



EOS, Inc. Astro-Mining Macro-Project Proposal



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Mission Statement

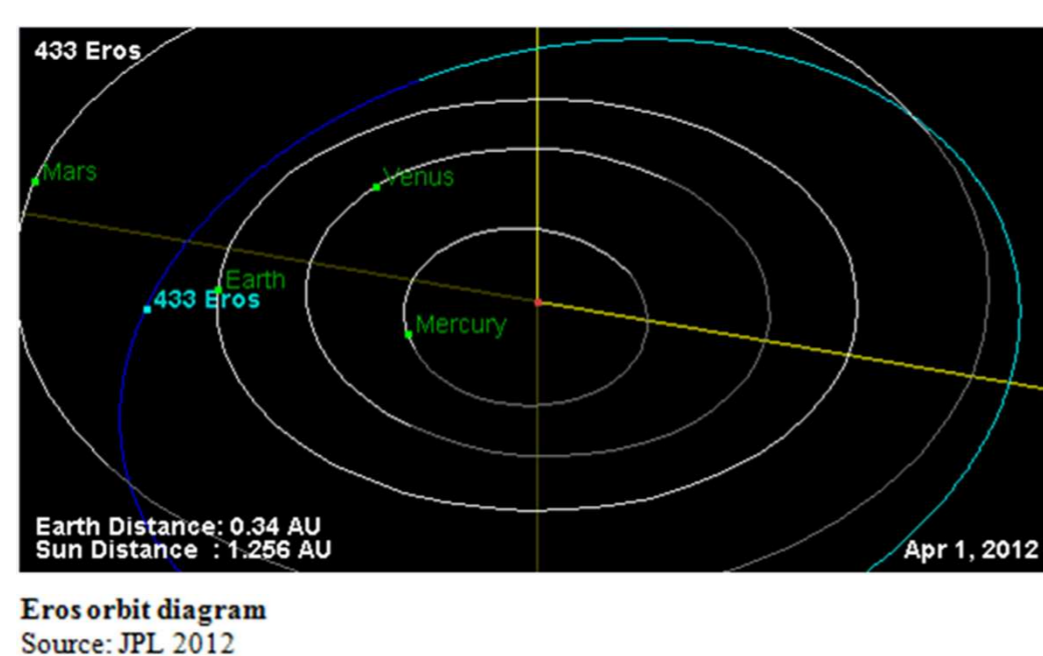
EOS, Inc. Mission Statement:

To enhance and extend the quality of life on earth by developing new resource streams from the mining, recovery and return of resources from Eros or other Near Earth asteroids.

Objectives

Resources on the planet Earth are finite and becoming increasingly scarce as the population and consumption increases. Extraterrestrial bodies such as asteroids have the potential to provide massive quantities of valuable minerals, and such bodies can serve as vehicles to expand the supply of terrestrial minerals and economic expansion. Particularly, extraterrestrial deposits of platinum-grade metals (PGMs) found in asteroids offer fantastic opportunities to enhance economic growth, foster new levels of global cooperation and provide a path forward for future expansion into outer space via for-profit enterprise.

