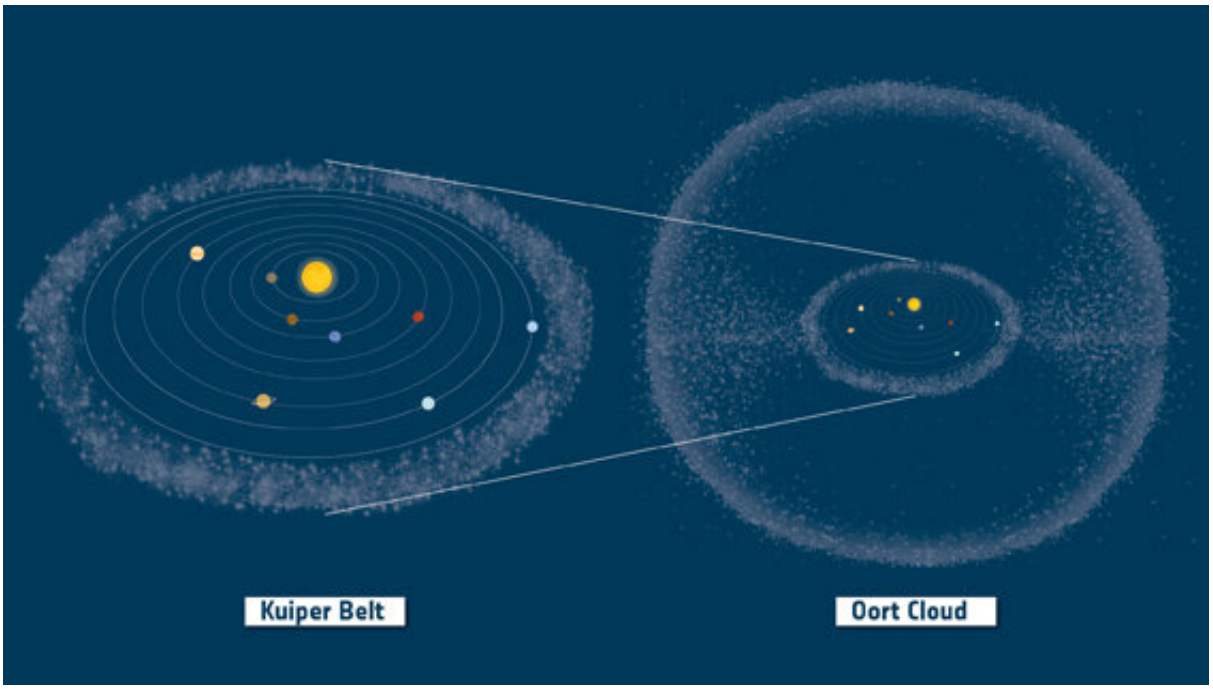


Illustration showing the two main reservoirs of comets in the solar system: the Kuiper Belt, at a distance of 30–50 astronomical units (AU: the Earth–sun distance) from the sun, and the Oort Cloud, which may extend up to 50 000–100 000 AU from the sun. Halley's comet is thought to originate from the Oort Cloud, while 67P/Churyumov–Gerasimenko, the focus of ESA's Rosetta mission, hails from the Kuiper Belt. The comet is now in a 6.5-year orbit around the sun between the orbits of Earth and Mars at its closest and just beyond Jupiter at its furthest. Credit: European Space Agency

ESA is leading the development of the main spacecraft and one of the probes, both carrying different but complementary instruments built by European scientific institutes and industry. JAXA, the Japan Aerospace Exploration Agency, is providing the other probe and its instruments.

"Comet Interceptor is an ambitious mission that requires a unique spacecraft—three novel spacecraft in fact—and after an intensive study and planning phase we are ready to start building the European elements," says Nicola Rando, ESA's Comet Interceptor project manager.

"European scientists, engineers and flight operators are set to strengthen their positions as leaders in all aspects of cometary exploration as we take this important step in building ESA's next iconic comet mission," says ESA Director of Science Günther Hasinger.

The signing of the contract was celebrated between ESA and OHB with a small ceremony at ESA Headquarters in Paris on December 15.

Comet Interceptor was proposed to ESA in July 2018 and selected in June 2019. It is an example of a "fast" development or F-class mission. Comet Interceptor is foreseen for launch as co-passenger with ESA's exoplanet-studying Ariel spacecraft in 2029.

Provided by European Space Agency

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