We. Create. Space.

OHB

SPACE SYSTEMS

ASTEROIDS

A real hazard to planet Earth and an opportunity to use space resources

900 potentially hazardous Near Earth Objects under surveillance

A 20 m asteroid explosion in the atmosphere caused 1,500 injuries in 2013

1,000 asteroids discovered each year

Asteroid collisions with Earth triggered major changes in the structure and evolution of the Earth’s crust and mantle

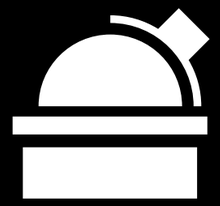
Regardless of the place of impact on our planet, an asteroid of 100 m will cause casualties. The soci-economic effects would be disastrous

Energy of an asteroid impact
›› that of a nuclear bomb

An asteroid impact caused the extinction of the dinosaurs

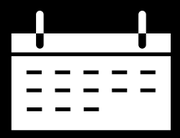
NASA'S ASTEROID IMPACT SIMULATION SCENARIO
generated within the „Planetary Defence Conference“ May 2019, Maryland USA

Overview of the individual events in the scenario:



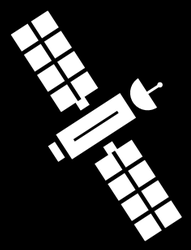
Discovery of the asteroid
140-260 m diameter

March 29, 2019



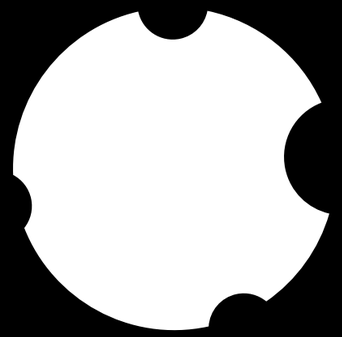
Impact predicted for
April 27, 2027 in Denver, Colorado

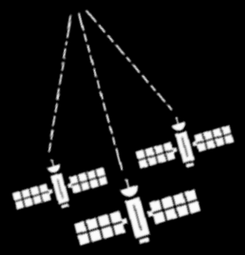
March 30, 2019



Launch of reconnaissance mission to the asteroid

2021



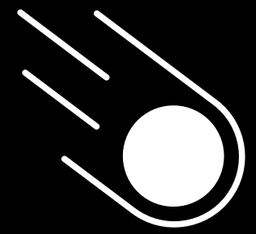


Launch of three probes for asteroid deflection

2024

50 to 80-m fragment breaks-up and moves towards the US ....

Evacuation of New York



Impacting the Earth at 69,000 km/h (releasing up to 200,000 TNT energy), the asteroid damaged an area of 82 km² and led to € 1.8 trillion losses. No one survived in this area.

Asteroid impacts Manhattan

April 29, 2027

Asteroid impact is not science fiction. It happens!

- In 2013, a 19-m diameter asteroid burst over the city of Chelyabinsk, Siberia: The large shock wave released 30 times more energy than the Hiroshima bomb. Over 1,600 people were injured and over 7,200 buildings damaged by the blast.
- In 1908, an asteroid impacted Tunguska, Siberia, and levelled more than 2,000 km² of forest. Had the impact happened two hours later, St Petersburg would have been destroyed.
- In 2018, the 48-110 m diameter asteroid 2018 GE3 was detected only 21 hours before it came within 192,000 km of the surface of our planet, namely half the distance Earth-Moon

How can we protect ourselves from these potentially disastrous events?

Asteroid impact is the only natural disaster that can be predicted and potentially avoided by human action. This can be achieved through:

Detection and identification of objects in space. The smaller they are, the closer to Earth they have to be in order for us to detect them. The Fly-Eye telescope developed by OHB Italia will contribute to early-warning as it will detect objects > 40 m in diameter three weeks before threatened impact.

Testing the most efficient asteroid deflection technology (kinetic impactor) and gathering all data necessary by investigating the asteroid so that the results can one day be applied in a real-case scenario.