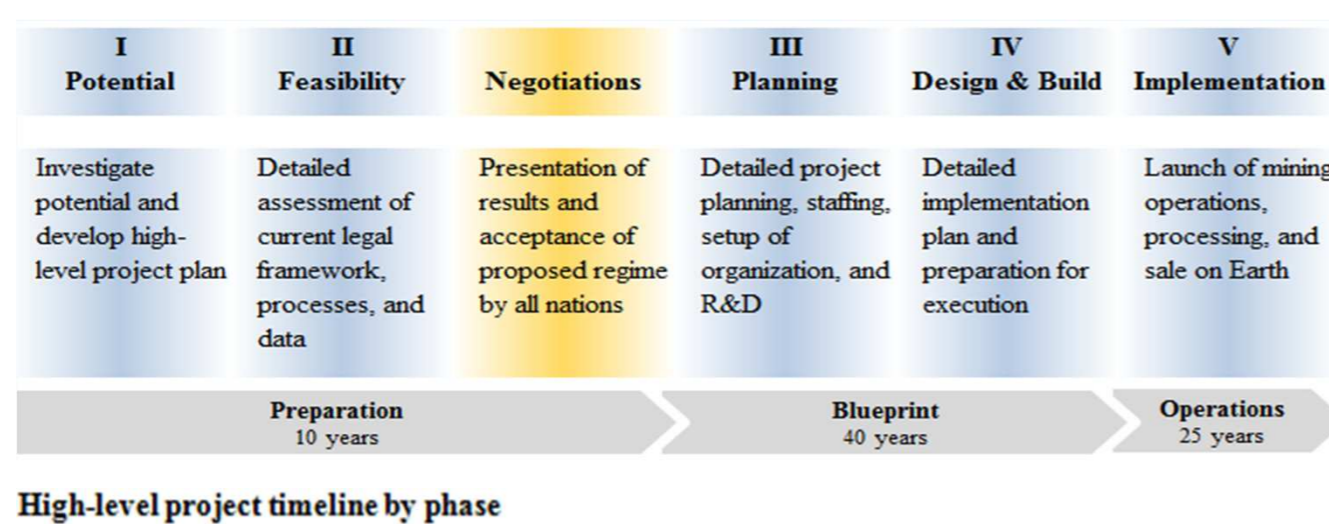
EOS, Inc. is a non-governmental, trans-national institution which, with backing from the United Nations, is charged with the development and implementation of an astro-mining macro-project to recover and distribute PGMs from Eros. In doing so, EOS, Inc. intends to enhance and extend the quality of life on Earth.



Overview

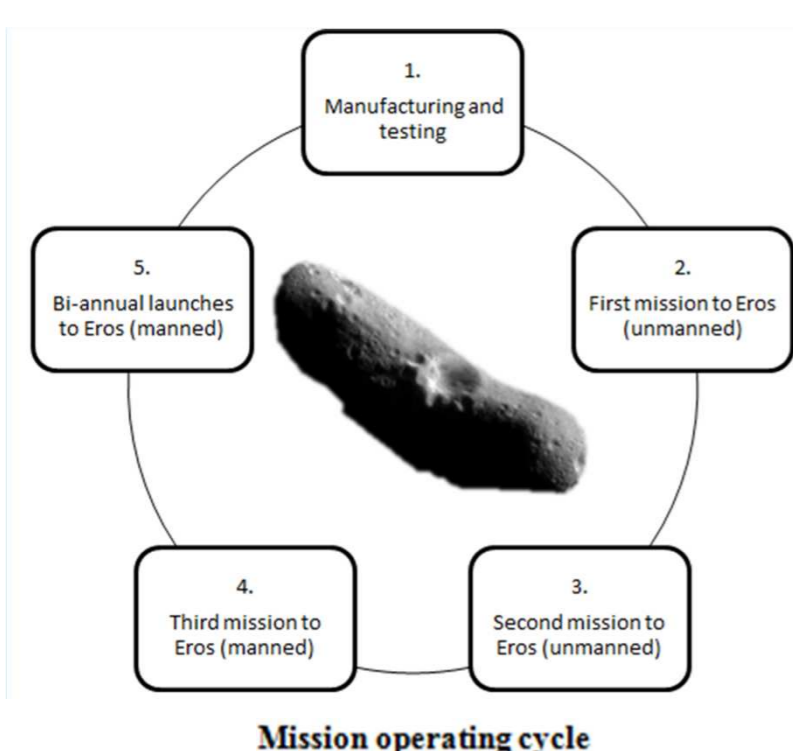
The EOS, Inc. vision is to assemble a global consortium capable of the development and execution of a macro-project to enable extraction of natural resources from asteroids, in order to locate and recover enough raw materials to create a sustainable alternative which maintains a steady supply for an ever-growing demand for natural resources on Earth.

