

Exploration of Near-Earth Asteroids (4)  
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MINING OF NEAR-EARTH ASTEROIDS AND EXPLORING THEM FOR FUTURE HUMAN SPACE  
MISSIONS

**Abstract**

Asteroids and comets impact are not uncommon in the solar system. The earth is continually hit by small objects (meteorites) and occasionally by larger (asteroids). Asteroid impact is still the main theory for the cause of mass biological extinction of cretaceous period- including the extinction of dinosaurs. The near-earth asteroids or NEAs are the one that travel to within 1.3Au (195 million km) of the sun. NEAs are 872 in numbers as per 2015 and are classified into three groups or classes Amor, Apollo and Aten. Scientist are working to identify NEAs with a diameter of 1km or more that which pose a danger of colliding with the earth. Asteroids that are larger than 150m across and that travel closer than 7.5 million Km to the earth are called potentially hazardous asteroids (PHAs). Finding these PHAs does not mean that these asteroids will impact the earth, but these are the asteroids that need to be tracked and monitored. Learning more about PHAs could help humans learn to deflect them and protect earth. The main purpose of exploring these NEAs is for mining. Visiting an asteroid will provide valuable mission experience and prepare us for the next steps-possibly for the first humans to step on Mars. By visiting these near-Earth objects to study the material that came from the solar nebula, we can look for answers to some of humankind's most compelling questions, such as: how did the solar system form and where did the Earth's water and other organic materials such as carbon come from, it may be pioneer in unlocking mysteries about our solar system and the origin of earth. By understanding more about asteroids, we may learn more about past Earth impacts and possibly find ways to reduce the threat of future impacts. Future robotic missions to asteroids will prepare humans for long-duration space travel and the eventual journey to Mars. Robotic missions will provide reconnaissance information about asteroid orbits, surface composition, and even return samples to Earth for further evaluation. These robotic missions are a critical step in preparing humans to visit asteroids where we will learn about the valuable resources available in space, and further develop ways to use them in our quest for more efficient and affordable exploration. When combining both human and robotic exploration methods we will use technology and our senses to increase our ability to observe, adapt, and uncover new knowledge.