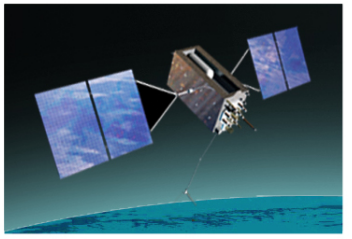
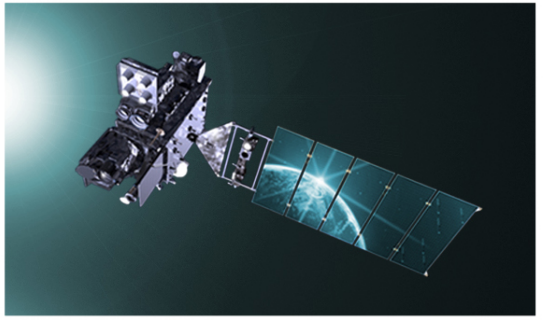
ASSURANCE TECHNOLOGY CORPORATION

84 South Street • Carlisle, MA 01741












Capabilities Overview 2018

Corporate Overview

Corporate Locations

Corporate Offices
Research And
Development, Consulting
Carlisle, Massachusetts

ATC Power Systems
Merrimack, New Hampshire

Space, Aerospace And C4ISR
Systems Production And
Test Services Facility
Chelmsford, Massachusetts

Research And
Development, Systems
Engineering
Alexandria, Virginia

Research And
Development, Systems
Engineering
Chantilly, VA

Software Development
Cocoa, Florida

Core Business Areas

- ◊ Advanced, High Performance, High Reliability Space, Avionics And C4ISR Systems Design And Development. More Than 350 Space Payloads And Systems Launched; More Than 300 Avionics And C4ISR Payloads And Systems Deployed
- ◊ Annual Sales Of $100 Million With Approximately 350 Employees; And Over 100,000 Square Feet Of Facilities At Four Major Locations

Typical Products And Services

- ◊ Space RF And Optical Payloads With Software Defined Digital Processing
- ◊ Space Weather And Other Scientific Instruments
- ◊ Payload Controllers And Data Processors
- ◊ Embedded Real-time Software And Firmware
- ◊ Digital Signal Processing Algorithms
- ◊ Systems Engineering/ CONOPS
- ◊ Analog And Power Systems
- ◊ Spacecraft Antennas
- ◊ Optical Telescopes
- ◊ Focal Plane/Cryocooler Support Electronics
- ◊ RF Integrated Microwave Assemblies
- ◊ Suspended Substrate RF Filters/Multiplexers
- ◊ Large Aperture Ground Terminals
- ◊ UAS/Airborne ES And EW Software Defined Radios
- ◊ C4ISR Systems
- ◊ Ground Support And Test Systems And Services
- ◊ Reliability, FMECA And Worst Case Analysis Engineering
- ◊ High Reliability Space Parts Processing
- ◊ Failure Analysis/DPA

Design And Development Expertise

RF And Optical Payload Systems

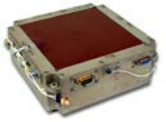

SRP


SRR, SRR 2.5

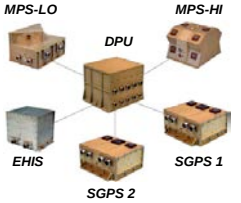

ROEM


RWR

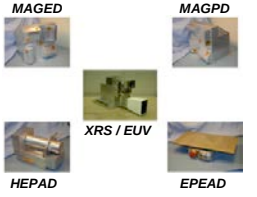

RDP


CIE

Space Weather Instruments



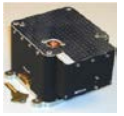
GOES-R SEISS



GOES N/O/P


WindSat


POES/ METOP/ SEM


CEASE

Payload Controllers And Data Processors

Hardware And Software Development For Space, Avionics And C4ISR

C4ISR Systems


A2C2S


UCIM


JTRS SINCGARS, SRW, INC


Army Embedded GPS Receiver (AEGR)

