Asteroid Mining Mission

Do we send a spacecraft or do we “bring” the asteroid nearer earth and then send a smaller spacecraft?

Even if we brought the asteroid to an orbit nearer Earth, in what distance would it be safe to bring it in order to exploit?

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Let’s say we send a bot to the asteroid.Is it possible a swarm of robots to do the job collaborating with each other?These robots would be enough complex.More likely that a “mother spacecraft” gives directions.

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Let’s stick to the scenario that a “mother spacecraft” maps the region at a specific radius around Earth to locate asteroids.In that case can asteroid trajectories be tracked?

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“Mother spacecraft” in orbit around Earth

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Consider some asteroids are traced (medium distance between them 966,000km!)

“Mother spacecraft” should be able to “decide” to which robot(s?) should be sent (based on Dr. Elvis equation or other similar equation probably).

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Which bot to send?The idea of swarm of robots questioned to some extent.Aren’t swarm robots somewhat similar?Thought that robot characteristics will differ first of all regarding what we want to extract from asteroid surface (maybe water mining robots smaller e.g., etc).BUT, swarm of swarms could work, swarm of water mining robots along with swarm of metal mining robots.In the end, how many should be sent to one asteroid?”Mother spacecraft” programmed to “decide” or human intervene?(Generally, where human intervene?)

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Bot held with some kind of hooks on asteroid surface?Could moons around some asteroids make the mission more difficult – the asteroid more difficult to reach?(!)Could the moons be put in another orbit not so near to the asteroid?Should the asteroid be left unexploited?Cost?Moons around asteroids “drain” asteroids (search!!!)

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Before sending robots to asteroid to exploit its surface calculations should be made regarding possible obstacles “on the road”.Maybe collision with other asteroids or other near-earth objects.

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Regard mission of sending bots begins successfully.

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Gravity assist to pick up speed followed by a change in trajectory leading to asteroid.

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In most of cases bots should be synchronized with rotation of asteroid aligned with its rotation axis (further investigation!).Questions arise if from that region the asteroid could be fully exploited – to put it more generally to what extend could it be exploited?

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Bot with thrusters on asteroid surface.”One bot working at a time?”First mine water and then metals (if in some asteroid we find both)?First metals, then water (further investigation!)?

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Water mining procedure thoughts

-Protection of the electronics of the bot.

-“Vessel” to carry the water (water in compounds actually found on asteroids).

-Size, volume, weight of bot.

-Water processing.

Metal mining procedure thoughts

-Protection of robot in general (couldn’t metal mining even destroy it?)

Proposal: something like “vacuum cleaner mechanism”?! may be applied to lead metallic pieces to specific location to gather maybe.

-“Vessel” to carry compound or pure metal?

-“Cleaning” metal procedures (separation procedures from compound (further investigation – use of earth-used techniques applicable more likely to some extent).

-Use of canopy so as not to produce debris and loose precious material.

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What to send back to Earth?The full mission?The robots operating the specific procedures?The “vessels”?(In last case, necessity for leveled mothership – “grandmother spacecraft” located on Earth(?)🡪”mother robots” miners, etc. 🡪”daughterly vessels” returning to Earth before robots – “return of robots ends mission).

**Random questions that arise**

-Robots and vessels can be reused?How many times each?Then?

Suggestion (without investigation): Recycling (How?)

-Should plant be created on larger asteroid surfaces or useless?(More leveled mothership?! :

“Great grandmother spacecraft” located on Earth 🡪 “Grandmother plant” on asteroid 🡪 “ Mother robots” operating minings, processing etc. 🡪 “Daughterly vessels” carrying the materials.

*Actually, quite utopic.Due to near-zero gravity.Some kind of hook attachment to the asteroid could possibly destroy the asteroid.*

“The important thing is not to stop questioning. ”( Albert Einstein)