

Video 17: StarTram and the Deep Underground Concept

In one of the previous videos, we mentioned that the Deep Underground concept cannot be directly applied to underground construction for cars and high-speed railways. This is generally true, but in one particular case, we might at least partially ignore basic postulates of the Deep Underground concept and build a high-speed facility for a special purpose.

The StarTram concept was proposed in the late 20th century to overcome the limitations of conventional rocket-based space launch systems. StarTram envisions a magnetic levitation launch system capable of catapulting payloads into space at high speed.

The proposed system consists of a long vacuum-sealed tunnel, where a maglev track supports the spacecraft to enable ultra-fast acceleration. As the spacecraft is propelled along the track by a succession of electromagnetic pulses, it gradually gains velocity until it reaches escape velocity, enabling it to break free from Earth's gravitational pull and enter space.

The key advantages of the StarTram concept are its potential to significantly reduce the cost of space launches by using fewer resources and its potential to increase the frequency of the launches.

However, the StarTram concept also faces numerous technical and logistical challenges, which include designing a robust and reliable maglev track capable of withstanding the extreme forces involved in launching payloads into space.

This figure shows a StarTram built according to the Deep Underground concept. We start with shaft excavation with a distance of 1 kilometer between shafts to be continued with tunnel excavation, exactly in the same way as we saw in the video about transport. Simultaneously, an underground geothermal power plant can be constructed. The excavated material can be used for molehill construction at the surface.

The facility should be constructed at a high level to decrease air friction and resistance at projectile launch.

So, how can the Deep Underground concept help build such a facility?

Starting construction at many places at the same time can save a lot of time compared to traditional construction.

High-altitude construction is always a challenge. Less and more simple mechanisation provided from the Deep Underground concept makes construction possible in such conditions too.

A geothermal power plant can provide all the energy needed to run such a facility.

Living at a high altitude is not easy because of the low percent of oxygen. Molehills can provide an environment with a normal level of oxygen and normal living conditions for those running the facility.

Shafts can be used to pump air out of tunnels to establish a vacuum for each short section of the tunnel, which would make this task much easier.

Once we construct the shafts, we can build several lines simultaneously. The result is the multi-lane StarTram, which can rapidly improve the capacity of such a facility.

So, the Deep Underground concept doesn't solve all problems, but it makes such a facility easier and less expensive to construct.

It is clear that rocket transport has its limitations, including the amount of cargo that could be transported and the price for cargo transportation. The StarTram, constructed by the Deep Underground concept principles, might be a good alternative that is worth some deviation from the Deep Underground basic principles.