



SeRFNet

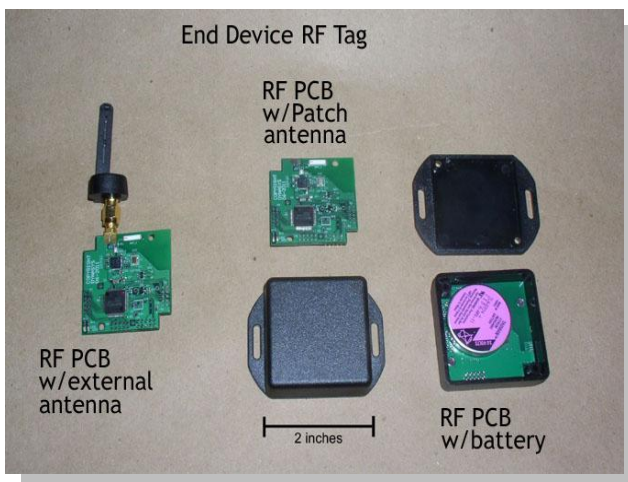
Dynasys Sensor RF Network SeRFNet

SeRFNet Monitor System

As equipment systems evolve, the supply system must adapt by being more agile and flexible. Lack of agility and flexibility requires increased inventory volumes, transportation costs, and personnel. The aging inventory and declining reliability of systems adds additional stress on the supply chain by increasing the maintenance requirements thus increasing the demands for parts. The unpredictable nature of failures drives the necessity for worst-case provisioning, thereby further reducing supply chain mobility and velocity. The ability to effectively measure the condition of systems through the use of technologies, such as RFID, and advanced analysis techniques can provide essential information for performing supply chain optimization and just-in-time re-supply. Supply chain footprint reduction is essential to meet today's rapidly evolving maneuver and deployment nature. This reduction can be realized through the application of product reliability improvements, Reliability Centered Maintenance techniques, Condition Based Maintenance using technology insertion, and advanced analysis system maintenance and diagnostic information.

System Components:

1. JRAMS - Information Management System by SwRI.
2. SeRFNet Network Controller - Controls Local communication and data uploads to central database
3. SeRFNet RFID Remote Sensor End Device Tag - Asset identifier and sensor data collector.
4. SeRFNet High-Capacity Data Collector RFID Tag - Asset identifier and multi-channel sensor data collector with high capacity battery.
5. SeRFNet Range Extender- Extends local network range.
6. SeRFNet Current Sensor - fast response sensor to monitor current and ON/OFF times.



- Uses an innovative low-power radio frequency (RF) sensor network to monitor critical metrics such as power consumption, temperature, vibration, etc. and relay to a global database.
- Has the ability to effectively measure the energy usage of systems at point of use.
- Cost is minimized by utilization of an existing USAF Joint Reliability Availability Management System (JRAMS).
- Enhanced ability to identify and address failure root causes can lead to improved repair processes.

