

EXPLORING VENUS TOGETHER TURBOREACTINE

SOLAR & WIND TURBINE POWERED MECHANICAL ENERGY STORAGE SYSTEM



DAWID INGLOT / JOLANTA GORAJ / EWA ANTKOWIAK / PAWEŁ KLUPŚ / GABRIELA GAJDA / MICHAŁ UNGEHEUER



Problem

Venus is one of the most hostile planetary environments in the solar system

Temperature



Pressure



Atmosphere



sulfuric acid

Many classic engineering solutions will simply fail in such conditions

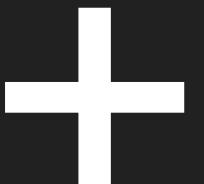
Challenge

Design energy system storage system that will work in such adverse atmospheric conditions over long period of time

Idea

scope of application

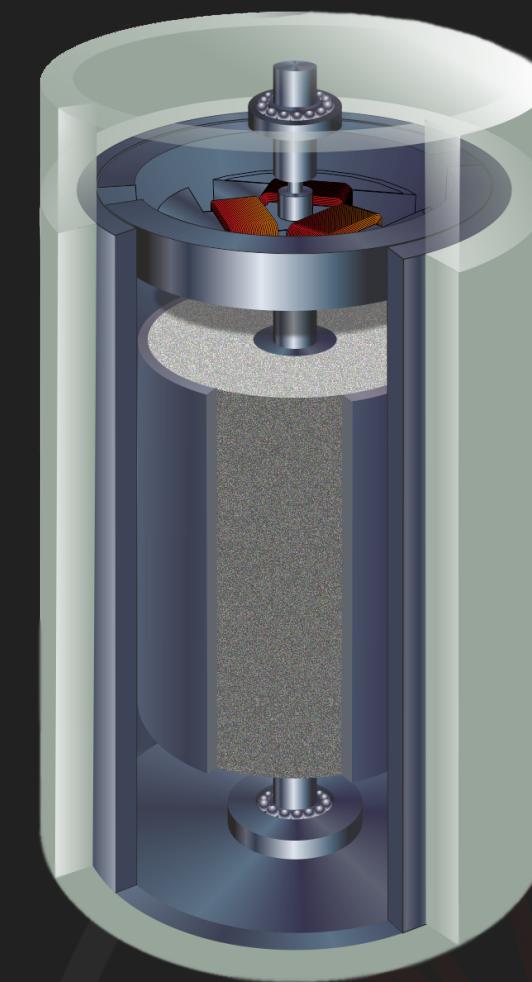
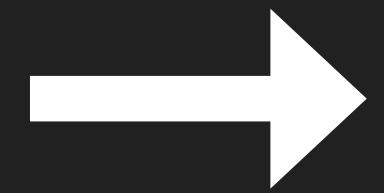
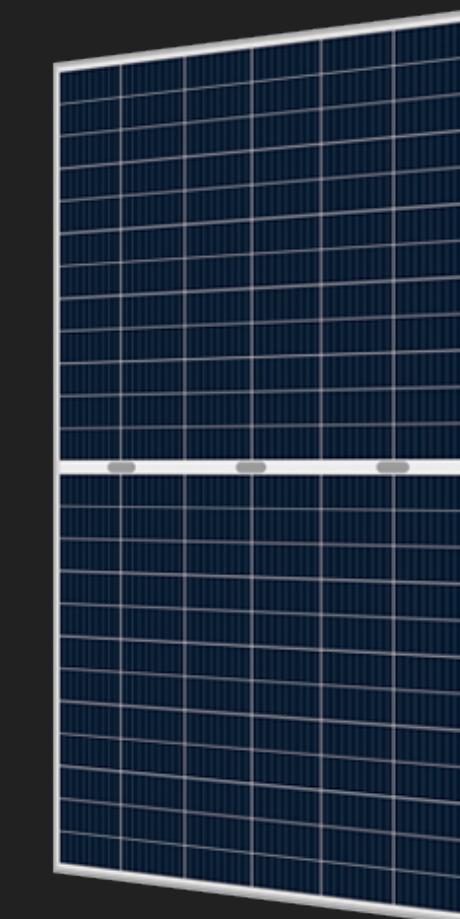
power generating



