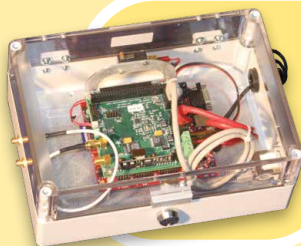
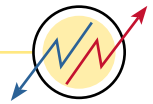


“ **Nuclear measurement solutions  
for safety and security.** ”



**RMSA –**  
Remotely Monitored  
Sealing Array

**CANBERRA**



# RMSEA: Remotely Monitored Sealing Array

The 'Remotely Monitored Sealing Array' or RMSEA system is a versatile, low-power/low-bandwidth active sealing solution that can support multiple sealing and containment verification disciplines. The RMSEA system introduces an electronics platform that is designed to monitor a fiber optic loop seal and to communicate the results to a data consolidation Translator via secure radio frequency communication. At the Translator station, data can be stored locally or forwarded to a remote host computer for analysis.

Based upon the Secure Sensor Platform (SSP) technology developed by Sandia National Laboratories (SNL), the RMSEA seal is a low-cost active fiber optic loop seal that stores, forwards and communicates data (tamper events, open/close events, seal status) via a customized data communication protocol over an RF link. The data can

be transferred remotely and securely (authenticated and encrypted) to the Translator that collects data from all the RMSEA seals in a particular location. The data is made available on the Translator in an easily accessible format either for data retrieval by an authorized inspector (SD Card) or for remote data communication via Ethernet link. The data collected by the RMSEA seals can then be verified and analyzed on-site or worldwide with the RMSEA software package. The RMSEA programmer serves as the tool for initial set up of the RMSEA seals (loading keys).

Two versions of the seal: with internal or external antenna.

Two versions of the translator: basic housing (Plastic Case) or IAEA-approved tamper indicating housing (Metal Case).

## RMSEA Fiber Optic Seal

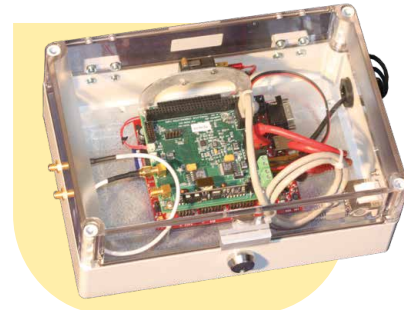
- > **Power** – One or two lithium, 3.6 V AA batteries
- > **Expected Operational Life** – 4+ years (two lithium batteries)
- > **Non-volatile Memory** – Thousands of messages
- > **Fiber Seal** – 1 mm Plastic Fiber  $\leq$ 50 m Length
- > **Security** – Active/Passive/Intrinsic
- > **Other Features** – Clock accurate to two minutes/year, battery monitor, temperature monitor
- > **Environmental** – -40 to +85 °C (operation or storage)
- > **Humidity** – 5% to 95%
- > **Case** – IP54 minimum
- > **Case Material** – White PVC plastic
- > **RF Frequency Operation** – 900 MHz ISM Band (902 to 928 MHz)
- > **RF Sensitivity** – -110 dB (typical)
- > **RF Power Output** – -30 to +7 dBm typical at antenna input (internal or external) ~10 dBm ERIP improvement with 1/4 wave vertical external antenna (transmit and receive)
- > **Antenna** – Internal F or External SMA connection



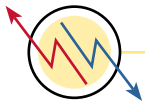
- > **Communications Protocol** – SSP/Sandia TLV
- > **Encryption** – AES 128-bit cipher
- > **Authentication** – AES 128-bit cipher
- > **Weight** – 0.7 lb (with batteries)
- > **Dimensions** – 4.640 x 4.125 x 1.438 inch
- > **Attachment** – Four slots (2 per side) for #8 screws
- > **Communication range with the translator** – 800\* meters with external antenna, 500\* meters with internal antenna – \* based on outdoor test with no obstacles

## RMSEA Translator (Plastic housing)

- > **Power Source** – AC power (universal 120 V/220 V, 50/60 Hz) /POE
- > **Power Dissipation** – 6 W maximum, 4 W typical
- > **Environmental** – -40 to +85 °C (operation or storage)
- > **Humidity** – 5% to 95%
- > **Case** – IP54 minimum
- > **Case Material** – Polycarbonate
- > **Security** – Active
- > **Memory** – Removable SD Card, 128 MB SDRAM, 512 MB Flash
- > **Software** – Debian Linux 2.6.21 based application
- > **RF Frequency Operation** – 900 MHz ISM Band (902 to 928 MHz) (other ISM/SRD bands available)
- > **RF Sensitivity** – -110 dB (typical)
- > **RF Power Output** – -30 to +7 dBm



- > **Antenna Ports** – Dual SMA Female connectors, only one active
- > **Communication** – Compatible with SSP/Sandia TLV protocol
- > **Ports** – Gigabit Ethernet, 10/100/1000 speeds
- > **Weight** – Four pounds (includes AC power adaptor and one antenna)
- > **Dimensions** – 9.8 x 6.8 x 3.7 inch



## RMSA Translator (Metal housing)

- > **Power Source** – AC power (universal 120 V/220 V, 50/60 Hz)/POE
- > **Power Dissipation** – 6 W maximum, 4 W typical
- > **Environmental** – -40 to +85 °C (operation or storage)
- > **Humidity** – 5% to 95%
- > **Case** – IP54 minimum (DCM-14 based)
- > **Case Material** – Aluminum
- > **Security** – Active
- > **Memory** – Removable SD Card, 128 MB SDRAM, 512 MB Flash
- > **Software** – Debian Linux 2.6.21 based application
- > **RF Frequency Operation** – 900 MHz ISM Band (902 to 928 MHz)
- > **RF Sensitivity** – -110 dB (typical)
- > **RF Power Output** – -30 to +7 dBm
- > **Antenna Ports** – Dual SMA Female connectors, only one active
- > **Communication** – Compatible with SSP/Sandia TLV protocol



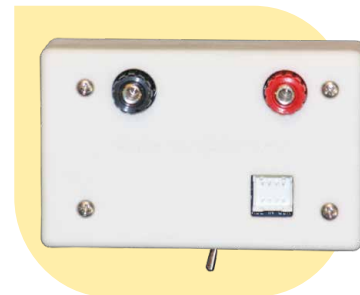
- > **Ports** – Gigabit Ethernet, 10/100/1000 speeds
- > **Weight** – 15 lb (includes AC cable and two antennas)
- > **Dimensions** – 13 x 7.7 x 11 inch

## RMSA Review Software

- > **Operating System** – Windows XP 32-bit required
- > **Hard Drive** – 500 MB minimum
- > **Memory** – 1 GB minimum plus hard drive swap space
- > **Other** – Ethernet port, Microsoft .Net Framework 3.5 SP-1 required
- > **Encryption** – AES 128-bit Cipher
- > **Authentication** – AES 128-bit Cipher
- > **Features** – Add/Subtract Categories, Sort on Category, Sort on Seal, Color coded alerts

## RMSA Programmer

- > **Power Source** – DC Power or USB or Microchip Programming Interface
- > **Power Dissipation** – 0.5 W maximum
- > **Environmental** – -40 to +85 °C (operation or storage)
- > **Humidity** – 5% to 95%
- > **Case Material** – SLA based plastic
- > **Communication** – USB 1.1 compatible
- > **Ports** – USB B connector, RJ12 (6-wire) for Microchip Programmer, Binding Posts (2) for DC power, RMSA Programming connector



- > **Weight** – 0.2 lb
- > **Dimensions** – 3.6 x 2.2 x 1.2 inch

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