Power Systems


DPU


RPU

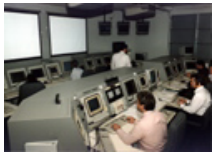

SEPS


Advanced StarTracker

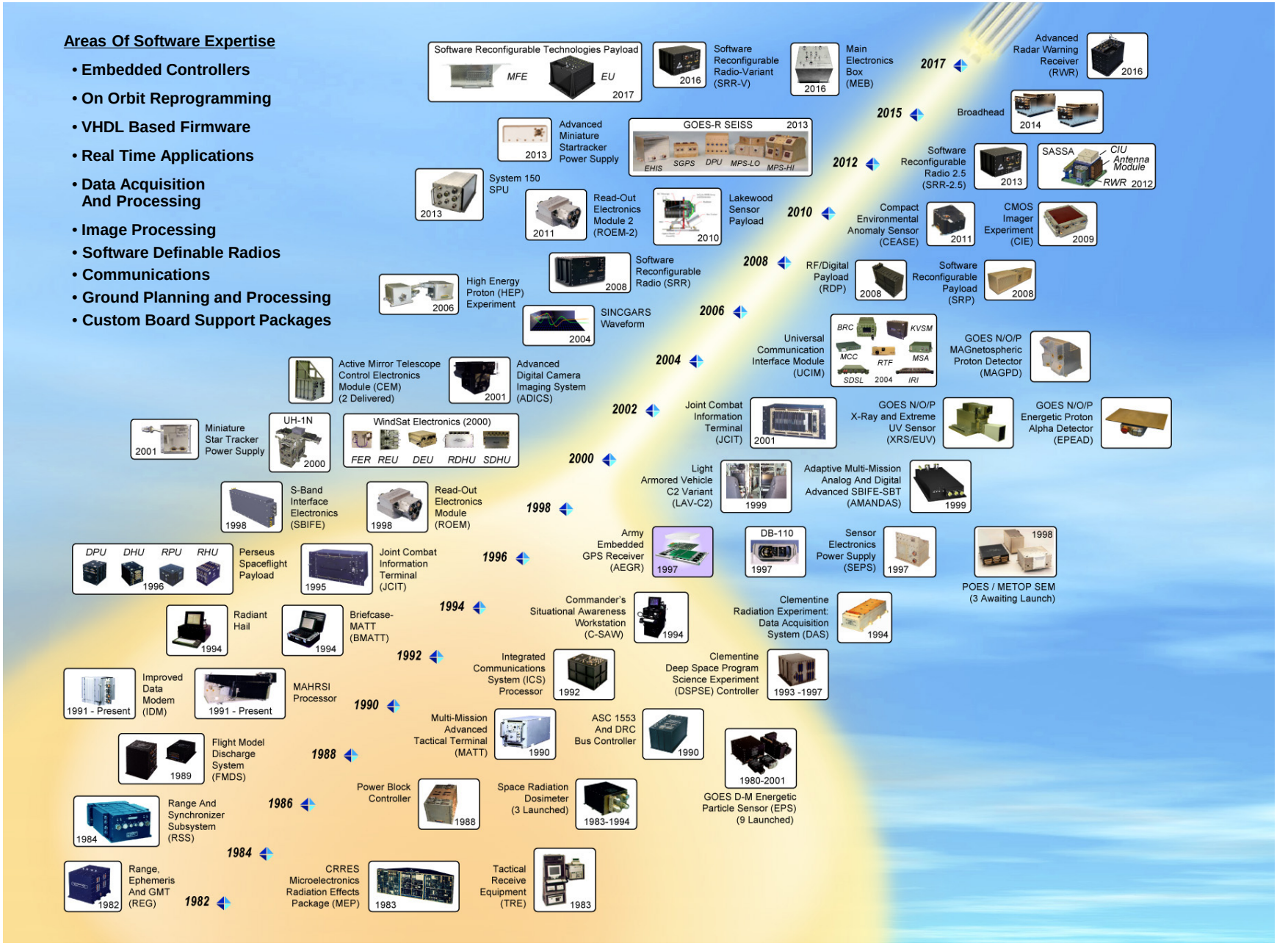

FMDS


MBS

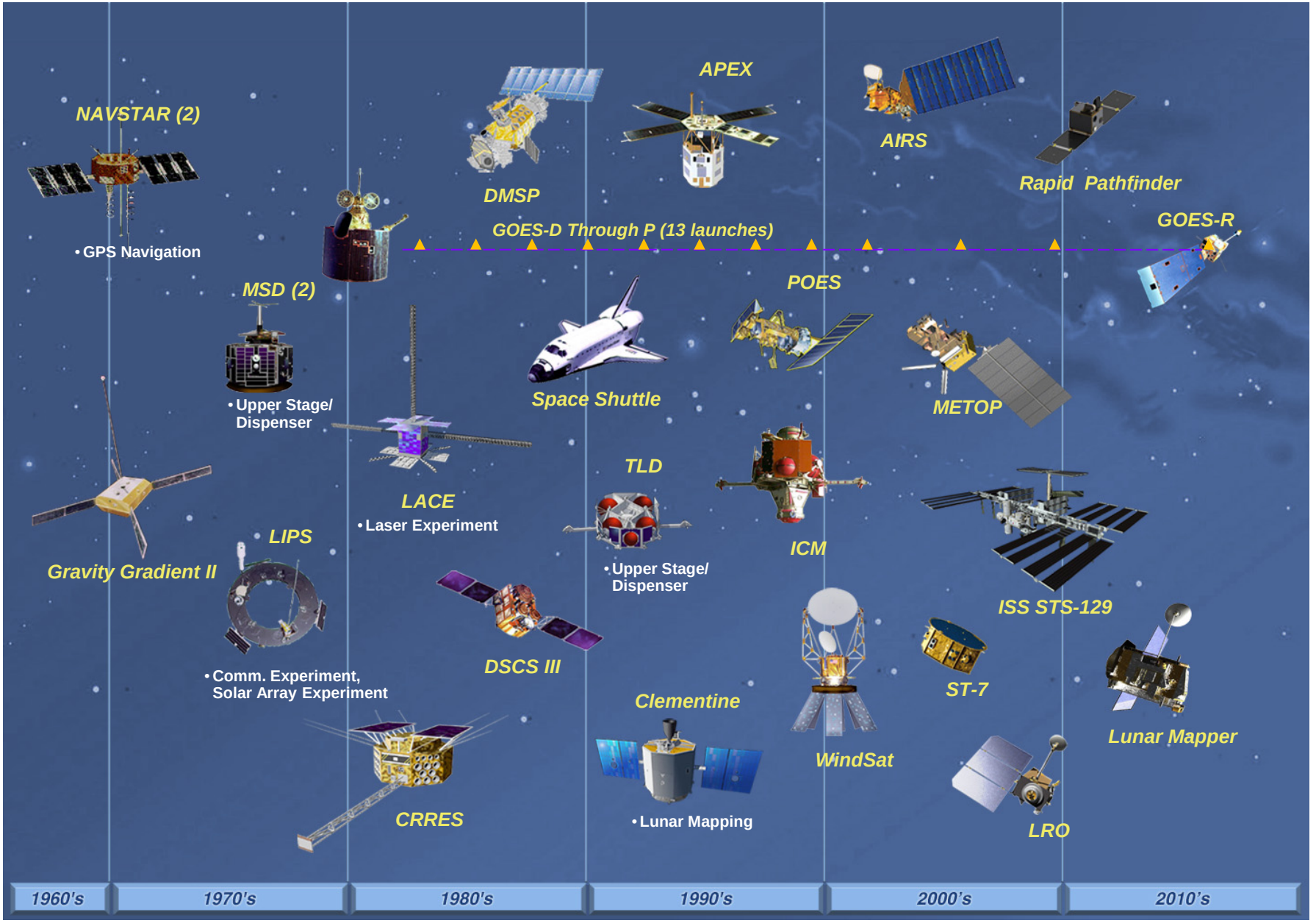
Ground Support And Test Systems



ATC Development Experience Overview

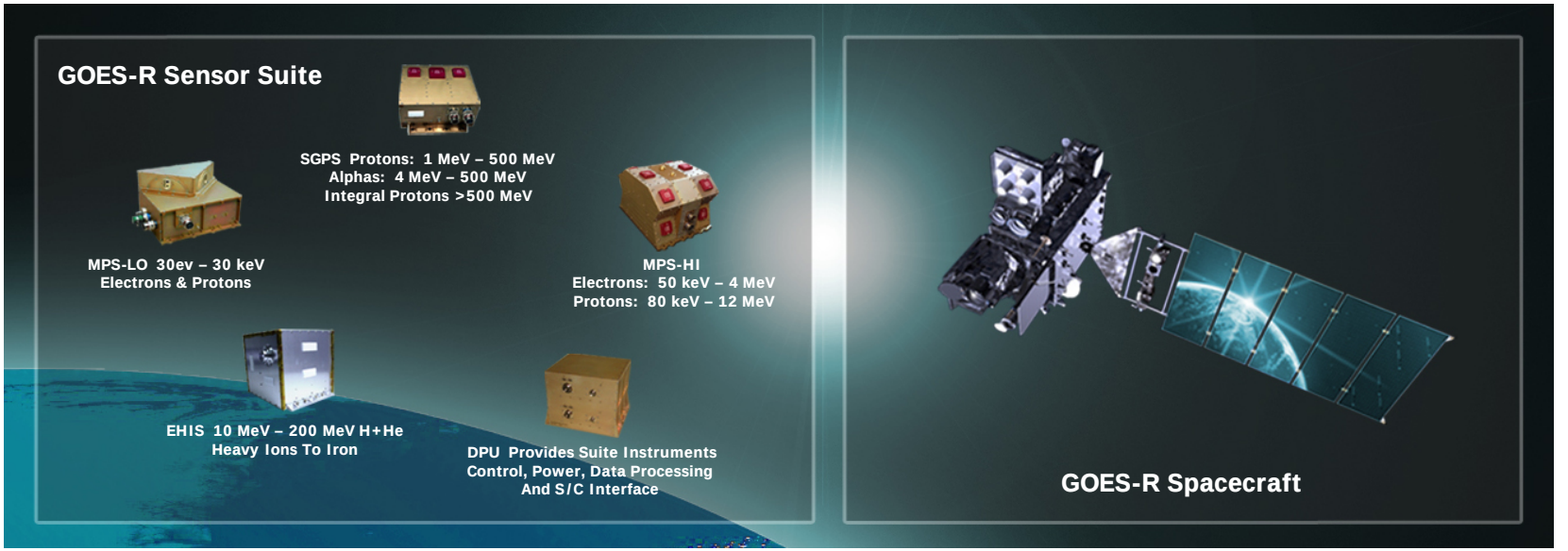


ATC History In Space



Recent ATC Payloads, Systems And Technologies

GOES-R Space Weather Sensor Suite



- NOAA's GOES-R Satellite, developed in collaboration with NASA, launched from Kennedy Space Center on November 19, 2016, carrying the latest generation of terrestrial and space-weather instrumentation. Among the payloads is the Space Environment In-Situ Suite (SEISS), developed by Assurance Technology Corporation (ATC), and its subcontractor, the University of New Hampshire. GOES-R achieved geostationary orbit on November 23, 2016, and was renamed GOES-16.
- ATC activated the SEISS Data Processing Unit (DPU) on 21 December 2016, and began its successful checkout procedure. The SEISS team activated on the five SEISS sensors (MPS-LO, MPS-HI, SGPS+X, SGPS-X, and EHIS) on 8 January 2017, and began their successful check-out and cross calibration.

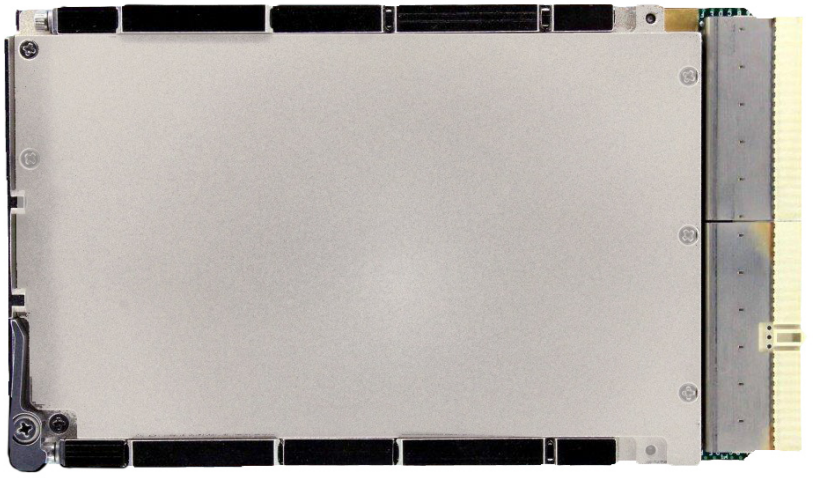
Main Electronics Box (MEB)

- High Speed Image Processor and Payload Controller
  - Performs Real-Time Non-Uniformity Correction, Sub-Windowing and Co-Addition of 16MPixel Data Stream using Meshed Virtex-5 (SiRF) FPGAs
  - Controls the Optical Telescope Assembly, Cryo-Cooler and Focal Plane Electronics
- High-Speed SERDES Interface to the Focal Plane Electronics
- High-Speed LVDS Mission Data Interface to Host Vehicle
- RS422 Interface to Host Vehicle for Low Rate Command and Telemetry
- On-Orbit Re-programmable
- NASA Level 2 Parts
- 60 kRads Total Dose

- Uses ATC's General Purpose Space Control Processor Module and Linux Software Stack
- 9.27"H x 10.16"L x 11.47"W
- 31.5 Pounds
- 178W Average Power Dissipation Including Cryocooler And Focal Plane Electronics

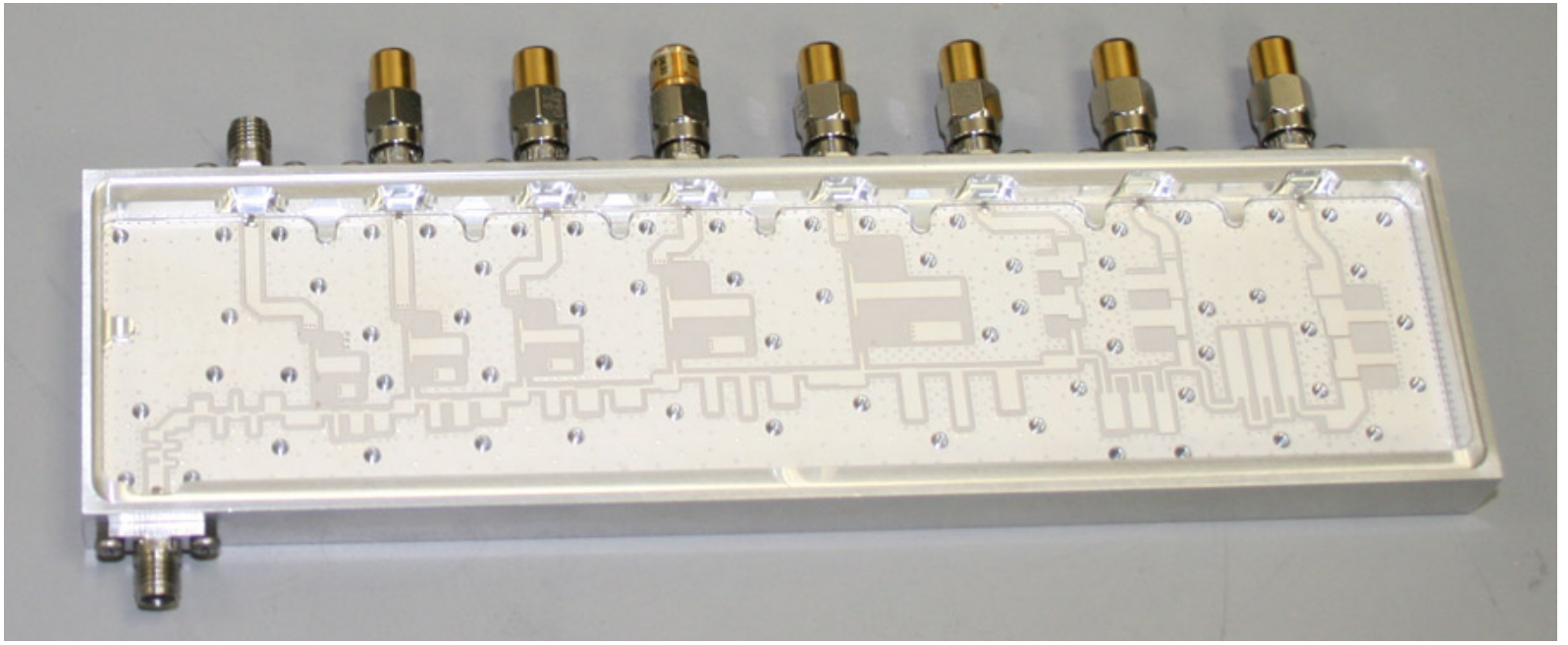
General Purpose Space Processor

- 3u cPCI Spaceflight Processing Module Based on the Aeroflex LEON 3FT (UT699E)
  - 96 DMIPS @ 80MHz
  - 7W Total Power Dissipation
- 512MB SDRAM
- 512kB PROM
- 8MB NOR Flash
- 1GB Triple Mode Redundant NAND Flash Array
- Three SpaceWire Endpoints with Data Rates up to 200Mbps
- Three RS422 UARTS with Data Rates up to 1Mbps
- PCI v2.2 Bus Master
- 100kRAD Total Dose
- Full Linux Kernel/BSP with File System Extensions to Support Redundant NAND Flash Array



