

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Interactive Presentations - IAF HUMAN SPACEFLIGHT SYMPOSIUM (IP)

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HABITATOS - OPEN SOURCE OPERATING SYSTEM FOR EXTRATERRESTRIAL HABITATS

Abstract

Development of the Operating System for extraterrestrial habitats can take years of careful planning, software engineering and testing. While open source community has brought an amazing Robot Operating System for robotics there's no such solution for habitats.

HabitatOS is the first and only Open Source Operating System for use in Human Spaceflight habitats. With responsive HTML interface it can be used on any device such as: desktop, mobile smartphones, tablets, TV screens and even smartwatches. It has an open and documented API for development of new features and easy to use pluggable add-on structure to build experiments around. It's minimal requirement is Python only, hence it could be deployed on any server easily and quick.

Everything can be real-time or custom time delayed to simulate communication impediment from speed of light limit.

Main features:

- Data:
 - data acquisition, analytics, visualization and exploration tool,
- Time system:
 - customizable time delay simulation for communication,
 - tasks scheduling and visualization,
 - implemented out of the box Lunar Standard Time, Coordinated Mars Time, Mars Sol Date and any Earth time zone
 - conversion between any supported timezones,
 - use of custom time formats and timezones in reporting, communication and everywhere in the system,
 - multiple small and big file upload with time delay,
- Habitat systems:
 - EVA planning, tracking and reporting with contingencies support,
 - EVA spacesuit sensors monitoring,
 - flexible and extensible habitat light control,
 - temperature regulation,
 - humidity regulation,
 - sensors data collection and real-time (or time delayed) analytics,

- machine learning algorithms for temperature and light adjustment,
- Science:
 - plugable platform for experiments, surveys, etc.
 - biolab support for hydroponics and aquaponics,
 - sociodynamics, psychological surveying (all with time delay),
 - medical data collecting from onboard devices,
 - medical evaluations and questionnaires support and data collecting,
 - water (blue, yellow, green, gray) usage tracking and analytics,
 - food tracking with expiration time tracking,
 - medications and drugs expiry time tracking,
 - inventory management (barcode and QR code support),
 - daily activity tracking,
 - user diaries, journals and videologs (all with time delay),
 - waste management,
 - incidents and repair log,
 - daily reporting,
- System:
 - flexible user management with groups support and permission model,
 - Continuous Integration/Deployment pipeline (with tests) - easy to deploy on any server
 - only requirement is Python