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Remote Monitoring Seal System

AIT/TECRO Working Item AE-SNL-G35
Information Management System for a
Spent Nuclear Fuel Interim Dry Storage Facility

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NNSA National Nuclear Security Administration

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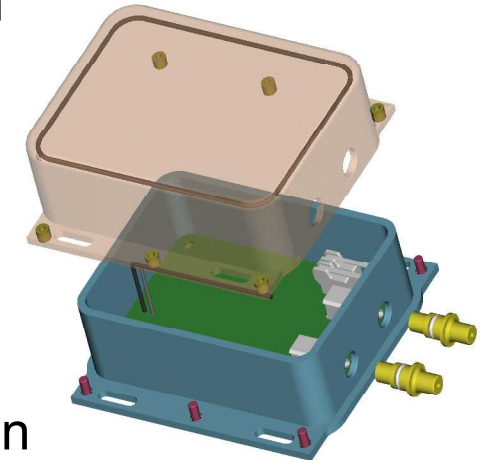
Secure Sensor Platform (SSP)

The SSP is a concept that provides for common security, communication and power management capabilities. These capabilities are designed to be versatile for monitoring a wide variety of sensors on an application specific platform.



Specific aspects of the SSP concept are based on a technology foundation providing secure collection and reporting of sensor data.

SSP (Secure Sensor Platform) Common Mode Capabilities

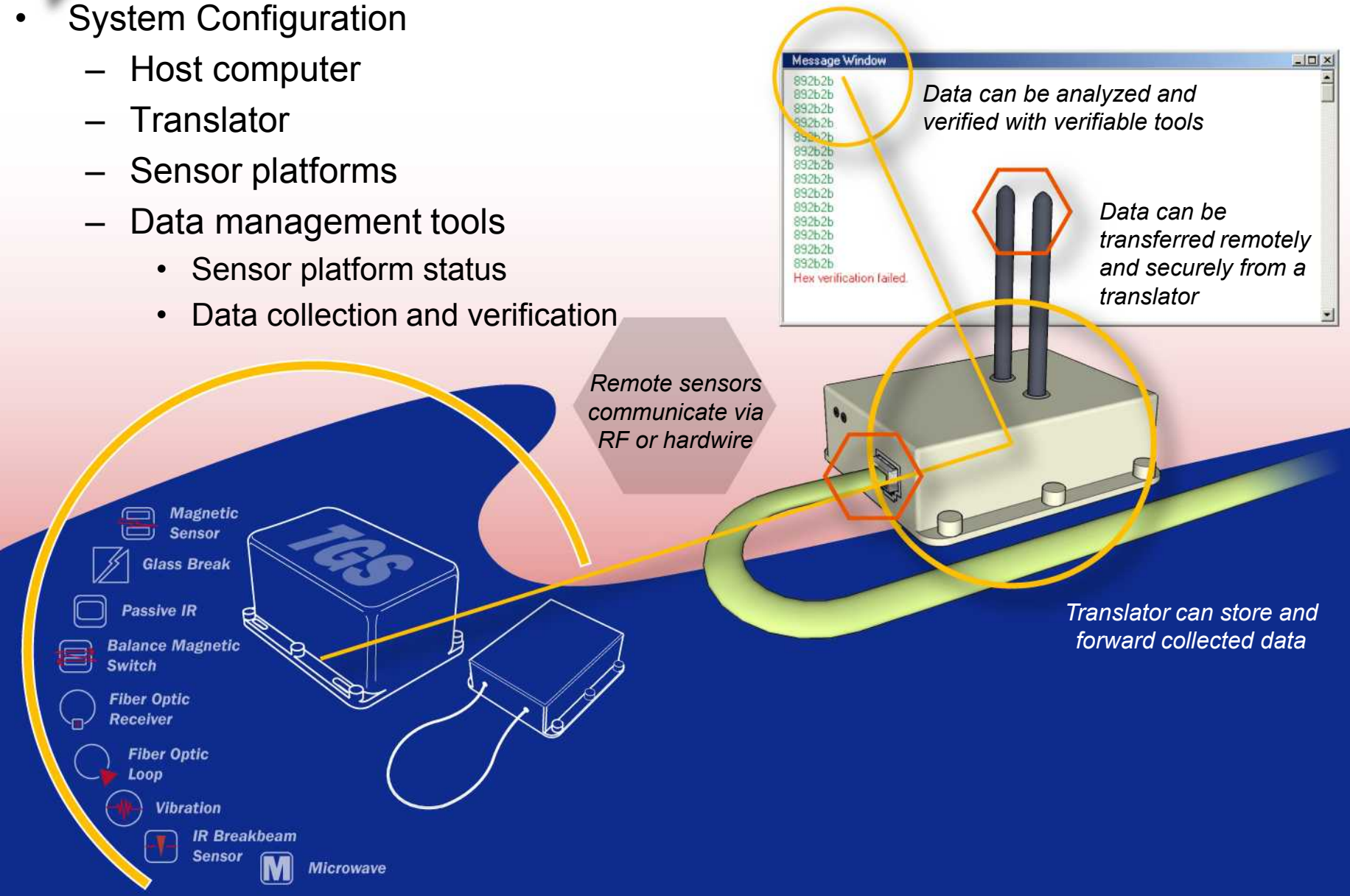
- General purpose sensor interface
  - Power controls providing regulated and unregulated power
  - Interrupt controls
  - Sensors are typically multiplexed to save energy
  - Analog and digital inputs - parallel or serial
- Periodic state-of-health (SOH) and immediate event notification
- Versatile data representation
- Integrated internal sensors and real-time-clock (+/-2 min/year)
- Typically LiThCl battery powered
- Authentication and encryption (active key protection)
- Tamper detection capabilities

