ABOUT **ROADS on Asteroids**

The ROADS on Asteroids mission

Teams will plan and simulate a mission to the "snowman" feature on the asteroid Vesta (see Figure 1.1). The mission will include an impactor from height onto the surface, drone landing and takeoff, and robotic navigation across potentially hazardous surfaces to look for the building blocks for life.

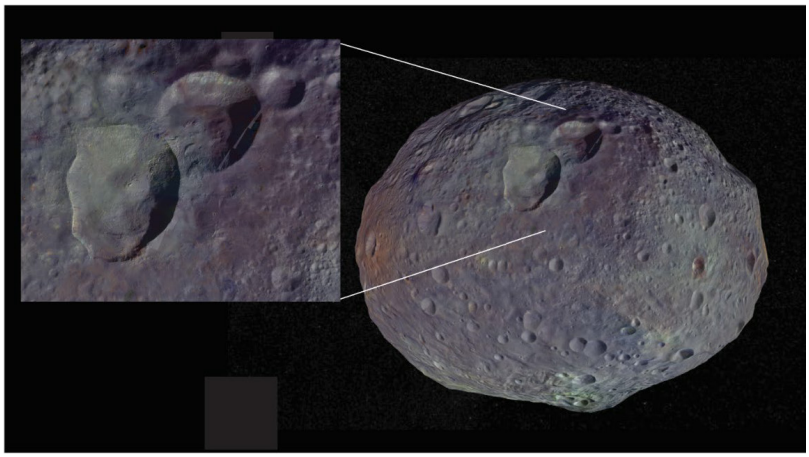

Figure 1.1: The craters on Vesta that form the snowman feature.

Relevant NASA Missions

ROADS on Asteroids focuses on developing and executing a mission to the asteroids — specifically to Vesta in the asteroid belt. Each Mission Objective is designed to involve students in NASA science mission design and execution. ROADS on Asteroids is also aligned with Next Generation Science Standards, creating a fun, hands-on activity that helps students meet many NGSS requirements and thereby helps them to be more successful in their studies.

ROADS on Asteroids takes elements from four current or future NASA missions. Images for these spacecraft images are shown in Figure 1.2.

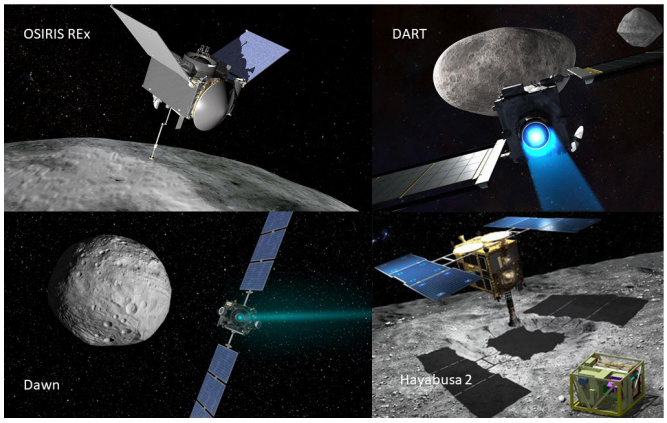

Figure 1.2: Current missions (OSIRIS REx, Dawn, Hayabusa 2) and DART to be launched in 2021.

1. Dawn (mission to Vesta and Ceres)
2. Hayabusa 2 (mission to Ryugu) ▸ Explore the surface of Ryugu
3. OSIRIS REx (mission to Bennu) ▸ Explore the surface of Bennu
4. DART (mission to Didymos)

Images from Dawn will be used for mission planning and to explore how scientists interpret data from spacecraft to create maps and to understand processes that have occurred (topics: communications, Earth sciences). Concepts from Hayabusa 2 and OSIRIS REx will be used to investigate the importance of taking local samples, how to the interpret the data, and what the data means for both the search for the building blocks of life and robotic exploration (topics: astrobiology/biology, robotics, programing). Finally, from the Hayabusa 2 and DART missions, the challenge will incorporate the principles involved in impacting a rocky object (topic: planetary geology). Complete details on each Mission Objective are found later in the manual.