Further information on this topic can also be found here:

NASA

ASTEROID DAY 30 JUNE

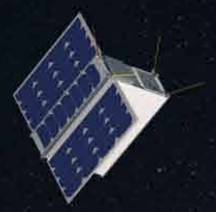
OHB

esa

OHB System AG
is sponsor of Asteroid Day 2019

PROTECTION OF THE EARTH BY ASTEROID DETECTION & DEFLECTION

DART & HERA: Pathfinder missions by NASA and ESA



NASA and ESA work on DART and HERA missions to test asteroid deflection technologies and improve our knowledge about asteroids in space. Operated independently, their combination will boost the scientific and technological return of both missions. Open data access between NASA and ESA will allow German and European institutions to prepare not only for future deflection missions, but also for in-situ resources opportunities.

DART

Launching 2021, NASA's Double Asteroid Redirection Test (DART) mission will demonstrate the kinetic impactor technology when impacting the asteroid Didymos B (dubbed "Didymoon") in Fall 2022. Telescopes on Earth will determine and measure the effects of the impact.

HERA

HERA is the second part of the mission led by ESA. It will launch in 2023 and conduct a survey of both asteroids, with a focus on the crater left by DART. HERA will also deploy the first two European deep-space CubeSats to gather data on Didymos B and its surroundings, delivering key information on the impactors energy transfer into the deflection. Hera will demonstrate new key technologies for vision-based close-proximity navigation, enabling future space systems to autonomously inspect low-gravity bodies in space. It will also deliver complementary observations, improving our knowledge of the evolution of the solar system.

Scientific returns from HERA include:

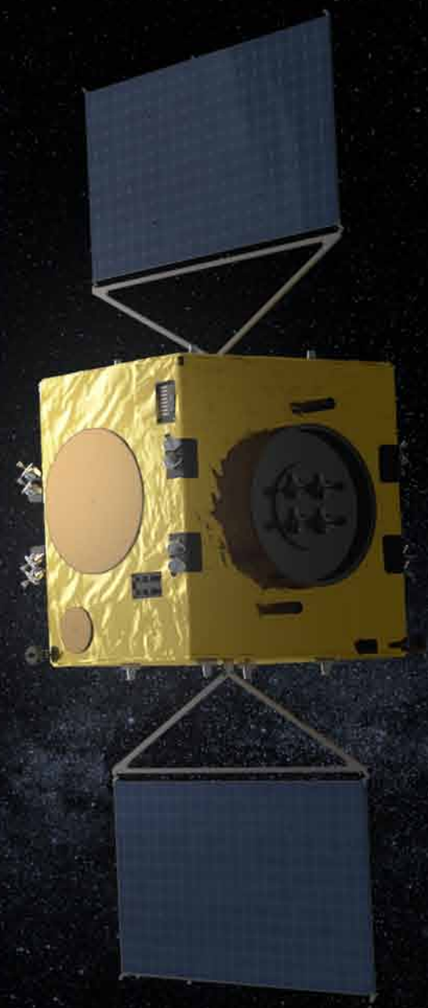
- First ever detailed images of a binary asteroid in orbit
- First ever images and in-situ compositional analyses of the smallest asteroid ever visited, enabling the determination of its geophysical and compositional properties
- Understanding of the physical and compositional properties as well as the geophysical processes
- Validation of hyper-velocity numerical impact codes that are used in planetary science, such as planet and satellite formation, impact cratering and surface ages, asteroid belt evolution.

The numerical codes validated by HERA could revolutionize the way the formation of the solar system is described!

HERA will also generate vital knowledge for further technology developments necessary to protect the Earth from potentially hazardous Near-Earth Objects, e.g. kinetic impactor technology for asteroid deflection.

As additional benefit, HERA will be the stepping stone for future asteroid mining mission testing technologies that will enable future space systems to interact with such space objects.

HERA will enable the European industry to maintain a worldwide leadership and demonstrate unique capabilities in space. It is a unique opportunity for Germany to prove its leadership in innovative and advanced technologies, to engage scientific education and innovation, as well as inspire citizens worldwide.



Picture courtesy ESA

About OHB System AG

OHB System AG is one of the three leading space companies in Europe. It belongs to the listed high-tech group OHB SE, where around 2,800 specialists and system engineers work on key European space programs. With two strong sites in Bremen and Oberpfaffenhofen near Munich and more than 35 years of experience, OHB System AG specializes in high-tech solutions for space. These include small and medium-sized satellites for Earth observation, navigation, telecommunications, science and space exploration as well as systems for human space flight, aerial reconnaissance and process control systems.

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