1. Introduction

J.MARS is a geospatial information system developed by ASU’s Mars Space Flight Facility that provides mission planning and data-analysis tools to NASA scientists, instrument team members, students, and the public [1].

We’ve developed a new version called “J.MARS 2035” for analyzing potential human landing sites and exploration zones (EZs) on Mars.

The beta version is available to the public for free at: https://jmars.asu.edu/jmars2035 [2].

J.MARS 2035 continues the exploration zone assessment process which began at NASA’s Human Exploration Zone/Landing Site Workshop for Human Missions to the Surface of Mars (Houston, Oct. 2015) [3].

J.MARS 2035 lets users define their own sites and compare them against any proposed site.

Statistics for sites can be generated from datasets including elevation, thermal inertia, slope, dust index, surface temperature, winds, and more.

2. J.MARS Background

J.MARS has been available to the public since 2003, is used in over 65 countries, and has over 4,000 registered users [1].

J.MARS provides global maps for over 25 planetary bodies and high resolution images and spectral data when available [4].

Mars datasets include products from THEMIS, MOC, CTX, HRIRSE, Viking, HRSC, CRISM, MOLA, TES, GRS/HEND, as well as derived products from USGS and others [5-15].

Users can compare, plot, and blend data from any combination of data sources.

3. Support for Human Exploration

A sustained surface presence by a crew around the year 2035 would require access to water, building materials, radiation shelter, thermal insulation, and other considerations [16,17].

We incorporated many published databases and figures relevant to Mars science and in situ resource utilization (ISRU) [18-26].

This software provides site proposers with convenient access to Mars datasets and specific tools for this analysis [27].

We hope this encourages collaboration and increases public awareness.

4. New Tools and Datasets

Tools (10)

- Exploration Zone
- October 2015 Proposed EZs
- Landing Zone
- Habitation Zone
- Food Production Zone
- ISRU Processing and Power Plant
- Science ROIs
- Water Ice ROIs
- Hydrated Mineral Resources
- Building Materials Resources

Science Survey Maps (14)

- Valley Network Database
- Clay Weathering Surfaces
- Recurring Slope Linea Shapes
- Recurring Slope Linea Points
- 2015 Gullied Landform Survey
- 2014 Aquifer Mineral Distribution
- 2012 Glacier-like Form Database
- 2010 Chloride Survey
- Hydrous Minerals (CRISM)
- Hydrous Minerals (OMEGA)
- Hydrous Mineral Detections (Both)
- USGS EQ Mars Dune Database

5. Feedback and Future Work

- Successful Mars human landing site assessment can only work if teams are integrated with mission engineers, ISRU specialists, mining engineers, and human spaceflight experts [16].

- Initial response has been very positive. We’ve received feedback from professors, graduate students, researchers, NASA mission engineers, and EZ proposers at several institutions. We would like your feedback as well!

- Future efforts will focus on water ice resources, solar energy resources, radiation hazards, landing site stereo coverage, slope and engineering thresholds.

- How can we improve this software? What datasets are missing? Email us at feedback2035@jmars.asu.edu [2].

- The beta version and tutorial videos are available at: https://jmars.asu.edu/jmars2035

6. References