An Integrated Architecture Study for Lunar Construction Operations

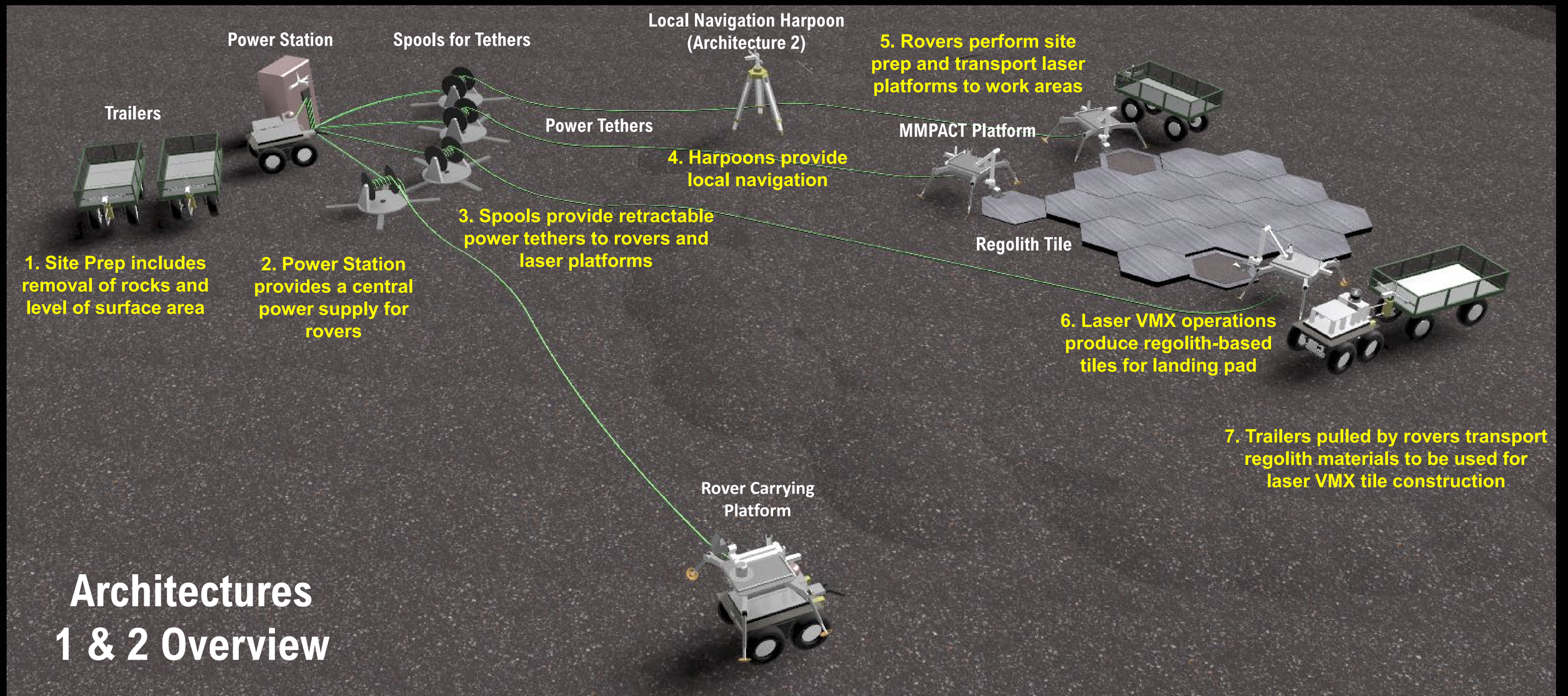
Purpose

This Pre-Phase A study traded three architectures that would survey and prepare a construction area to build a landing pad out of lunar regolith using MMPACT (Moon-to-Mars Planetary Autonomous Construction Technology) platforms, rovers, and navigation outposts

