CubeSats offered deep-space ride on ESA asteroid probe

February 26 2015

Launching in October 2020, ESA's Asteroid Impact Mission spacecraft will be humanity's first mission to a binary system – the paired Didymos asteroids, which come a comparatively close 11 million km to Earth in 2022. The 800 m-diameter main body is orbited by a 170 m moon. AIM will perform high-resolution visual, thermal and radar mapping of the moon. It will also put down a lander – ESA's first touchdown on a small body since Rosetta's Philae landed on a comet in November 2014. Credit: APL

Think of it as the ultimate hitchhiking opportunity: ESA is offering CubeSats a ride to a pair of asteroids in deep space.

CubeSats are among the smallest types of satellites: formed in standard cubic units of 10 cm per side, they provide affordable access to space for small companies, research institutes and universities. One-, two- or three-unit CubeSats are already being flown.

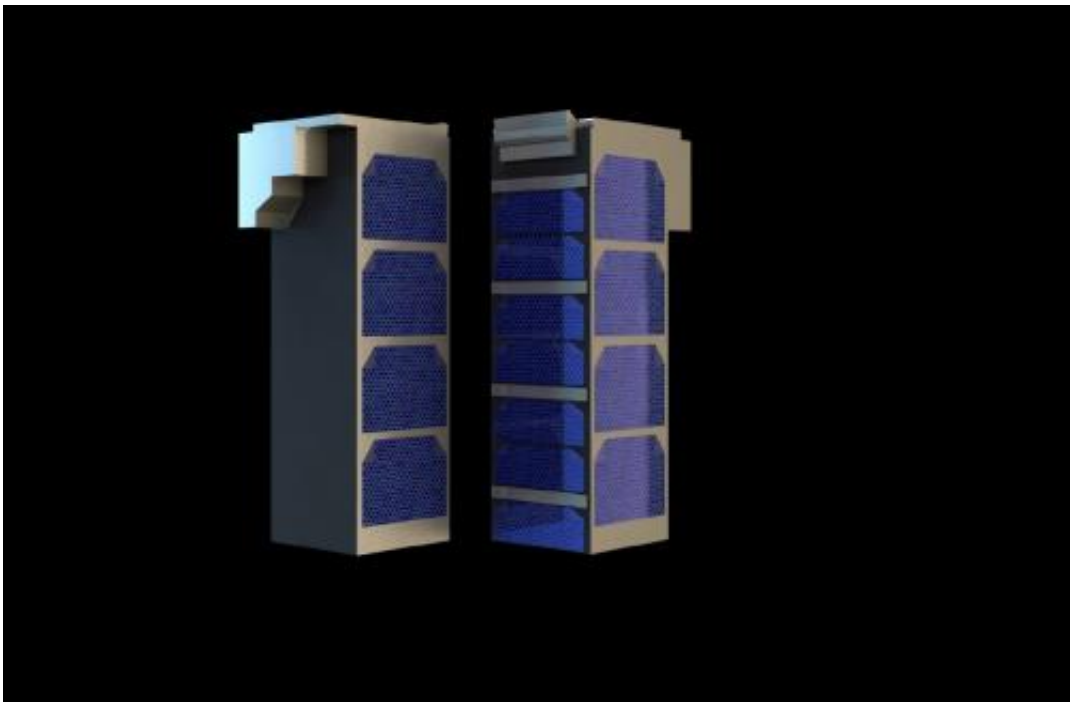
Teams of researchers and companies from any ESA Member State are free to compete. The selected CubeSats will become Europe's first to travel beyond Earth orbit once the Asteroid Impact Mission (AIM) is launched in October 2020.

"AIM has room for a total of six CubeSat units," explains Ian Carnelli, managing the mission for ESA. "So potentially that might mean six different one-unit CubeSats could fly, but in practice it might turn out that two three-unit CubeSats will be needed to produce meaningful scientific return.

"We're looking for innovative ideas for CubeSat-hosted sensors that will boost and complement AIM's own scientific return.

"We also intend to use these CubeSats, together with AIM itself and its asteroid lander, to test out intersatellite communications networking.

"ESA's SysNova initiative will be applied to survey a comparatively large number of alternative solutions, this competition framework giving industry and universities the opportunity to work together on developing their scientific investigations in a field that is the technological cutting edge."