The duration of the proposed astro-mining macro-project is 75 years from the examination of feasibility to the first sale of returned mineral resources in the global market.



Mining Process

Two main types of mining techniques could be used in the astro-mining macro-project on Eros. Both methods—underground extraction and in-situ drilling—offer a unique set of risks and benefits in this regard. EOS, Inc. has selected the in-situ drilling method.

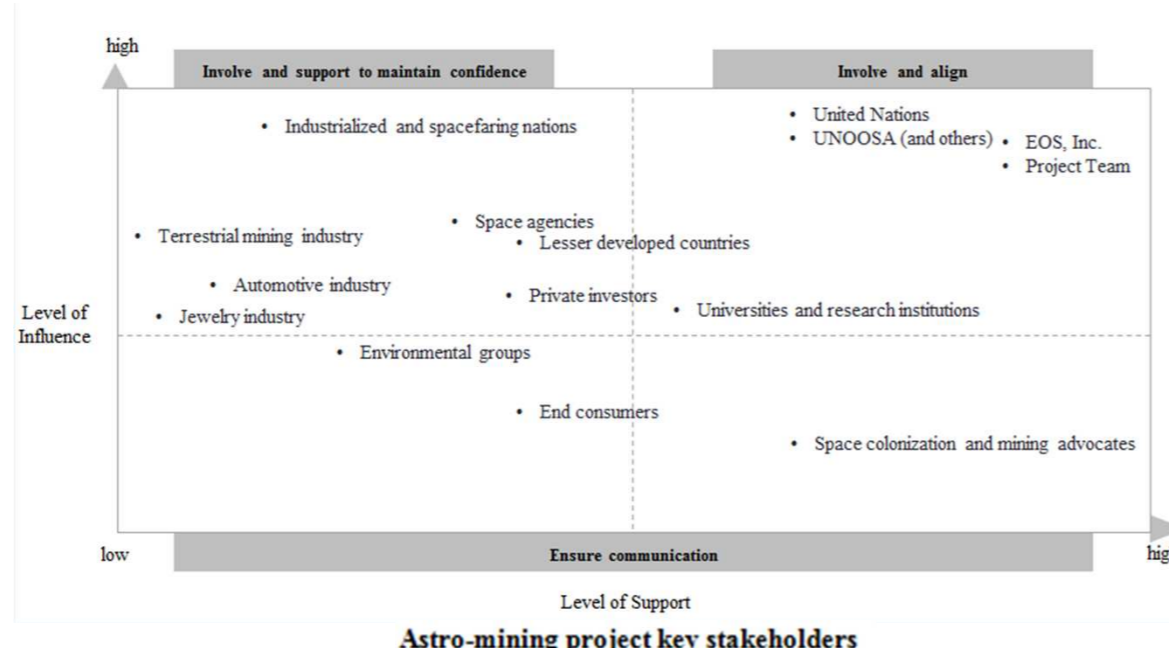


The “in-situ” method and it involves very high-pressure drills that extract minerals from the inner cavities of the asteroid. It is less complicated than traditional underground mining and would require less equipment than the tunnel construction. Additional benefits of the in-situ drilling method include less need for transportation human interaction in the actual mining process. The refining process is also much less complex than underground mining, since there is no need to crush, grind, or separate the minerals extracted.

The drill itself is “a reaction vessel,” so there are fewer steps in the process and less machinery required to refine the extraction. The most likely risk to such a method would potentially occur if debris clogs the drilling system. Also, mechanical components could be negatively affected by temperature changes.

Stakeholder Management

Mega-projects are classified as projects with an estimated total cost of at billions of dollars, with a high level of interest by the public. If not promoted and publicized effectively, global macro-engineering projects can ultimately portray negative influencers such as implied control over society at large.