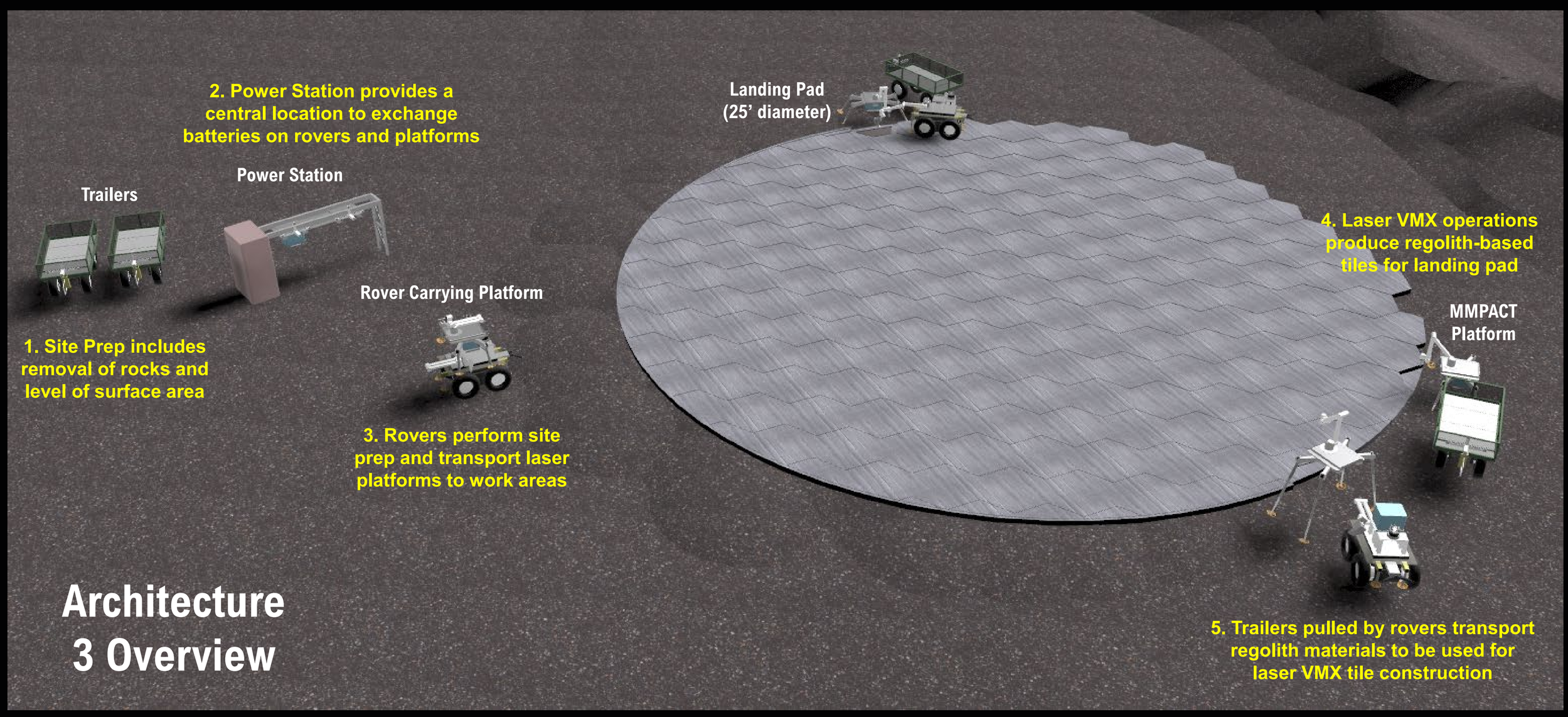
Trades

The main trades examined several capabilities

1. Navigation for the system/architecture
2. Rover navigation options
3. Intermittent vs continuous power
   - Battery vs tether power for the MMPACT robotic arm
4. Assets used for site prep
   - Differences between using the rovers or the MMPACT platforms for site preparation



Architectures 1 & 2 Overview



Architecture 3 Overview

Results

1. Local navigation was identified as being more accurate and continuous when compared to global navigation
2. For initial site mapping, a combination of LiDAR and Smart Video Graphics Sensors (SVGS) saved the most power
3. Tethered power was found to decrease mission duration when compared to battery power options
4. Assigning site prep functionality to either the platforms (Architectures 1 & 2) or rovers (Architecture 3) showed that both methods have their own benefits and challenges

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