Autonomous Mobile Energy System (AMES)

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Introduction

Ascent Systems would like to create a module to provide temporary **power solutions** to areas affected by **natural disasters**. The Autonomous Mobile Energy System (**AMES**) is a solution that can be:

- Delivered to any location in the world.
- Automatically deployed.
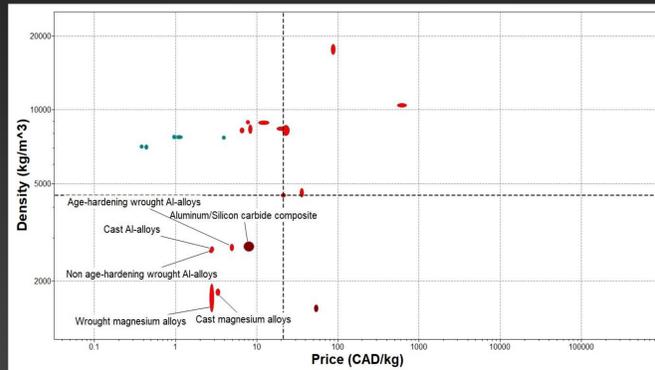- Supply renewable energy on demand.

Folded up, the AMES will be constrained to fit in a **shipping container** and will collect, store and provide both **thermal and electrical solar energy.**
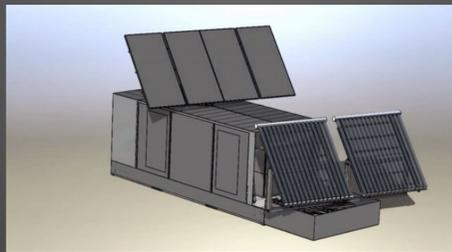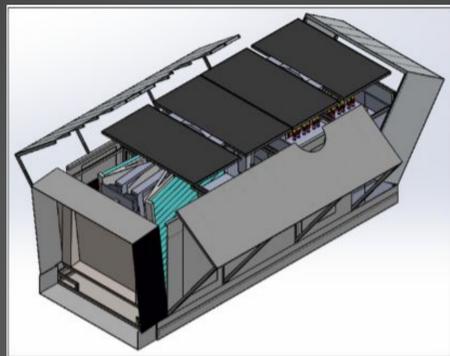
The AMES contains all the necessary components to function **fully autonomously** upon deployment.
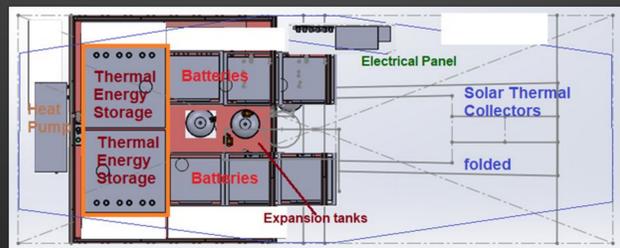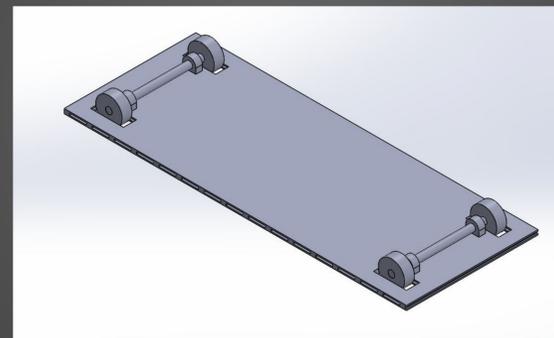

Physical Design

AMES needs to be made of a **light and cheap material** to reduce costs.

Using **CES** candidate materials were isolated and age hardened **aluminum** identified as material of choice due to **high weight-strength ratio** and **machinability**.

AMES is up to 9000 lbs and it needs to be able to roll out of its container easily and efficiently.

Solution is to attach **two dead axles** to the system and then add **wheels and bearings** on the ends of the axles, so it can be easily pulled out with a **winch**.
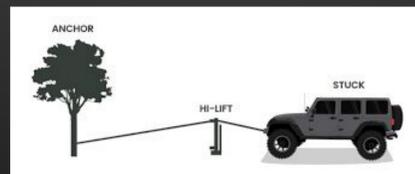
Software

The objective of AMES is to provide as much energy as possible.

Solar panels **tracking the sun** generate upto **40% more energy**

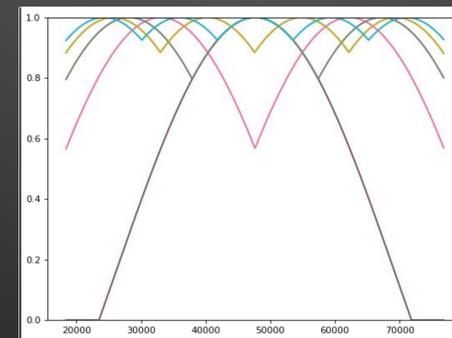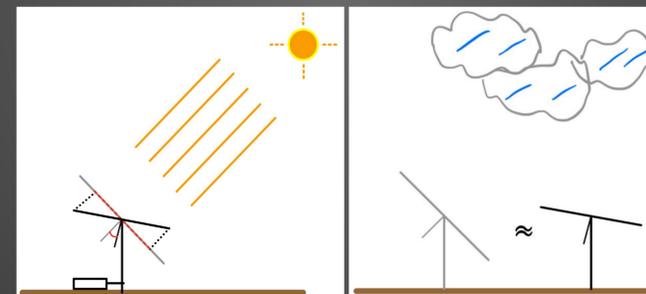Starting and stopping the panels uses energy too!

- On **sunny** days, this doesn't matter much since there is so much **more** solar energy absorbed by following the sun's path.

- On **cloudy** days, you absorb **less** solar energy but use the same amount to track the sun.

Tracking the sun on a day with less sunlight results in less energy available to those who need it

AMES' **solar tracking algorithm** chooses how many times the panels move based on if its a sunny day or not.

This results in choosing the optimal amount of times the panels' positions refresh to provide the **maximum amount of energy.**

HMI

Takes input from a PLC

Logs data on SD card (separate system to log data on an external database)

Switch between screens using menu on the the top-right corner

Displays both analog and digital data in real time