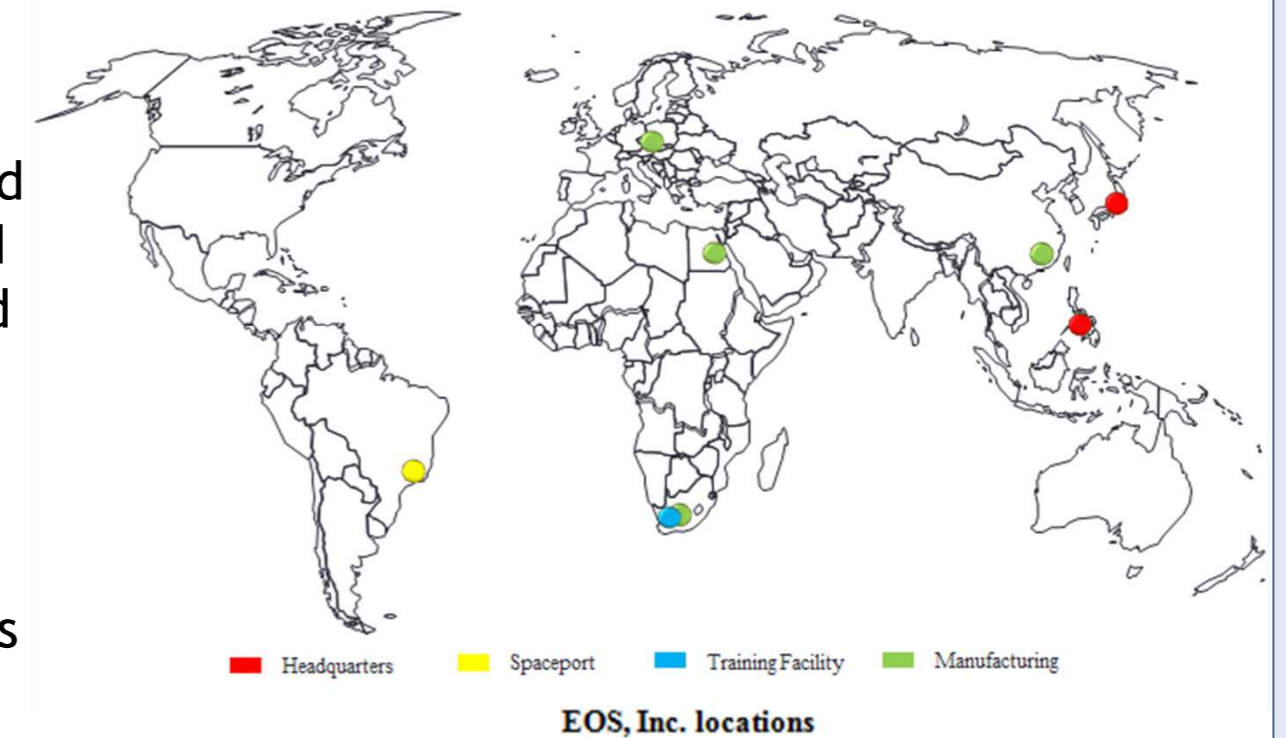
Proposed Regime and Organization

The development of a complete system to discover and recover potential resources from targeted extraterrestrial bodies, such as Eros, is very complex. A project of the magnitude being proposed by EOS, Inc. will require unprecedented levels of international cooperation. Therefore, EOS, Inc. believes that, in order to accomplish such an undertaking successfully will require a new paradigm in the realm of international cooperation and regime formation.



EOS, Inc. headquarters will be located in Japan. Japan is considered a trans-socio bridge between the east and west, developed and developing countries and free-market and centralized economies. Japan also has long-term experience in managing and executing global macro-projects. The spaceport shall be in Brazil, primarily because of access to affordable labor.