Suspended Substrate Filters / Multiplexers

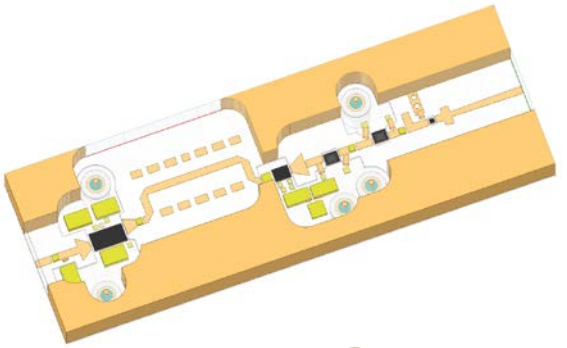
◊ Suspended Stripline Filters Provide A High Q Response, With Steep Skirts And Very Low Insertion Loss.

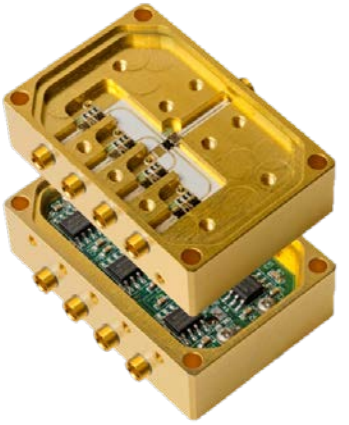


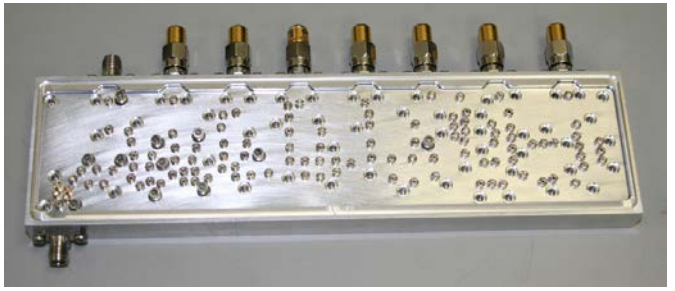
8 Channel Suspended Stripline Multiplexer (2-18 GHz)

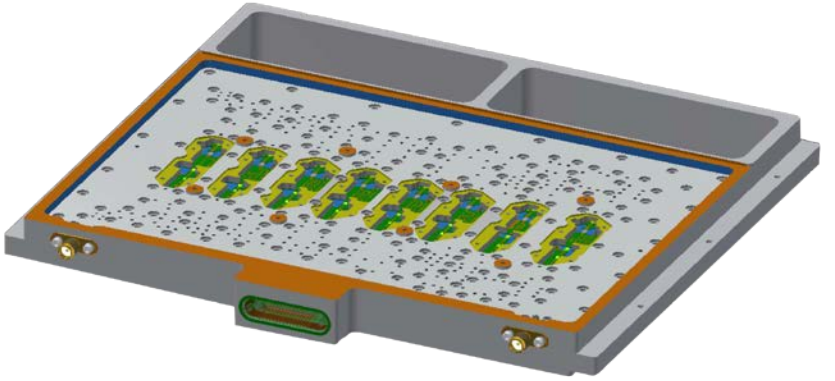
Integrated Microwave Assemblies

- Design, Fabrication, Test and Qualification of Custom Integrated Microwave Assemblies (IMAs) for Spaceflight, Avionics and C4ISR Applications
- IMAs Feature Suspended Substrate Filter Technology for Superior Performance
- Laser Sealed Hermetic Enclosures Support Operation in Rugged Environments
- Low Size, Weight and Power









Broadhead Multifunction EW UAS Payload

- Characteristics:
  - Modular and Scalable
  - Software Defined Functions
    - Supports SCA 2.2 Compliant Communication Waveforms
    - RedHawk Operating Environment

- Capabilities:
  - Multi-mission, Dynamically Reconfigurable
  - Electronic Support/Spectrum Awareness
  - EA (Offensive and Defensive)
  - Cyber
  - DF/Targeting
  - Air-Air and Air-Ground Networking
  - Voice/Data Relay; Cross-banding

Broadhead Features

Size: 6.9″W x 5.7″H x 11.8″L

Weight: 8-12 lbs.*

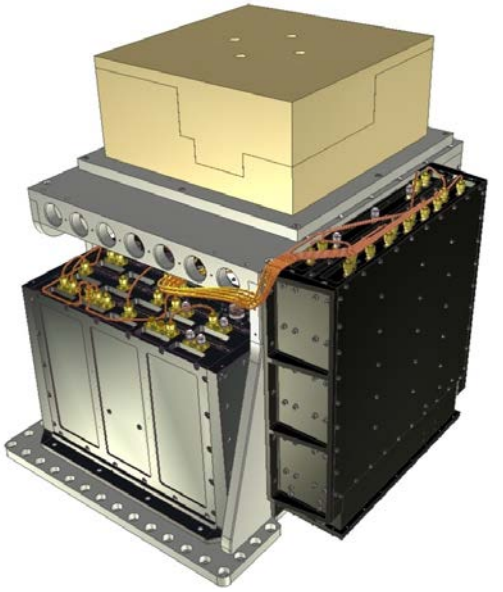
Power: 25-54 W*

Cooling: Conduction

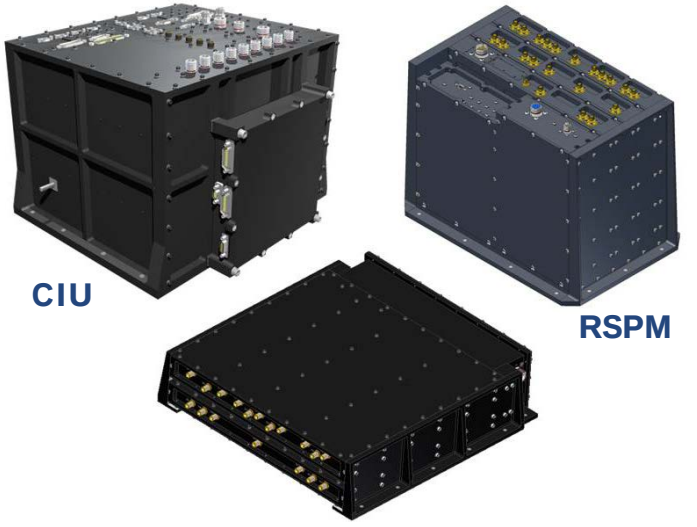
* Configuration Dependent

SASSA Flight Payload Systems

- Two SASSA Flight Payload Systems Were Developed For The Air Force Space And Missile Systems Center Space Superiority Wing (SMC/SY)
- The SASSA System Contains Five (5) Units
  - The Common Interface Unit (CIU), Which Provides Common Space Vehicle And SASSA Instrument Functional Interfaces, With The Processing/throughput Capacity, Interfaces And Power To Support Six (6) Instruments
  - The Radar Warning Receiver (RWR) Instrument, Consisting Of Three Units: The RWR Antenna, The RWR Antenna Module And The RWR Signal Processing Module (RSPM)
  - The Dedicated SASSA Communications (DSC) Instrument (Not Shown), Providing Communications With The AFSCN Ground Station