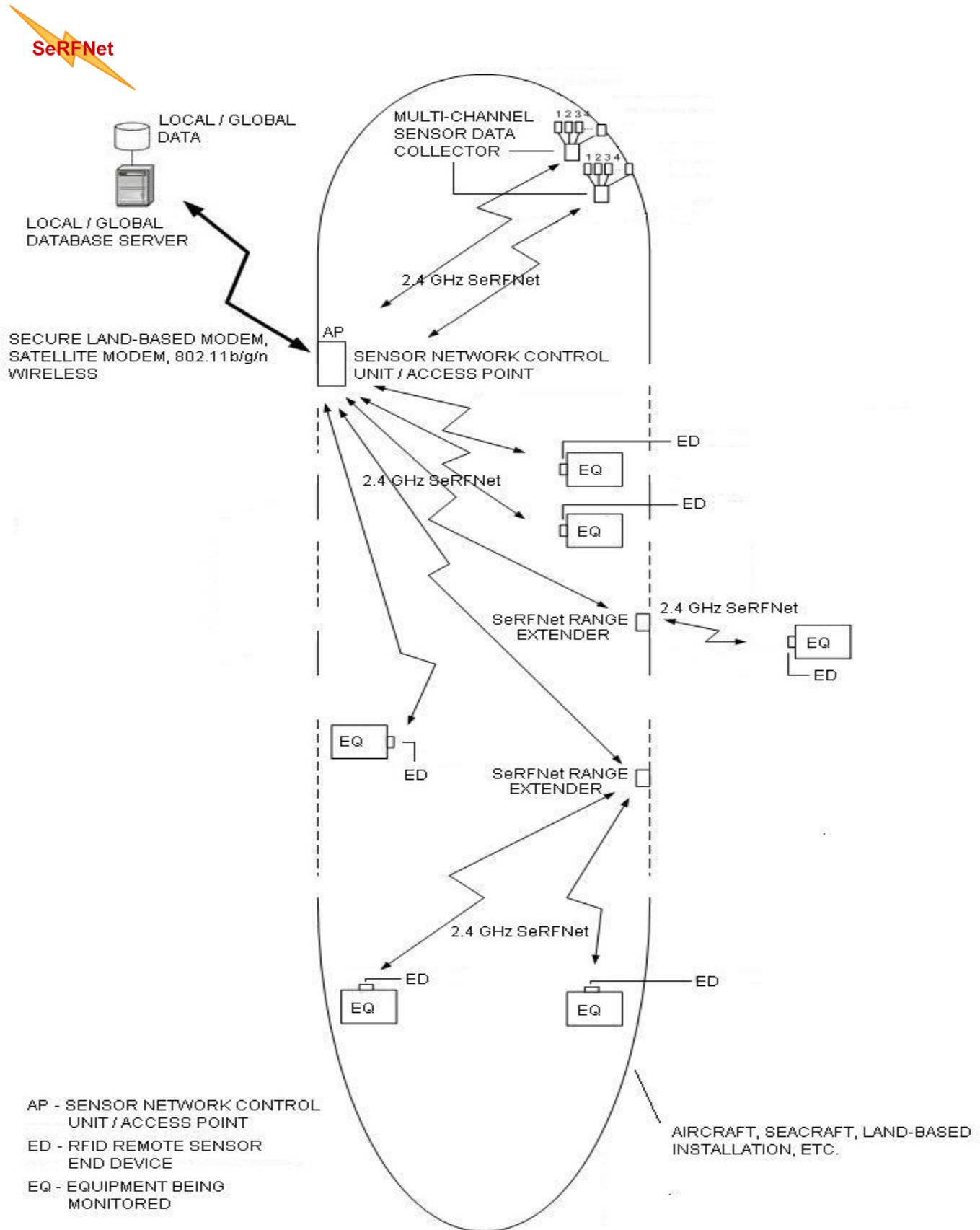
System was originally conceived to address a military requirement, compliance to military temperature, vibration and altitude requirements have already been addressed and can interface with an existing USAF Joint Reliability Availability Management System (JRAMS) software, equipment, and infrastructure allowing for easy transition to existing military systems or programs.

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SeRFNet Monitor System Diagram





SeRFNet and JRAMS



The Joint Reliability Availability Management System (JRAMS) is an integrated information management system, developed for the USAF by Southwest Research Institute (SwRI), that provides a suite of analysis tools to aid personnel with decision support and equipment management. The system uses a variety of external system interfaces to obtain data for further processing and analysis. The data obtained, in conjunction with the internal processing of the system, enable system applications to provide users with the means to assess key metrics required for planning, decision support, and monitoring activities. Key metrics include those related to availability, reliability, maintainability, and operational performance. The system also includes a statistical process control capability and supports interactive analysis of trending information. SeRFNet in conjunction with JRAMS can offer other benefits such as identifying failures prior to occurrence based on comparing sensor data to the baseline ‘normal’ performance of the system. Enhanced ability to identify and address failure root causes may lead to improved repair processes. The USAF JARAMS capabilities, with respect to this document, can be ported to other US Government data system environments as appropriate.