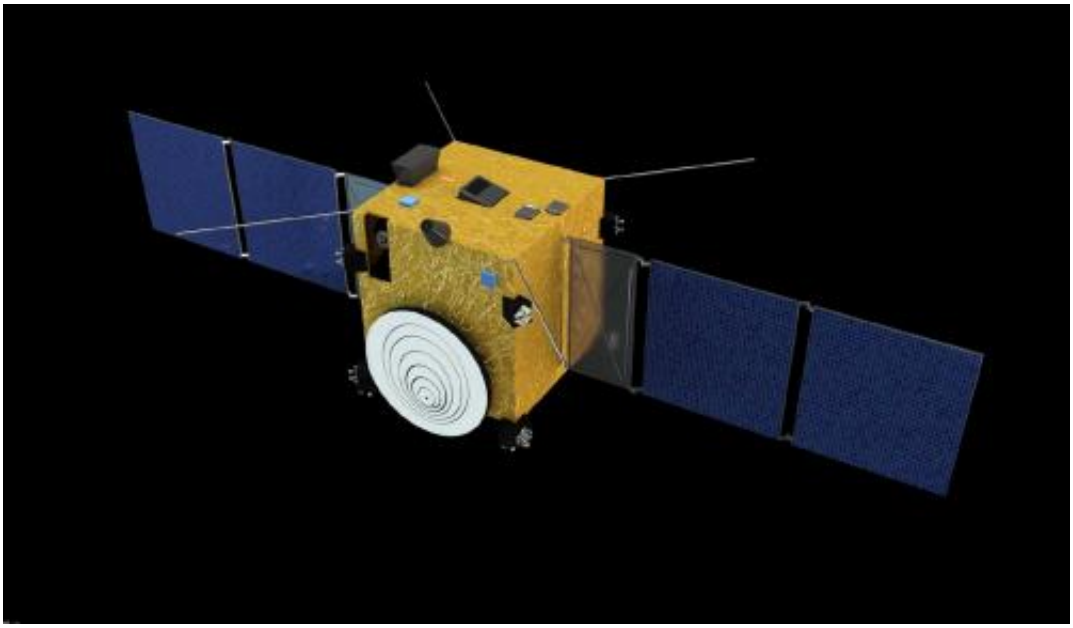
A pair of triple-unit CubeSats. ESA's 2020 Asteroid Impact Mission spacecraft will have room to carry six CubeSat units – potentially single-unit miniature spacecraft but more probably a pair of larger CubeSats as seen here. Credit: ESA / The Science Office Ltd.

Beginning its preliminary Phase-A/B design work next month, ESA's AIM spacecraft will be humanity's first mission to a binary system – the paired Didymos asteroids, which come a comparatively close 11 million km to Earth in 2022. The 800 m-diameter main body is orbited by a 170 m moon.

AIM will perform high-resolution visual, thermal and radar mapping of the moon. It will also put down a lander – ESA's first touchdown on a small body since Rosetta's Philae landed on a comet last November.

AIM also represents ESA's contribution to a larger international effort, the Asteroid Impact & Deflection Assessment (AIDA) mission.

The NASA-led Double Asteroid Redirection Test (DART) probe will impact the smaller body, while AIM will perform detailed before-and-after mapping, including pinpointing any shift in the asteroid's orbit.



Intended for launch in October 2020, ESA’s Asteroid Impact Mission spacecraft will be humanity’s first mission to a binary system – the paired Didymos asteroids, which come a comparatively close 11 million km to Earth in 2022. The 800 m-diameter main body is orbited by a 170 m moon. AIM will operate in conjunction with NASA's DART mission to form the international Asteroid Impact and Deflection Assessment mission. Credit: ESA / The Science Office Ltd.

"While it will return invaluable science," adds Ian, "AIM is conceived as a technology demonstration mission, testing out various technologies and techniques needed for deep space expeditions in future.

"These include two-way high-bandwidth optical communications – with data being returned via laser beam to ESA's station in Tenerife – as well

as intersatellite links in deep space and low-gravity lander operations.

"Once demonstrated, these capabilities will be available to future deep-space endeavours, such as Lagrange-point observatories returning large amounts of data and sample return missions to Phobos – and ultimately Mars – as well as crewed missions far beyond Earth orbit."

Provided by European Space Agency