RWR Antenna



Antenna Module

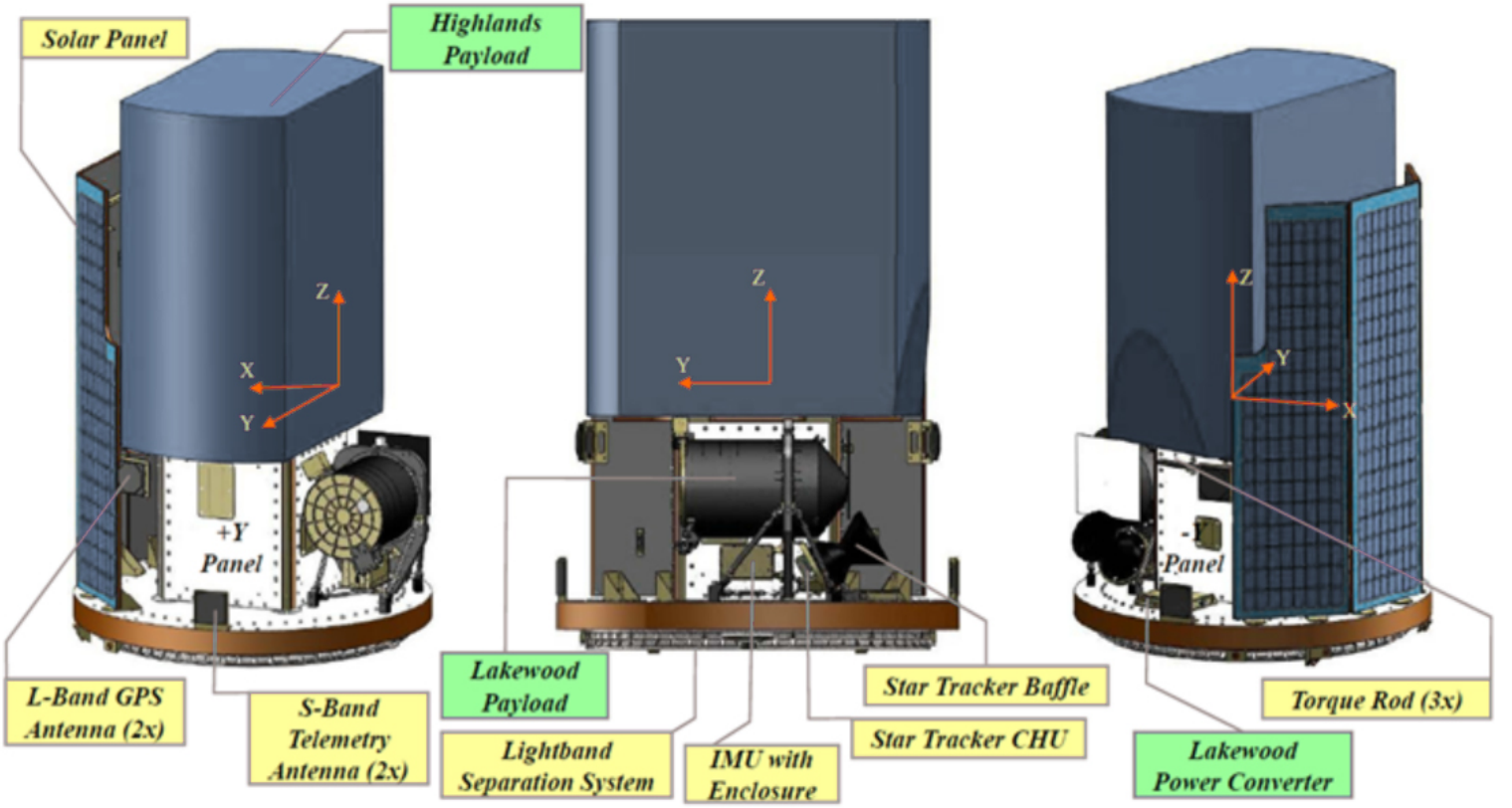
SASSA Ground Segment

- As Part Of The Efforts For The US Air Force Space And Missile Command (SMC), Self-awareness, Space-situational Awareness (SASSA) Program, Assurance Technology Corporation (ATC) Developed Two Deployable Ground Segments To Operate And Analyze The Data Received From The SASSA Payloads On Orbit. Features Include:
  - Integrated Custom And Off-the-Shelf Hardware For Interfaces To The Host Vehicle Ground Segment And The Air Force Satellite Control Network (AFSCN)
  - Ground Segment Has Full Red-black Separation Features For Division Of Host And SASSA Data Interfaces
  - Full Mission Planning And Analysis Suite For Mission Operations
  - Certification For IT Security At The Host Vehicle Level
  - Radar Warning Receiver (RWR) Workstation In Parallel With Mission Operations
  - Custom Telemetry Monitoring, Logging And Warning Screens

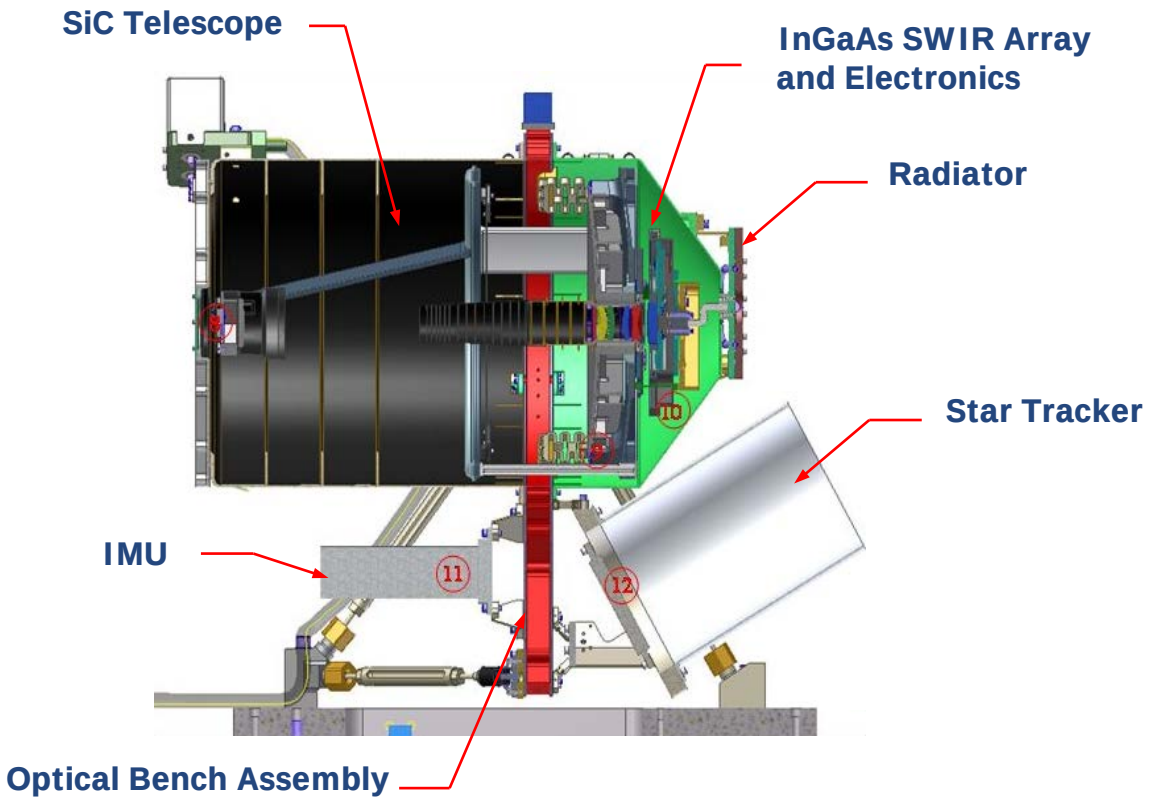
- Multi-Terabyte Redundant Data Storage Facility With Relational Database
- Signature Database For Signal Analysis Reference
- Remote Data Transfer And Operation Support At ATC Factory
- Ground Segment Can Operate Multiple SASSA Payloads Simultaneously
- Ground Segment Integrated And Operational At Site In Less Than One Week
- Currently Supporting Full Operations With With Dedicated ATC Operator On Site

Lakewood Short Wave IR Sensor
For NRL Upper Atmospheric Phenomenology Survey

- ATC Was the Lakewood Payload Prime Contractor/Payload System Engineer
- Instrument Launched On A Millennium Space Systems Bus
- Polar Orbit @ 1200 km, 2 Year Mission



Lakewood Sensor Payload



- Array Format: 640 x 512 pixels, 25 mm Pitch
- Integrated Thermo-electric Cooler
- Rad Hard Power Converter and Camera Electronics
- Aperture 23.8 cm, F/10

Software Reconfigurable Receiver, Version 2.5 (SRR2.5)

- ATC Designed, Developed, Fabricated And Tested The 2nd+ Generation Of This Software Reconfigurable Receiver.
  - Based On Successful, Operational First Generation SRR
  - Class S Or Equivalent Parts
  - 100 KRads Total Dose
  - Multi-Channel Narrow-band Receiver
  - Zero-IF (Direct Conversion) RF System
  - On-Orbit Demodulation And Processing
  - Dual-redundant 1553 Interfaces, Dual Redundant Power Converters
  - Selected Redundancy Throughout Payload For Reliability And Future Growth
  - Latchup Immune, SEU Tolerant

- Superior Performance Proven By The First Generation SRR Was Enhanced For This Series With Significant RF, Algorithm, Firmware And Software Improvements
- Program Accomplished On Schedule And Under Budget

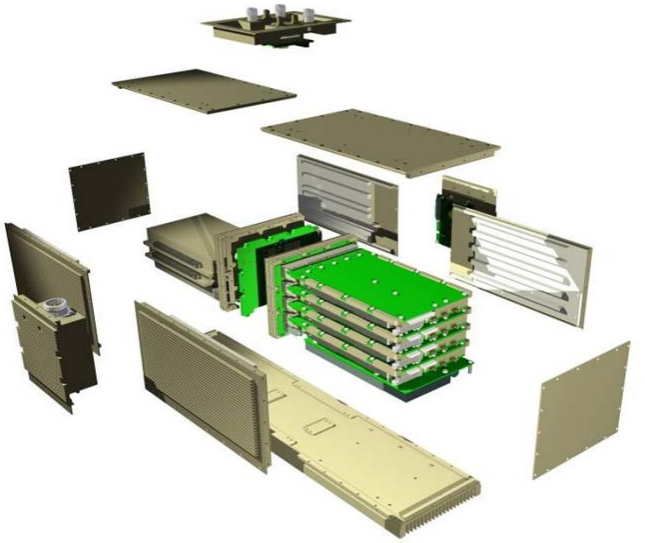
Software Reprogrammable Payload (SRP)

Military Relevance/Operational Impact

- Flexible: On-The Fly Reconfigurable, Multiple, Simultaneous Missions And Applications
- Extensible: Rapid Payload Upgrades In Response To Changes In Threats, Missions
- Modular And Open Standards, Formats And Protocols

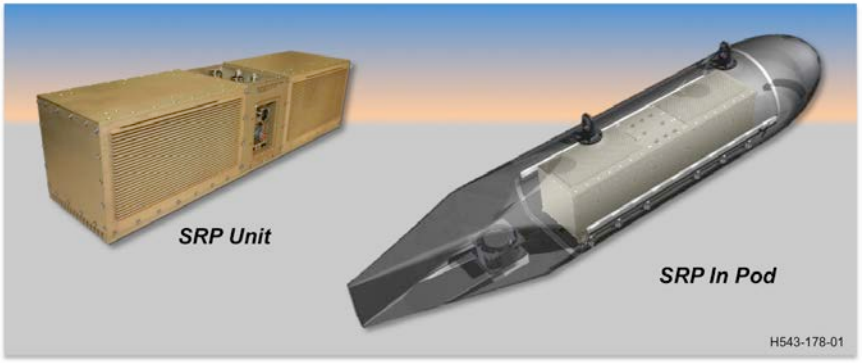
Mission Areas Addressed

- Baseline: Communications –Voice, Data, IP Routing, Signals Intelligence (VHF/UHF), ECCM
- Near Term: Reconnaissance, Target Identification/Designation, Battle Management, Sensor Support – CBRNE, Other



