



ZIN Technologies

ISS Advanced Exercise Concepts (AEC)

ISS Advanced Exercise Concepts (AEC) and Medical Capability



Glenn Harness (ISS Treadmill)
Operational on ISS since 2012

Kinematic Device Modeling

ISS exercise systems, such as the Advanced Resistive Exercise Device (ARED), have been modeled for use in optimizing studies and for human in-the-loop verification models.

ZIN uses ADAMS Multibody Dynamics Simulation software and Mathworks SimuLink© to model man machine dynamic systems.

Medical Consumable Tracking

Track ISS astronaut pharmaceuticals for logistics, and supply management for dose and compliance:

- Track the item – various sizes, item composition (RF Absorbing, Reflecting, Transparent) and item orientation.
- Track the usage -- database and software.

In Suit Injection System

Emergency astronaut injection through EVA Spacesuit

IntraVenous Fluid Generation

Compact water purification system (using ISS potable water) to reliably produce Sterile Water for Injection (SWI) in a reduced gravity environment (ISS) and for ground ambulatory field use.



Hybrid Ultimate Lifting Kit (HULK) Device Demonstration during Parabolic Flight

ZIN developed resistive and aerobic devices for use in ground human evaluation testing with an eye on future flight demonstrations. The AEC Ergometer Cycle and Gas Spring Devices have been utilized at Lunar Rover Desert Rats simulations the past two years. An ISS demonstration of transit exploration vehicle hardware is slated for 2016.



Advanced Exercise Concepts Ergometer Cycle



Glenn Harness (International Space Station Treadmill)



In Suit Injection System



Enhanced Zero-Gravity Locomotion Ground Simulator (eZLS)



- The ZIN/Cleveland Clinic designed Glenn Harness distributes the loading in an improved manner over previous ISS harnesses and therefore allows for higher loading to be achieved on a user; a critical aspect of preserving bone and muscle health.
- The Medical Consumables Tracking system utilizes a Radio Frequency Identification (RFID) system to read and write data content for medical consumables tracking.
- ZIN provides the Digital Astronaut (DA) project under the Human Research Program (HRP), computational modeling of exercise device and human in-the-loop multi-mode models to optimize on-orbit exercise prescriptions.

ZIN Technologies Inc.

6745 Engle Road | Middleburg Heights, Oh 44130
Phone: 440.625-2223 | johansonm@zin-tech.com | www.ZIN-Tech.com



ISS National Lab CASIS Implementation Partner

For 25 years, the ZIN engineering team has partnered with NASA management, scientific experts and industry to manage and develop space flight systems, from concept definition, design, development, and fabrication to system assembly, integration, test, launch, operations and return.

As an implementation Partner for the ISS National Laboratory ZIN can streamline ISS science facility utilization to researchers, businesses and educators to take advantage of the unique benefits offered through space-based investigations providing a variety of services to enable efficient execution of science initiatives.



Focus on Quality - Certified and Compliant with Industry and Government Quality Standards



Over 200 Payloads delivered, integrated and operated for shuttle, MIR, and ISS – 75% of all physical science research on ISS since 2001

OUR PRODUCTS & SERVICES

PRE FLIGHT:

ZIN provides a wide range of products and services and demonstrated experience for space-based science investigations.

- ❑ Access to a large repository of previous space experiments that align with promising commercial applications
- ❑ Collaboration with experienced payload developers and other subject matter experts to ensure successful experiment operations
- ❑ Utilization of unique capabilities and facilities for developing payloads
- ❑ Coordination with NASA and launch vehicle providers for transparent and easy interaction with investigators

IN - FLIGHT:

ZIN can support private sector product development and ensure seamless investigation implementation, including:

- ❑ Support of “real time” on orbit payload operations -Telescience Support Center
- ❑ Interfacing with ISS crew during experiment interaction
- ❑ Facilitation of data and software interfaces
- ❑ Coordination of contingency planning for mission changes to preserve science objectives

Primary Services:

- ❑ Hardware design, manufacture and certification
- ❑ Hardware analytical and physical integration
- ❑ Full lifecycle software, integration & testing
- ❑ Program management
- ❑ Export Compliance
- ❑ Hands-on crew training
- ❑ On-orbit operations

POST-FLIGHT:

After the project comes back to Earth, ZIN can assist with the following:

- ❑ All post-flight data & report requirements are submitted to the principal investigator in a timely fashion
- ❑ Post Flight Testing and Data Analysis
- ❑ Logistics support for sample and hardware return from ISS
- ❑ Identification and support at appropriate facilities for post-processing activities

ZIN Technologies Inc.

6745 Engle Road | Middleburg Heights, Oh 44130
Phone: 440.625-2223 | johansonm@zin-tech.com | www.ZIN-Tech.com