wind turbine

solar cell

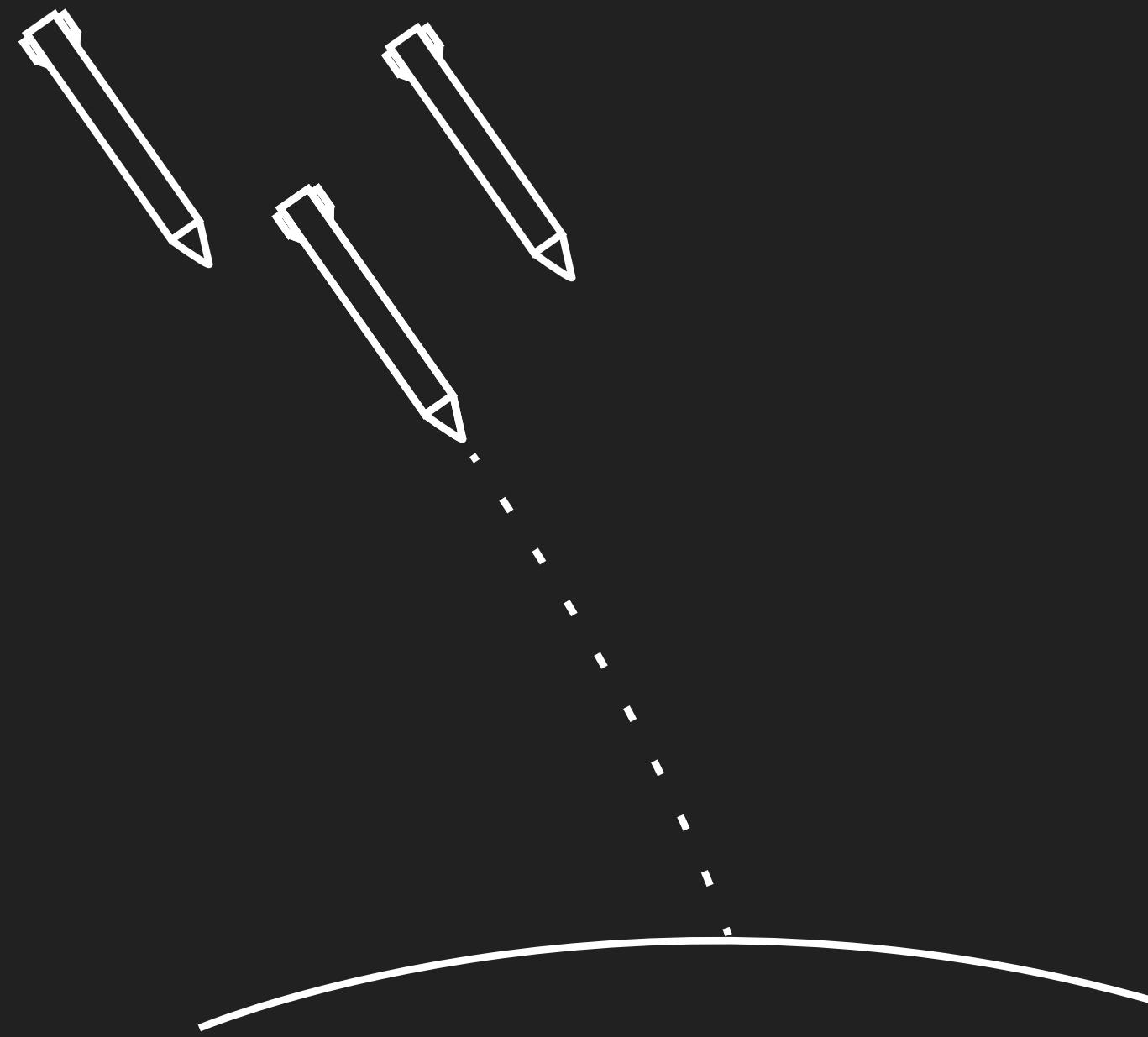
power storage



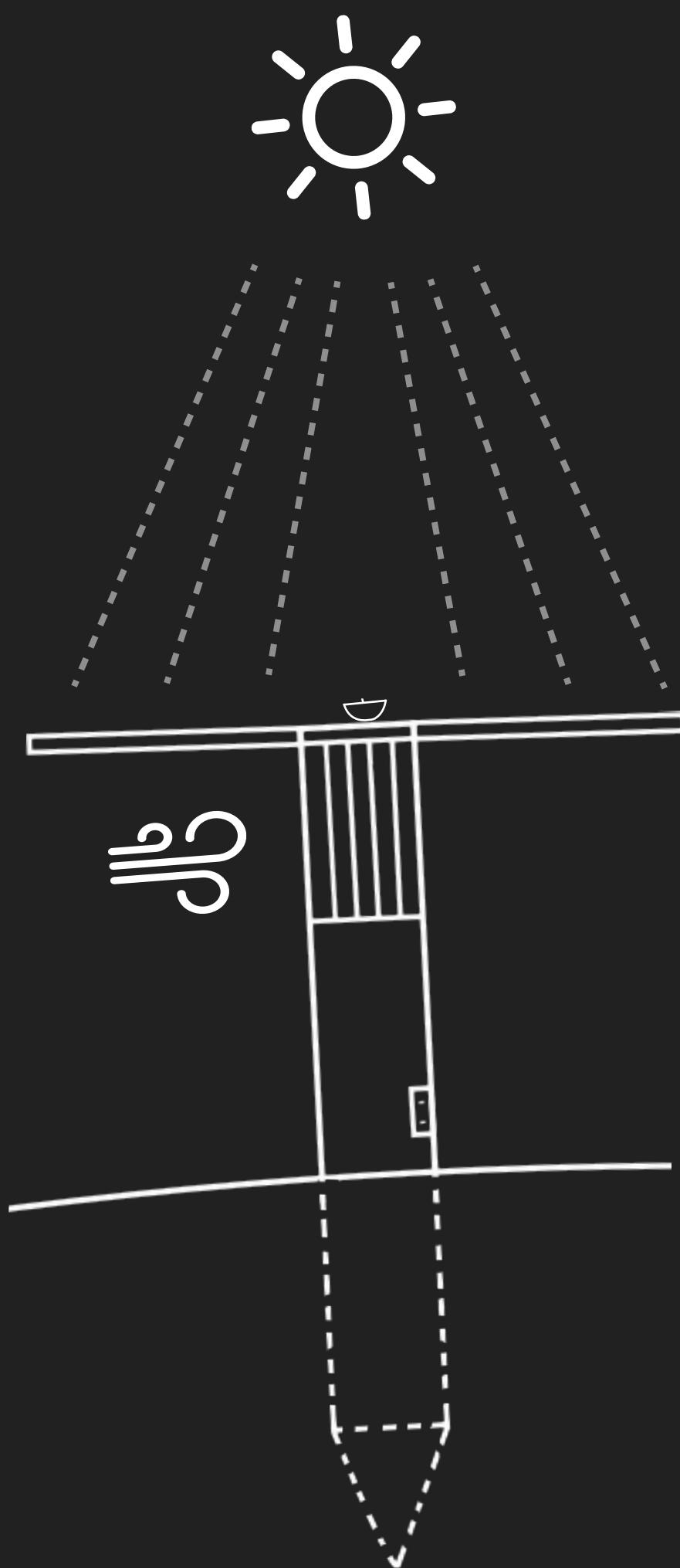
flywheel

energy output to
external systems

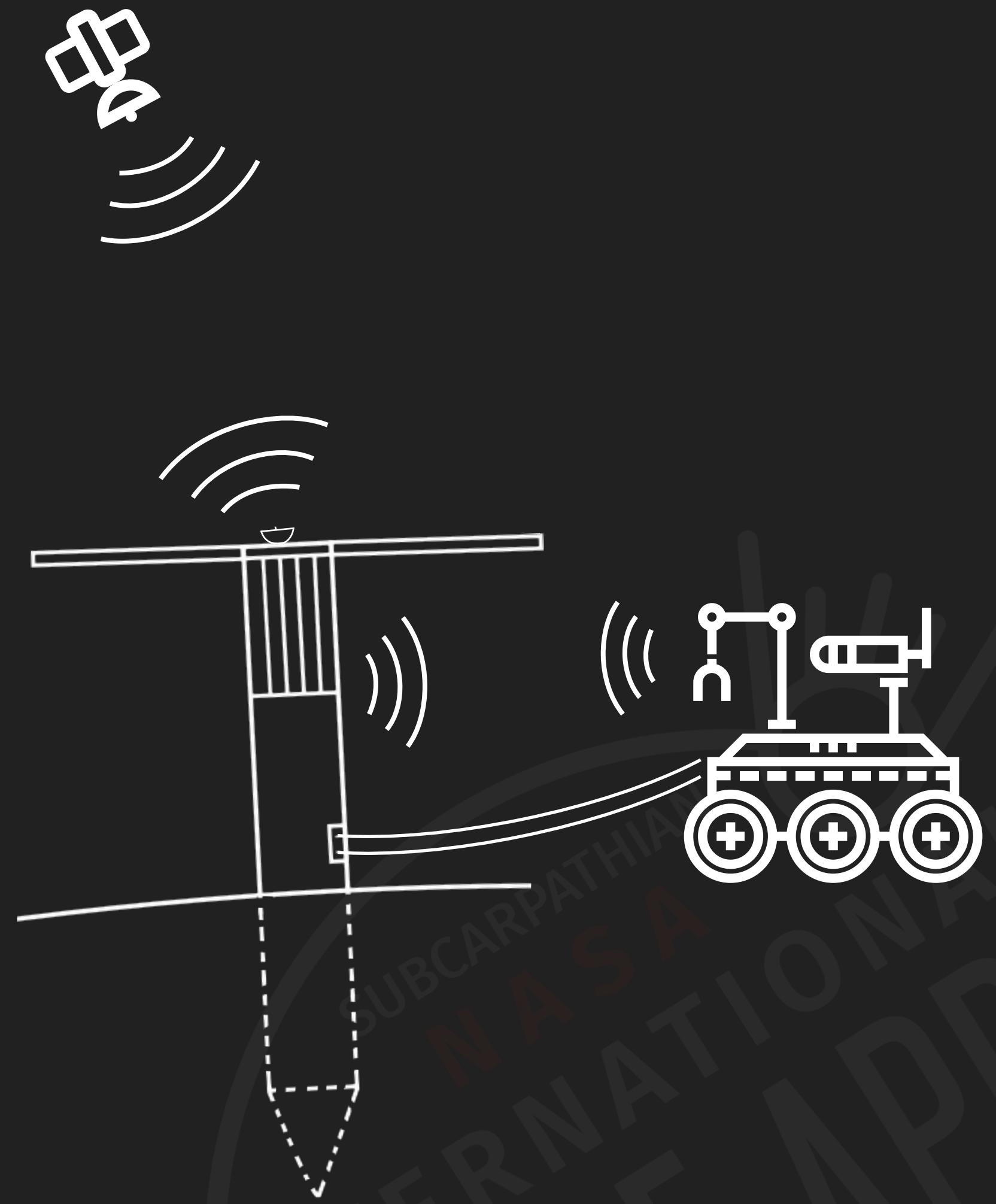
Solution



1. Anchoring maneuver



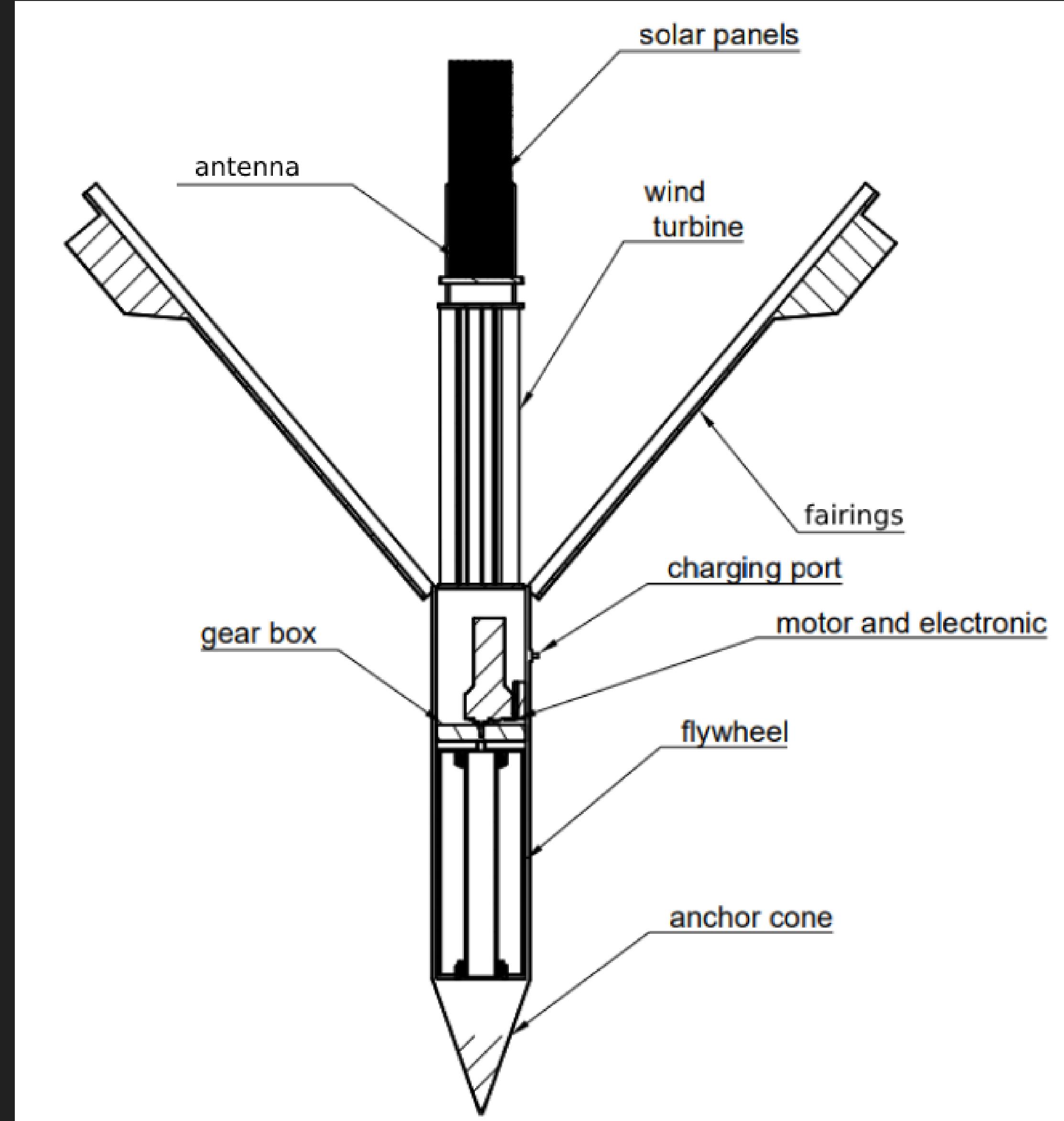