SRP Payload Exploded View

Shadow UAS



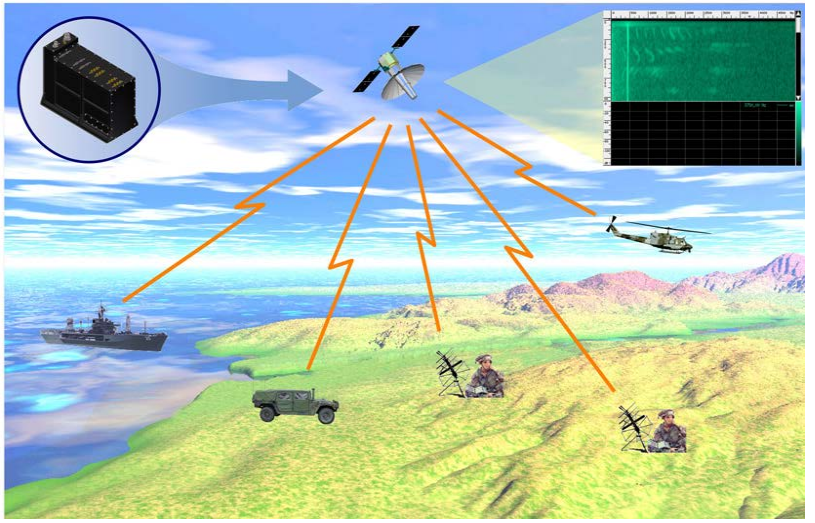
Shadow UAS Pod

ORSTECH RDP

Advanced On-Orbit Software Reprogrammable RF/Digital Payload (RDP)

◊ Background

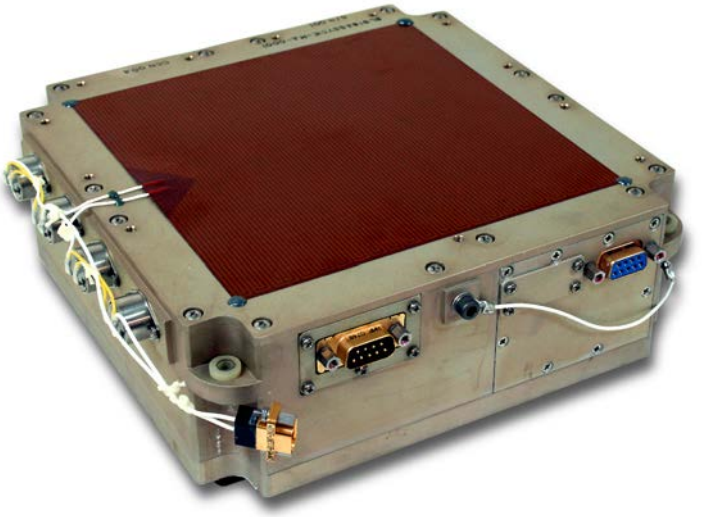
- High Priority Responsive Space Missions Enabled Through the Development of Space Based Software Defined Radio and Low Power Processing Technologies
- On-Demand Tactical Mission Capability using In Theater and On-Orbit Reprogrammability
- Flexible and Agile in Bandwidth and Frequency
- Directly Applicable to 48% of the Missions Identified by the COCOMs for TacSat 3 and 4
- Use of Open Standard Spacecraft Interfaces



◊ Includes:

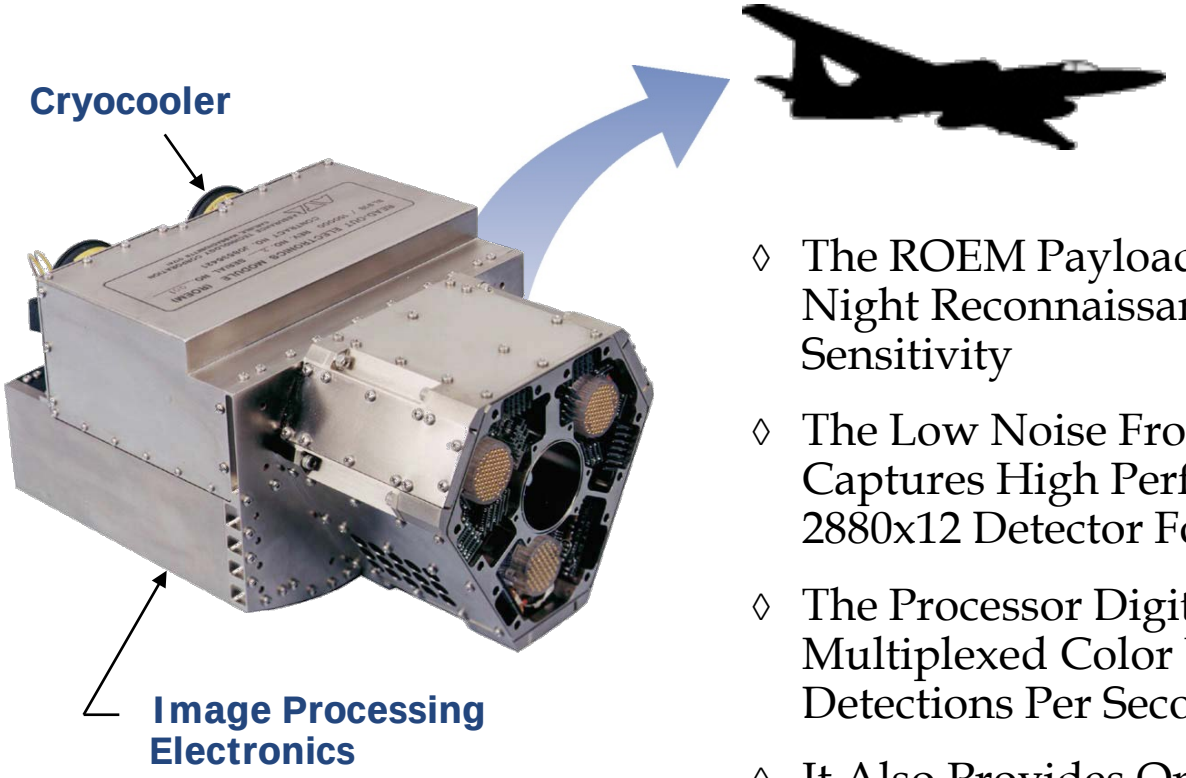
- Compact Tunable RF Transceiver
- Wideband Digital Transceiver
- Reconfigurable Low Power Computing Resources (3)
- RDP Infrastructure Software
- Web Based Ground Station Control Software
- RDP Assembly with Power Converter

CMOS Imager Experiment (CIE)



- Developed by ATC in 20 months for the MISSE7 Experiment on the International Space Station
- CIE Characterized the Performance of Its Advanced CMOS Image Sensor in the Natural Space Radiation Environment.
- Launched on Space Shuttle STS-129, MISSE7 Was Operational for 19 Months Before Being Returned To Earth
- CIE, a Self Contained Instrument, Includes a 1.2 Megapixel Imaging Array, Redundant Light Source and Light Source Monitor, Dosimeter to Monitor the Ambient Radiation Environment, an Image Controller, a Solid State Data Recorder and Embedded Processor for On-board Analysis of the Array Output, a Communication Interface for Command Upload and Data Download During on-Orbit Operations, a DC/DC Power Converter, and a Radiator for Thermal Control. CIE Weighs Less Than 7 Pounds and Operates on Less Than 15 Watts of Power.

Read-Out Electronics Module (ROEM)



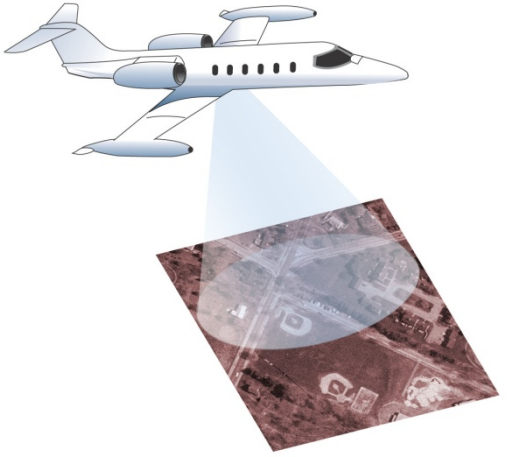
- The ROEM Payload Provides Unprecedented Night Reconnaissance Capability And Sensitivity
- The Low Noise Front End Electronics Captures High Performance, Four Color 2880x12 Detector Focal Plane Array Outputs
- The Processor Digitizes 48 Channels Of Multiplexed Color Video Data At 260 Detections Per Second
- It Also Provides On-Board Programmable Time Delay Integration, Gain, Offset, And Scene Based Offset Correction To Each Pixel
- The Digitally Multiplexed Fiber Optic Output Uses 1.06 GBPS Fiber Channel Standard

Advanced Digital Imagery Camera System (ADICS)

Operator Station (PC)

Data Handling Unit (DHU)

EO Camera



- High Performance, Multi-Platform Daylight Mapping System
- Provides Resolution And Area Coverage Rates 6 – To 10 Times Competing Systems
  - Coverage Of Up To 600 Sqmi/hr
  - Nominal Ground Resolution Of 6 in. From 10,000 Ft.
- All Digital Processing Chain From Focal Plane To Fibre Channel Digital Mass Storage
- 8196 Pixels With 96 Stages Of TDI, 10 Bit Pixel Data, Up To 32,768 Lines Per Frame
- Programmable Operation For Wide Range Of Platforms
- Full Kinematic Subsystem For Geolocation To The Pixel Level

RF Payloads (AMANDAS, WindSat)

Adaptive Multi-Mission Analog And Digital Advanced SBIFE-SBT (AMANDAS)

- Space Qualified S-Band Radio Receiver
- Both Coarse And Fine Tuning Over 2-4 GHz Range
- Both Wide Field Of View (WFOV) And Narrow Field Of View (NFOV) Capability
- Both Continuous Wave (CW) And Pulse Code Modulation (PCM) Capacity
- High Sensitivity With Low Phase Noise
- 4 Channel Sub-Band Tuner With On-Orbit Programmable Band Widths
- Snapshot Mode For High Data Rates

