

GLOBAL FRIENDSHIP THROUGH SPACE EDUCATION

YEAR 9, ISSUE 07
JUNE 13, 2016

ASTRO NEWSLETTER

Welcome again space adventurers! In this issue of Astro, we wanted to share some information about Asteroid Mining and its future.

Asteroid mining is the exploitation of raw materials from asteroids and other minor planets. These raw materials could be used in space as construction materials and rocket propellant or they could be taken back to Earth. At the moment, terrestrial mining is the only way we acquire raw minerals. Since current space transportation costs are very high and extraction techniques are still being developed, it looks like we will have to wait awhile before asteroid mining becomes reality.

On the other hand, Asteroid Mining is becoming a hot topic and many countries along with their space agencies are starting to focus more and more on this issue. For example, United States President Barack Obama has signed a law that legalizes commercial asteroid mining. So U.S. citizens will get to own asteroid resources they obtain in space. This law also encourages the commercial exploration and utilization of resources from asteroids. One of Europe's smallest states, the Grand Duchy of Luxembourg, recently announced it would draw up a law to facilitate mining on asteroids. Two US companies have already established "legal entities" in Luxembourg. They are Deep Space Industries and Planetary Resources. Planetary Resources deployed its first spacecraft from the International Space Station last year. Their goal is to transform asteroid water into rocket fuel, and harvest valuable and useful platinum-group metals from space rocks.



Some scientists do not see asteroid mining as cost-effective missions. The upcoming NASA mission OSIRIS-REx, which is planned to return just a minimum amount (60 grams) of material (but could get up to 2 kg from an asteroid to Earth) will cost about US\$1 billion. New technologies that bring the cost of space flight down have to be developed. Also scientists believe fuel costs can be reduced by extracting water from asteroids and splitting it to hydrogen using solar energy.



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One of the benefits of using resources from space is the ecological benefits. The mining we do on Earth has serious ecological impact on our planet. Mountains vanish away as we mine them for raw materials. With space mining, we wouldn't disturb the ecological balance of Earth. Asteroids are rocks out of the ground already floating in space. We just need to be careful not to excavate them in orbit incase some of the rocks pass through our atmosphere.



PSSP & FEP

Digital Learning Center Continues Full Speed

Since autumn of 2014, Space Camp Turkey's Digital Learning Center (DLC) has been taking an active role in the Partner School Science Program (PSSP) and Future Explorers Program (FEP). During 2014-2015, DLC has hosted 49 videoconferences with schools participating in PSSP and FEP. This year, the total number of videoconferences has increased to 89! We would like to take this opportunity to thank all the schools, teachers, and students that participated in our programs for their contribution and great effort. We have witnessed some amazing creativity and restored hope for the future thanks to this wonderful young generation.



Şişli Doğa College, İstanbul



TÜZYEV-Mozaik, İstanbul



MEF, İstanbul

ASTRONOMY PICTURE OF THE DAY



A Roll Cloud Over Uruguay

Credit & Licence: Daniela Mirner Eberl

Explanation: What kind of cloud is this? A type of arcus cloud called a roll cloud. These rare long clouds may form near advancing cold fronts. In particular, a downdraft from an advancing storm front can cause moist warm air to rise, cool below its dew point, and so form a cloud. When this happens uniformly along an extended front, a roll cloud may form. Roll clouds may actually have air circulating along the long horizontal axis of the cloud. A roll cloud is not thought to be able to morph into a tornado. Unlike a similar shelf cloud, a roll cloud is completely detached from their parent cumulonimbus cloud. Pictured above, a roll cloud extends far into the distance in 2009 January above Las Olas Beach in Maldonado, Uruguay.