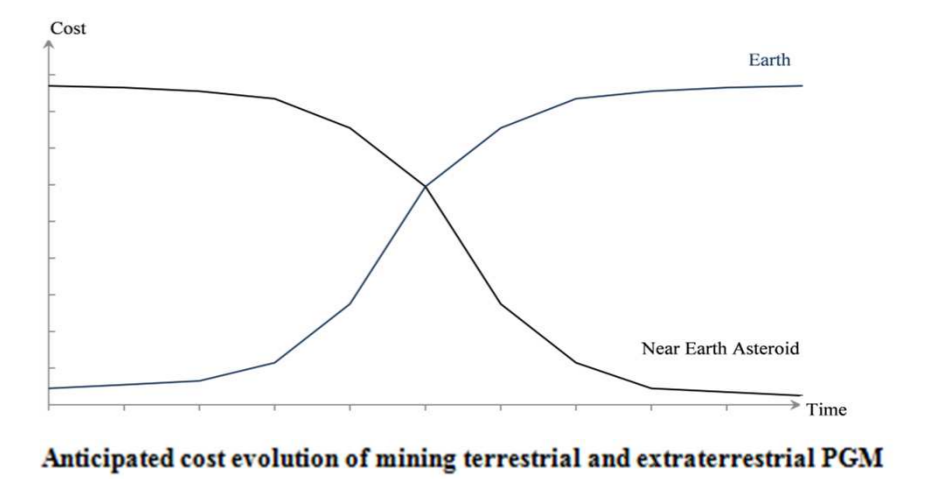
Future manufacturing facilities in China, Czech Republic, Egypt and the Middle East, Central Africa and South America will be constructed accordingly for manufacturing and finishing purposes. EOS, Inc. has selected areas of relatively large population and lesser-developed country (LDC) status in order to bring economic and social benefits to these areas.



Feasibility

At present, mining asteroids is not economically feasible, as scientific data on the composition of asteroids is largely based on estimates and costs for research, development, the required equipment and transportation are prohibitively high. However, the project team believes that in the long-run, resources from outer space will become essential to meeting increasing world resource demands. Over time, the mining of asteroids containing PGM will become more feasible and beneficial than the extraction of PGMs from the Earth’s crust.

As demand for terrestrial PGM resources increases, terrestrial mining activities require an increasing amount of effort to expand existing mines and access additional deposits, often located extremely deep in the Earth’s crust.



	Composition		Market Value	
	grams	troy ounces	price in USD ¹	Total USD
Ruthenium	192,226,038	6,180,211	197	1,217,501,567
Rhodium	36,697,698	1,179,858	2,458	2,900,090,964
Palladium	147,664,547	4,747,525	526	2,497,198,150
Iridium	134,558,227	4,326,147	642	2,777,386,374
Platinum	276,106,491	8,877,030	1,611	14,300,895,330
Total	787,253,001	25,310,771	5,434	23,693,072,385

¹ average market prices per ounce in 2010

Estimated market value of 433 Eros PGMs
Sources: AbundantPlanet.org, 2009; JohnsonMatthey, 2011

Overall, demand for PGMs is expected to further increase as technology advances and the growing industrial sector in developing and nations create additional demand.

Cost-Benefit Analysis

The overall costs of the project are estimated to amount to 5 trillion USD. This takes into consideration all costs for the design, development, testing and launch of planned missions, both manned and unmanned, personnel, training, and setup of proposed locations. Further, forecasts consider the costs of comparable mining projects on Earth as well as mission to celestial bodies.

The valuation of social costs and benefits resulting from areas such as employment, environment, and human life has been considered in an attempt as to neither over- nor understate said impacts.

Year	Project Phase	Cost in billion USD	Benefits in billion USD	NPV @ 50% in billion USD
10	I Potential			
	II Feasibility	(0.5)	0.0	(0.1)
	III Negotiations			
40	IV Planning	(3,450.0)	0.0	(172.5)
25	V Implementation	(1,549.5)	18,000.0	1,316.0
75	Total	(5,000.0)	18,000.0	1,143.4

Net present value calculation

The project team calculated a positive net present value of 1.14 trillion USD. Therefore, the team strongly recommends the implementation of the EOS, Inc. Astro-Mining Macro-Project.

The Authors



The project was completed as part of the MBA 596 International Regimes and Macro-Projects class taught by Dr. D. J. Kranioiu at Point Park University in Pittsburgh, PA during the Spring Semester 2012.