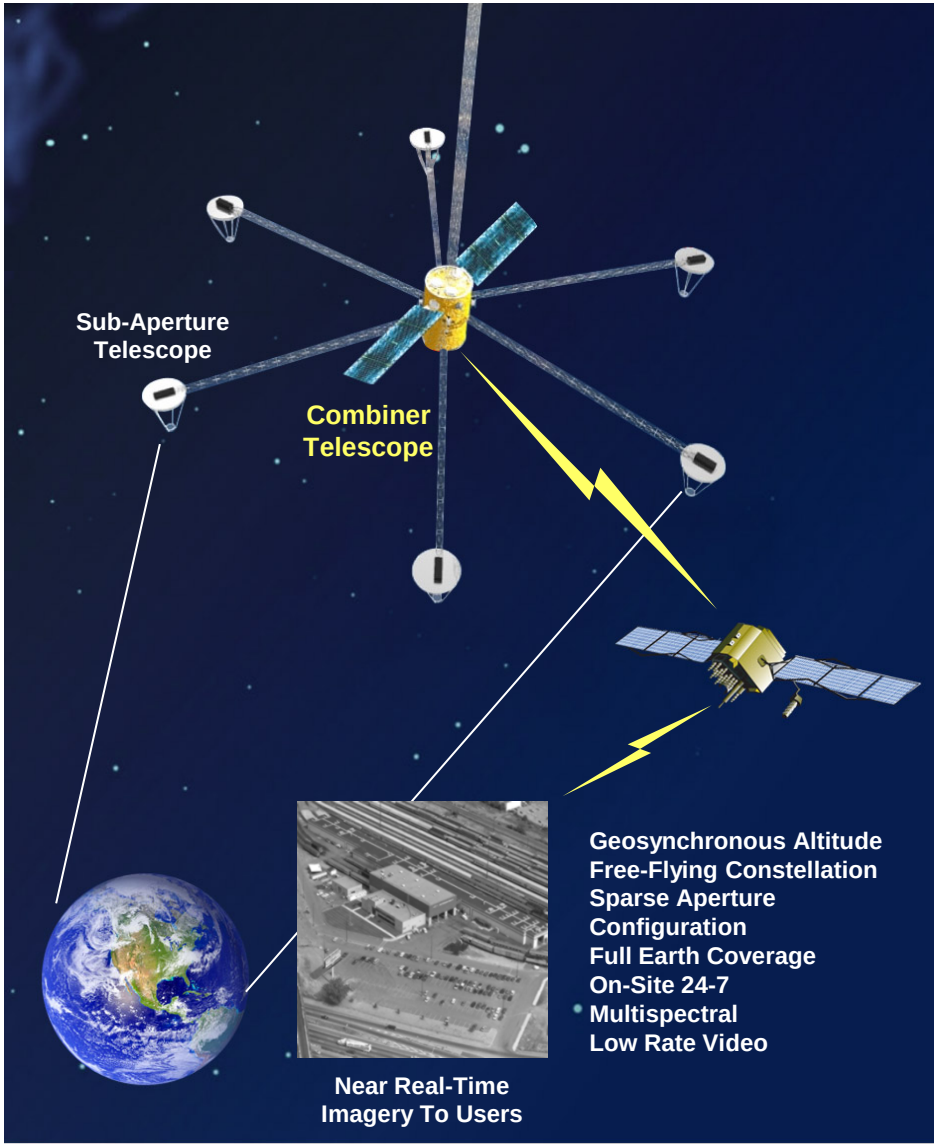
WindSat Mission Overview

- ATC Designed And Developed The Antenna Structure, RF Receiver And RF Digital Data Processing
- Characteristics/Description:
  - Measures Ocean Surface Wind Speed and Direction Using Polarimetric Radiometer On A Modified Satellite Bus, Launched Into A 830 km 98.7° Orbit By The Titan II Launch Vehicle

- Special Features:
  - Demonstrate Polarimetric Radiometry
  - Risk Reduction For National Polar-Orbiting Operational Environmental Satellite System (NPOESS)
  - Space Test Program Satellite Bus
  - Sensor To Shooter Direct Data Read-Out
- Capability/Improvements:
  - Measure Ocean Surface Wind Direction (Non-Precipitating Conditions)
  - 3 X Improvement In Horizontal Resolution (Viz. SSMI)
  - Secondary Measurements: Sea Surface Temperature, Soil Moisture, Rain Rate, Ice, And Snow Characteristics, Water Vapor

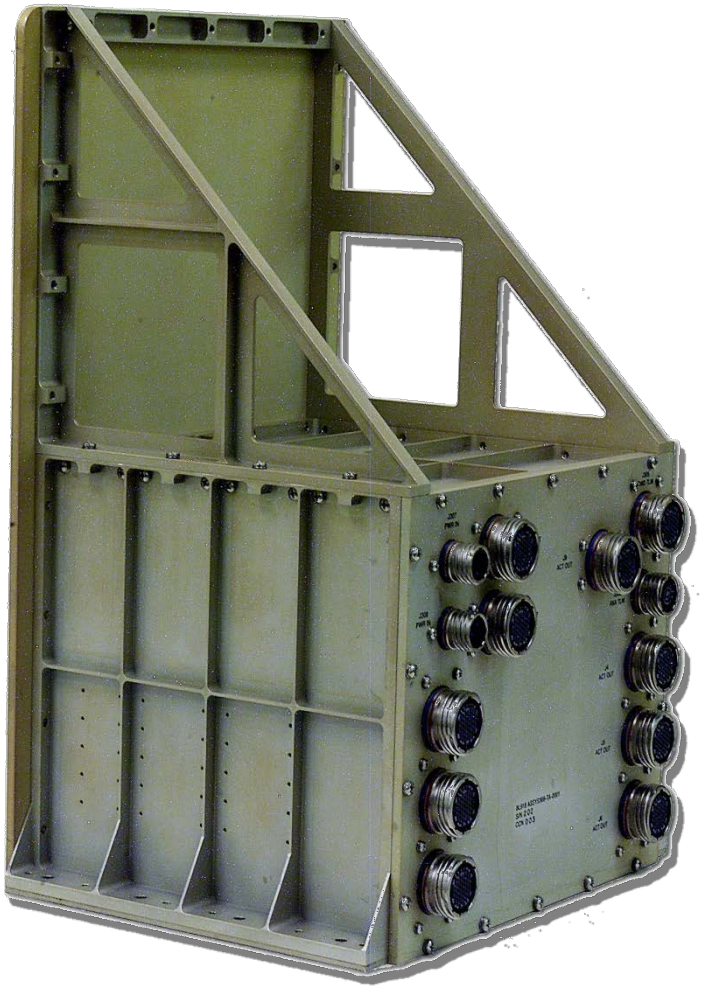
Revolutionary Imaging Technology (RIT)

- The RIT Program Explores Concepts for Achieving Extremely Large Effective Optical Aperture Diameters in Space
- The Intelligence Payoff of Such a Capability Is the Ability to Capture High Resolution Imaging From Orbits That May Be As High As Geosynchronous
- Program Elements Supported By ATC Include:
  - Space System Concept Development
  - Metrology Subsystem Laboratory Development
  - High Altitude Sensor Testing
  - Large Area Visible Focal Plane (LAVA) Development



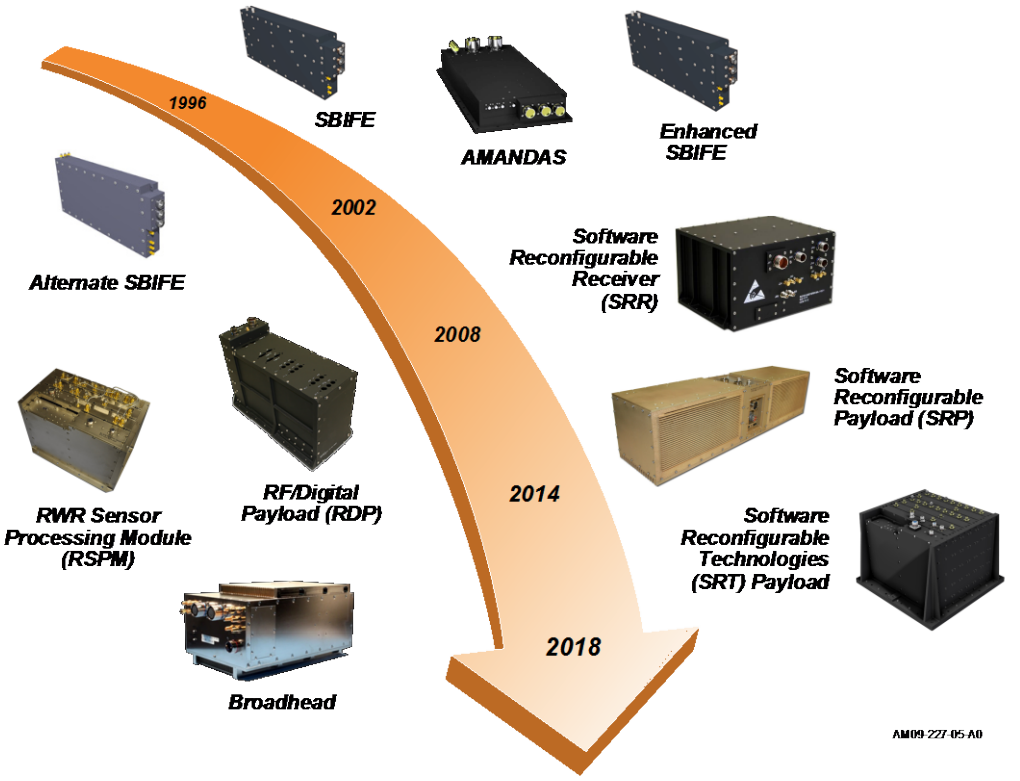
Active Mirror Telescope
Actuator Control Electronics Module (CEM)