J-RAMS
JOINT RELIABILITY AVAILABILITY MANAGEMENT SYSTEM

RFID Demo

Demo Tag Data

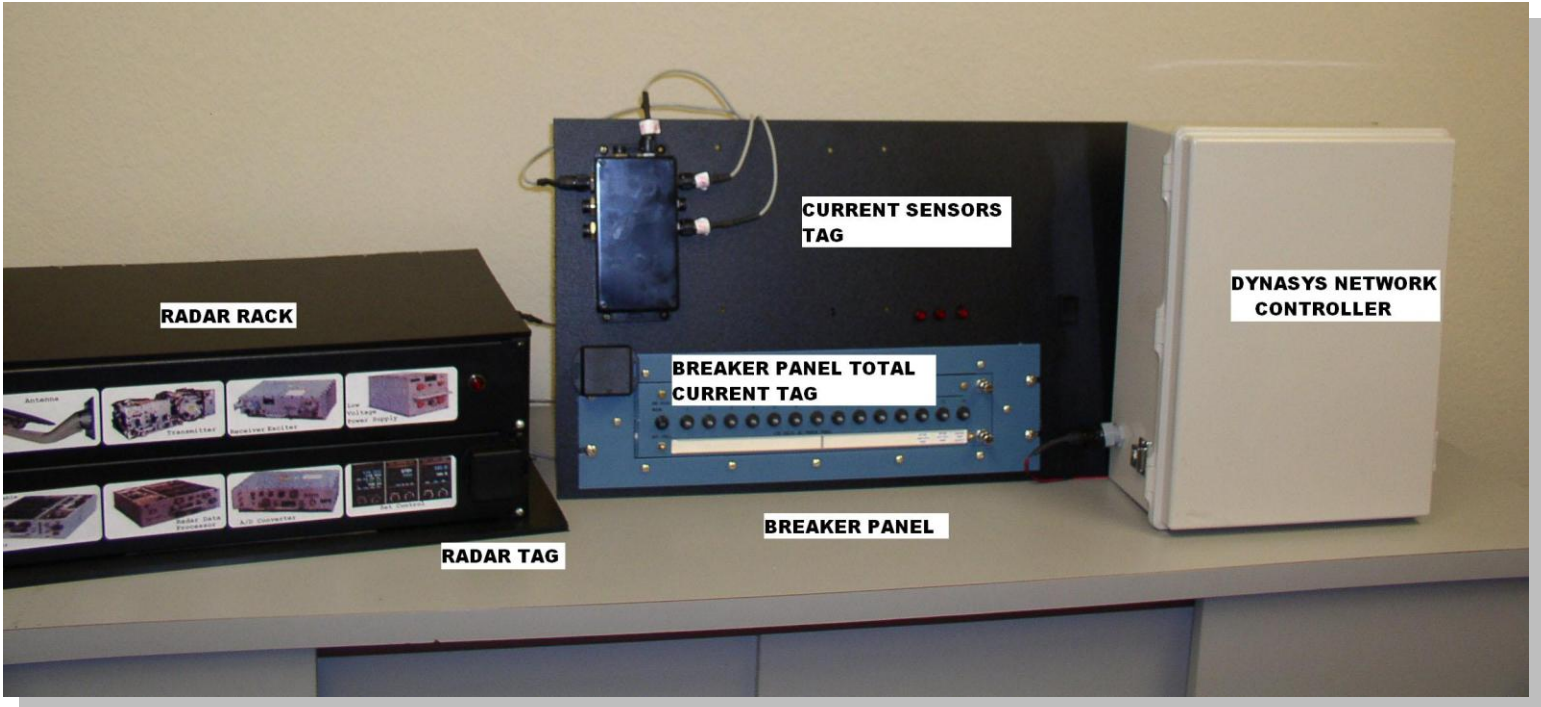
Installed MDS: AC130U Installed Full Ac Serial Number: 9200000253

Noun	WUC	NIIN	PRI NR	Case CD	RFID tag	Tag Hours	MIBF	MTBF %	Tag Amps	Average Amps	Amp Threshold	Date time
APQ-180 Transmitter LRU	72WC1	002791357	3263843	01456	41100001	133	182	73%	152.7	1.5	1.5	2012-09-06 15:50:38
AQP-180 Receiver/Exciter LRU	72WB0	014891000	3173025-117	4U884	41100002	183	247	74%	202.7	1.5	1.5	2012-09-06 15:50:38
AQP-180 Antenna LRU	72WCG	014878407	3173032-105	R2577	41100003	333	287	82%	252.7	1.5	1.5	2012-09-06 15:50:38
APQ-180 Radar Data Processor LRU	72WCC	010350744	253957-1	R2577	41100004	283	332	85%	302.7	1.5	1.5	2012-09-06 15:50:38
APQ-180 Signal Data Processor LRU	72WCD	010350744	253957-1	R2577	41100005	333	397	85%	352.7	1.5	1.5	2012-09-06 15:50:38
APQ-180 Analog to Digital Converter LRU	72WFD	013100160	3173037-100	R2577	41100006	133	182	73%	152.7	1.5	1.5	2012-09-06 15:50:38
APQ-180 Power Supply LRU	72WGD	013100160	3173037-100	R2577	41100007	183	232	78%	202.7	1.5	1.5	2012-09-06 15:50:38
AQP-180 Set Control LRU	72WH0	011938113	3173542-100	R2577	4110000A	183	437	41%	202.7	1.5	1.5	2012-09-06 15:50:38
ALQ-172 PR Receiver LRU	76KA0	013252225	2624701G003	28527	42100001	220	247	89%	256.4	1.3	1.5	2012-09-06 15:50:38
ALQ-172 PR Transmitter LRU	76KC0	011521792	2624702A003	28527	42100002	320	332	96%	356.4	1.4	1.5	2012-09-06 15:50:38
ALQ-172 Signal Controller LRU	76LL0	013884412	121A812-1	03640	43100004	300	352	90%	324.1	1.2	1.5	2012-09-06 15:50:38
					44100001	520	1422	38%	773.1	3.9	100	2012-09-06 15:50:38

JRAMS RFID demo screen showing a given aircraft along with its location, inventory of critical items, unique ID, and on-time since commission based on a true measured MTBF. The system also has the ability to generate other alarms such as current overload and equipment overheating.



SeRFNet Monitor Demo System



SeRFNet Monitor Demo System represents an APQ-180 Radar System in an USAF AC-130 aircraft. Equipment includes a network controller, a high-capacity sensor tag, two standard sensor tags, and a mock APQ-180 radar rack and breaker panel. System monitors and reports LRU current consumption and accumulated On/Off time.