2. Power accumulation



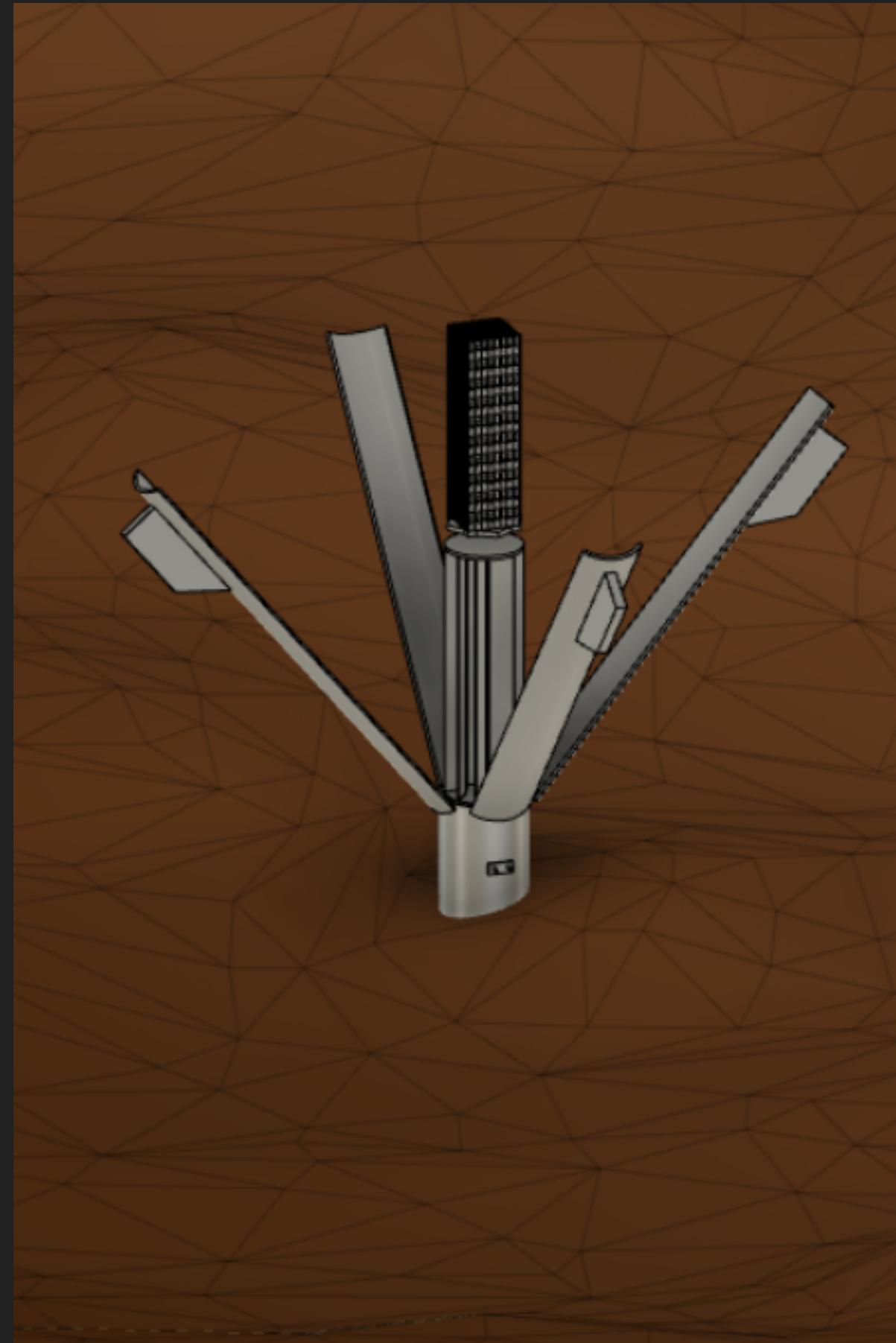
3. Energy sharing

Solution

A power plant assembly in a shape of ballistic missile launched from a spacecraft is being anchored on the surface of Venus. Swarm of these assemblies provides redundancy of elements which lowers the risk of whole system failure and increases the area of exploration. Once anchored to the surface, the assembly retracts solar panels placed on a vertical wind turbine. The electricity generated from solar panels and wind turbine drives the motor to spin up the flywheel, acting as an energy storage. External vehicles working on Venus can connect to the assembly by using the port located on the surface of the charging station.



Solution



3D renders showing the anchoring phase of the mission

Future:

Due to lack of time and resources we need to perform additional research and tests, e.x.:

- research about overcoming high deceleration rates acting on the components in the anchoring phase
- research about materials to ensure their required strength and durability
- research about picking proper type of the wind turbine
- evaluating the needed energy capacity according to mission needs