- ATC Designed, Fabricated And Qualified The Actuator Control Electronics Module (CEM) To Provide Multiplexing Functionality For The Addressing, Operation And Control Of 414 Actuators Used To Correct Mirror Self-Deformation And System-Level Wavefront Error
- Flight Unit CEM, Flight Spare And Spare Circuit Card Assemblies Delivered
- Performed Electrical / Mechanical Design; Mechanical CAD; Thermal / Structural And Worst Case Design Margin Analyses; Parts Procurement And Screening; Fabrication, Assembly And Test



Software Defined Radio Technologies Overview

- ATC Has Developed Software Defined Radios For Space/Airborne Applications Since 1989
- Recent Airborne and UAS SDR Systems Include The NRL SRP, Versions 1.0, 1.5 and 2.0
- The RF/Digital Payload (RDP) Was Developed for NRL and The Air Force Operationally Responsive Space (ORS) Program Under A BAA Award
- The RDP Is A Prototype Flight Unit With Three Processors, One Transmitter and Receiver, Power Converter and Digital Transceiver



- Both SRP And RDP Use A Modified Software Communication Architecture Operating Environment. RDP was Demonstrated with Two Test Waveforms. A SGLS Waveform Was Prototyped in MATLAB
- The RDP Is Sized to Add An INFOSEC Module and Two More Transmitter/Receiver Modules
- ATC Leveraged It's Experience Gained In Developing The JTRS SINCGARS Waveform, And Contributing To The Soldier Radio Waveform In The SRP And RDP Payload Developments, And Has Since Migrated To The Red Hawk Operating Environment
- The SASSA Radar Warning Receiver (RWR) Payload And Its Predecessors Provided Proven Advanced Technologies For Two Generations Of Advanced RWR Payloads

Communications Systems Product Evolution

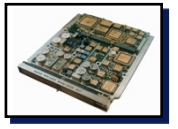
Early Software Based Communications Technology

Tactical Receive Equipment (TRE)

Software Definable Radio (SDR) Technology Evolution

SLDCOM IV Integrated Communications Systems (ICS)

Joint Combat Information Terminal (JCIT)



Single Channel Radio

Enhanced Briefcase MATT

Multi-Mission Advanced Tactical Terminal (MATT)

Improved Data Modem (IDM)

JTRS Pathfinder Waveforms

- SINCGARS/SIP
- HAVEQUICK II (Voice)
- HF SSB (USB/LSB)
- HF AM
- HF PSK
- HF FSK
- VHF ATC
- VHF AM
- VHF FM Public Radio
- ATC HF Data Link
- UHF AM/FM PSK LOS
- TRAP
- TADIX-B
- TIBS
- UHF DAMA SATCOM (Partial)
- HF/VHF/UHF Scanning

JTRS Waveforms

- SINCGARS/ESIP
- (INC) 188-220
- SRW

SRP Waveforms

- SINCGARS/ESIP
- LIPR
- AIS
- Interference Mitigation
- Electronic Attack
- Switchblade
- Spectrum Analyzer

Waveform Software Development Environment (WSDE)

Test Suite

Platforms Supported:

F-16

A/OA-10

JSTARS

E2-C

Shadow

CH-47

OH-58D

UH-60

AH-64

UH-1N

Abrams

MLRS

LAV

AAV

HLS

UOC

WHCA

Integrated C4I Achievements

Assault Amphibious Vehicle (AAV) C2-Variant (USMC)

Health & Human Services

Light Armored Vehicle (LAV) C2-Variant (USMC) (4 Versions)

HMMWV C2 System (Civilian & USMC) (4 Versions)

UH-1N C2 System (USMC) (2 Versions)

Army Airborne Command And Control System (A2C2S)

Analog/Digital Non-Converged Voice/Data

Universal Tool Kit
- Standard Interfaces
- Common Power
- Flexible Computing/Comms
- Modular Design

Digital Converged Voice/Data

USMC Unit Operations Center (UOC) (4 Versions)

First Responder (FEMA)

Universal Communication Interface Module (UCIM)

Advanced Business Concept (ABC) WHCA

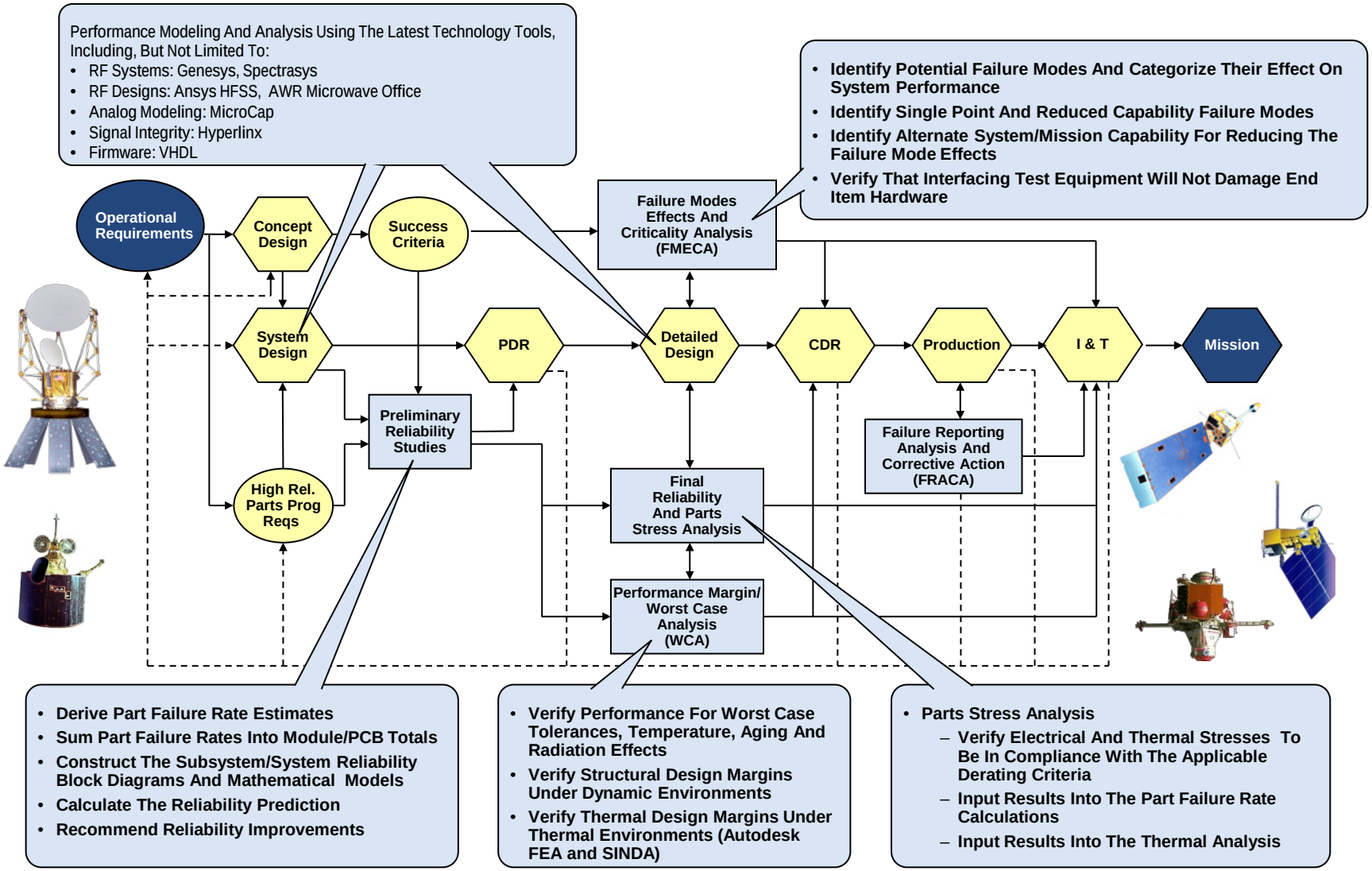
High Speed Vessel Command & Control Center (HSV C^3)

Homeland Security

Analysis And Test Services

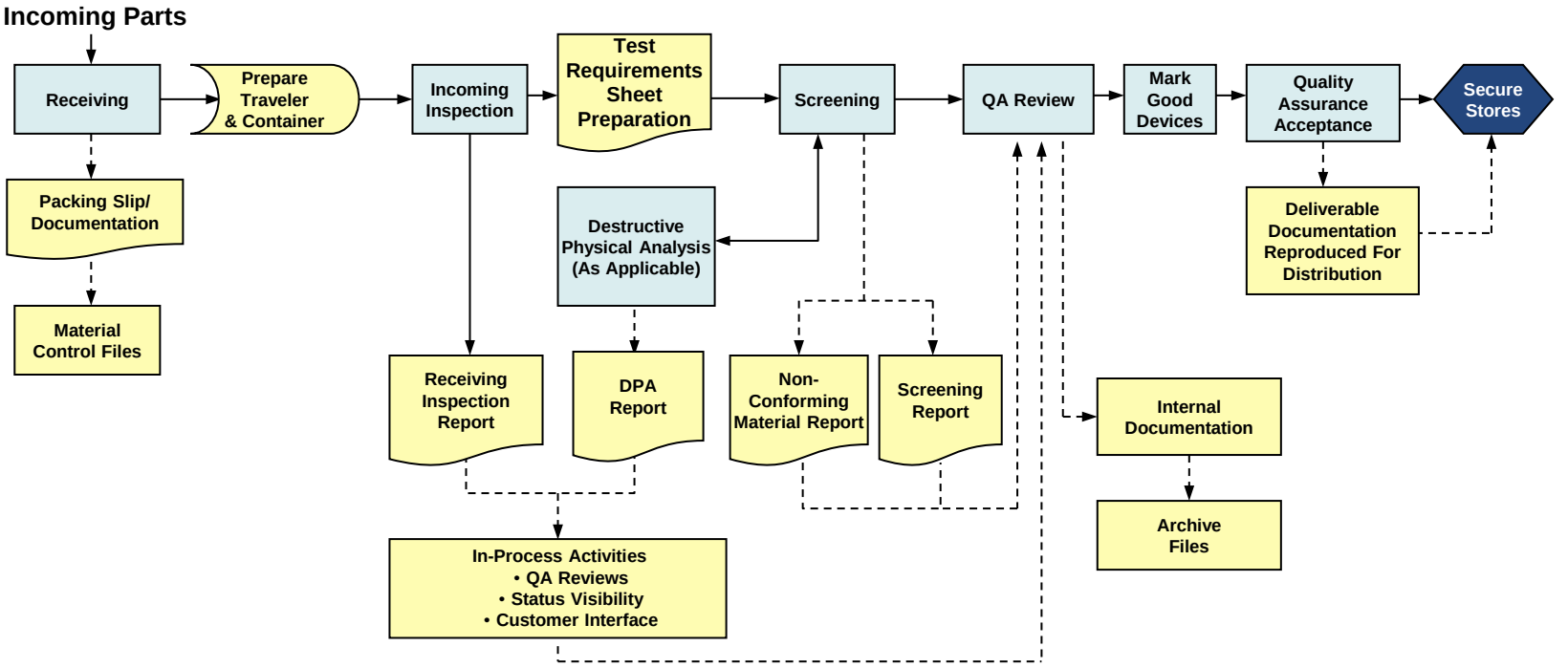
ATC Performance, Reliability, Structural And Thermal Design Analysis Expertise