SSP Remote Access Configuration

- Sensors and Seals
  - Secure housing with active tamper detection
  - Sign, store and forward with 256K bytes flash
- Translator
  - Store and forward with GB's of flash
  - Support access to individual sensor/seal
  - Integrated web server
- Client Computer
  - Verify authenticity of sensor/seal messages
  - Support simple approach to data analysis

Secure Sensor Platform (SSP)

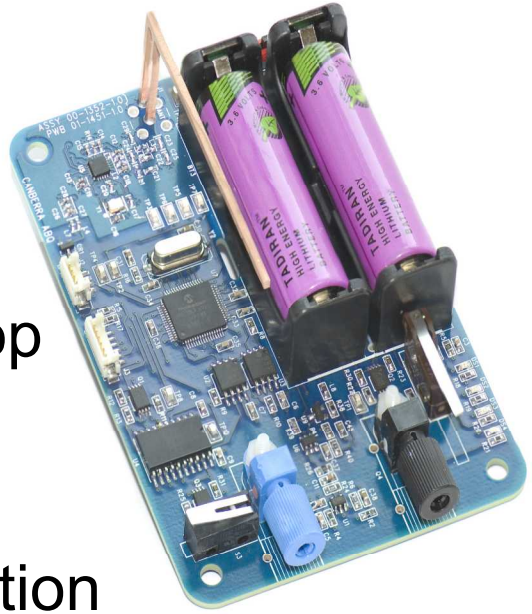
- System Configuration
  - Host computer
  - Translator
  - Sensor platforms
  - Data management tools
    - Sensor platform status
    - Data collection and verification



Example SSP Sensor Application

Remote Monitoring Seal System

- Fiber optic seal sensor
- Low cost seal
- Up to 4 year battery life
- Up to 50 meter length of sealing loop
- Fiber can be cut to length
- Parametric fiber monitoring
- Provides all of the SSP communication and security capabilities
- RF communication



Advantages of Remote Monitoring Seal System

- Current IAEA approved seal for a SNF interim dry storage cask is a metal wire – passive; no immediate event notification; manual inspection of state of health of device at a given time interval (months or longer)
- New remote monitoring seal is a fiber optic seal sensor – active; remote immediate event notification; send state of health of device at a given time preset by operator (e.g., hours, or days)