◊ ATC Employs Advanced Technology Modeling , Simulation And Analysis Tools To Assure That Performance, Environmental And Reliability Requirements Are Achieved



ATC High Reliability EEE Parts Processing Overview

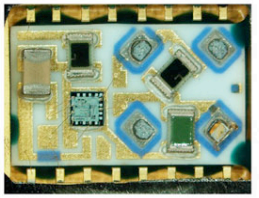
- ATC is one of the foremost independent EEE parts screening and qualification firms in the U. S. space and aerospace industry, successfully servicing over 430 customers over the past four decades.
- The ATC facilities and equipment enabling this success include advanced technology test systems, comprehensive software test libraries, special test fixtures, and a wide array of environmental test equipment.



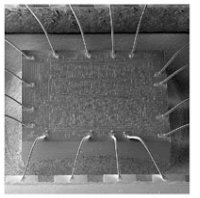
ATC Parts Screening Capabilities

- External Visual Examination
- Stabilization Bake
- Temperature Cycling
- Temperature Shock
- Constant Acceleration
- Hermetic Seal (Fine and Gross)
- Particle Impact Noise Detection (PIND) Testing
- Radiographic Inspection
- Thermal-Vacuum
- AC, Functional and DC Electrical Test
- High and Low Temperature Electrical Test
- Power Burn-In
- High Temperature Reverse Bias (HTRB) Testing
- Voltage Conditioning
- Surge Current Testing
- Device Marking
- High Reliability Device Packaging
- Destructive Physical Analysis And Failure Analysis

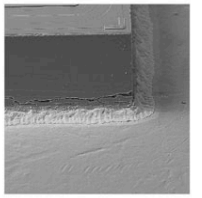
Samples Of ATC Failure Analysis, Construction Analysis And Destructive Physical Analysis (DPA) Results



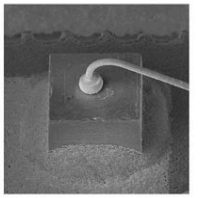
Overall Optical View Of A Typical Hybrid



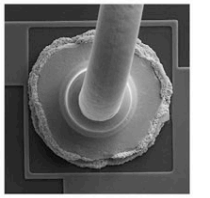
Overall SEM View Of A Typical IC



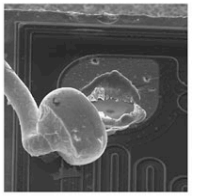
Detailed SEM View Of Fracture Near Die Attach



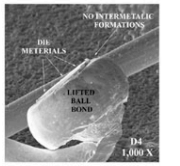
Overall SEM View Of Diode Showing Good Ball Bond



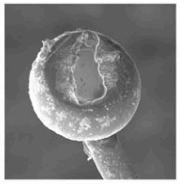
Detailed SEM View Showing Intermetallic Formations



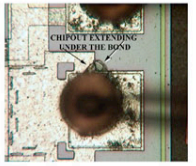
SEM View Showing Lifted Bond (No Force Applied)



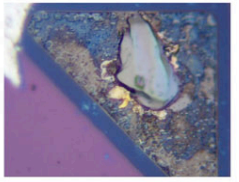
SEM View Showing Lifted Bond Failing Bond Pull Test



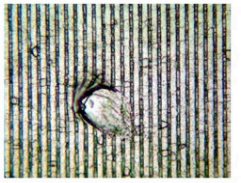
Detailed SEM View Showing Attached Silicon From The Chip



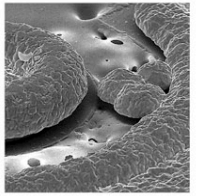
Microscopic View Showing Chip Out Under Ball Bond Induced During The Bonding Process



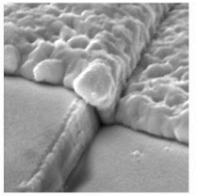
Chip Out Induced During The Wire Bonding Process



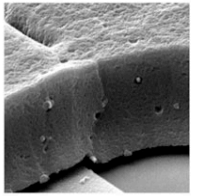
Die Surface Damage Induced During Wafer Handling



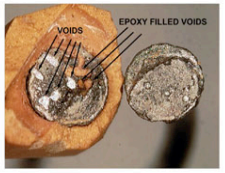
SEM View Showing Extraneous Metal In Close Proximity Of Adjacent Metal

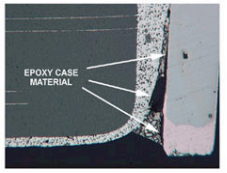


Cracked Or Reduced Metal Greater Than 50%

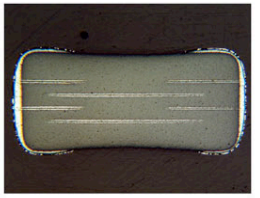


Cracked Metal Greater Than 50%

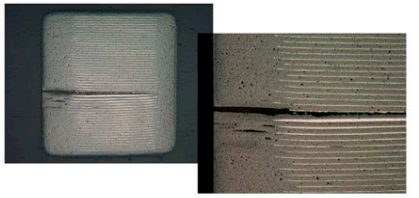




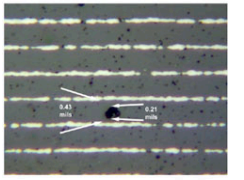
Capacitor Lead Separation With Epoxy Filled Voids



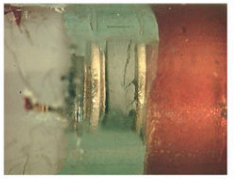
Acceptable Capacitor



Delaminated Capacitor Plated (Fixed Ceramic)

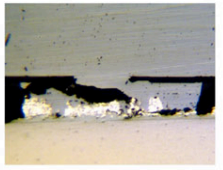


Void In Dielectric

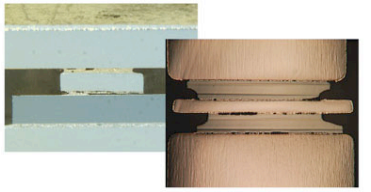


Through The Glass Inspection Showing Fractures In The Die

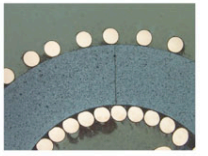
Cross Sectional View Of Diode Showing Fractures Die



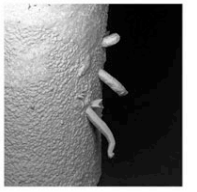
Diode Anode Showing Fractures



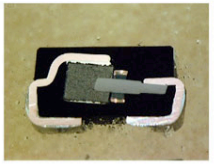
Poor Die Attach Diode



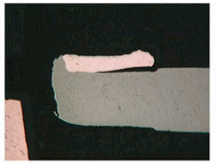
Cracked Magnetic Core



Tin Whiskers On 100% Tin Lead



Tantalum Capacitor (Typical)

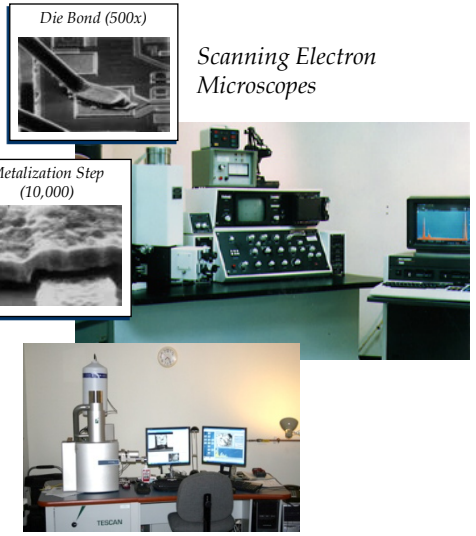


Poor Anode Weld (Tantalum Capacitor)

H702-009

ATC Facilities And Equipment Overview

Systems Engineering And Operations Support Facility Chantilly, Virginia



Scanning Electron Microscopes

Real Time X-Ray System

» ATC Facilities And Equipment Have Evolved Over A Four Decade History In Space, Avionics And C4ISR Systems Development For Over 100 Government And Civilian Customers

» These Facilities And Equipment Have Enabled The Design, Development, Production, Test And Operational Support Of Over $2 Billion Dollars In Advanced Technology ATC Space/Avionics/C4ISR Electronics Systems

» ATC Facilities And Equipment Offer The Most Advanced, Proven Technologies Available To Support The Design, Development, Test, And Documentation Of High Reliability Electronic Systems For Space, Avionics And C4ISR Applications

High Reliability Production Facility

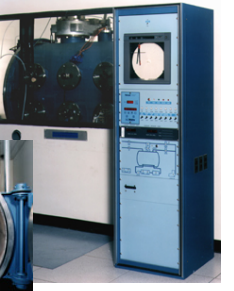
Automatic Microcircuit Test Systems

High Reliability Surface Mount Technology (SMT) Production Facility

BTU Pyramax 98N Convection Oven

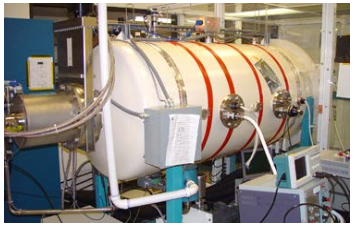
FLX2011 LBV Automatic SMT Placement System

Tenney Engineering Model 4D3 Thermal Vacuum Chamber



EMI Test Facility

Dynavac Thermal Vacuum Chamber



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