

Government Integrator Case Study – Motorola SATCOM

Project/contract related information:

Customer name

Motorola SATCOM (providing services in support of Motorola SATCOM operations as a subcontractor to Boeing)

Address of Customer

Scottsdale, Arizona (Motorola project site)

Period of performance

Ongoing support contract for last 5 years+

Value of Contract/project

\$10 M (approximate to date)

Description of project and Tools used for project

Software development and support associated with satellite communications and avionics: ground station software development, test, integration, and CM processes for Motorola SATCOM operations.

Software development support service areas include:

- Solution Architecture and Package Selection
- Customization, Migration and Porting
- Requirements Discovery and Gap Analysis
- Project Implementation
- Process Design and Workflow Analysis
- System Integration
- Project Management
- System/Network/Database Administration
- Database Modeling and Design
- Performance Monitoring and Management
- Application Development, Maintenance, and Support
- Developed tens of thousands of lines of object-oriented Code, embedded and non-embedded, using design methodologies in support of the payload support
- Developed web-enabled code in support of the project utilizing state-of-the-art tools
- Utilized personnel to do tool analysis to determine the usefulness and applicability to the project and used the selected tools in different stages and scenarios of the project
- Developed most of the CM/CMM code and managed a great deal of the Clearcase/Clearquest modules
- Systems administration and integration of UNIX, Cisco, and Windows NT and administration of the initial installation rollout of Gateway software around the world in support of the project (Brazil, China, Russia, Italy, and the U.S.)
- Assisted in the development of the payload software and the associated testing
- Developed a large portion of the Iridium pager system

Government Integrator Case Study – Motorola SATCOM

- Supplied support for the SEI process and the associated improvement to raise the level to 3+
- Helped to develop the Iridium Earth terminal software, which is currently in use in the daily operations of the Iridium Constellation
- Supplied project managers to develop plan, manage staff, produce deliverables and chair the quality and defects and code review teams
- Supplied management for code review teams to insure timely, correct, and defect-free software
- Supplied a defect manager to be a liaison between Arizona development groups and the Master Control Facility and worldwide gateways
- Supplied business analysts to help develop the BSCS and MPS software

Administration of the entire system's Sun enterprise systems as well as the NT and Windows systems in support of the master control system

- Developed and supported the networking systems
- Developed Web code and associated software
- Presently developing Telecom Network Performance Management software, by utilizing data coming in from satellites and switches
- Developing new software and utilization of tools to add functionality to the existing system

The satellite support personnel categories associated with this support include:

Ground Network Controllers – These support personnel

- Monitor Gateways and initiate corrective action to resolve Gateway faults
- Monitor the system Gateway Monitoring System to note operational trends and possible problems with the various network elements at the Gateway
- Monitor OSN and ODN for outages and perform first level troubleshooting to isolate the problem
- Work with Infrastructure GSNE and telecommunications provider to resolve WAN outages and
- Monitor and respond to anomalies of the Message Termination Controller

• Satellite Operations Shift Supervisors – These support personnel

- Coordinate all activities between Flight Operations Specialists, Space Vehicle Engineers, Control Facility Systems Operators, Ground Networks, Mission Planning, and Orbit Analysts to accomplish all mission objectives
- Serve as the final authority in command and control of the Space Vehicles
- Manage the daily operations of the Ground Network

• Space Vehicle Link Operators – These support personnel are responsible for

- Real-time execution of Spacecraft commanding pass plans
- Performing Real-time Spacecraft state of health evaluation
- Supporting in-orbit testing execution and test evaluation
- Performing spacecraft software uploads and switchovers to updated software, and
- Verifying the integrity of all products loaded to the spacecraft

Government Integrator Case Study – Motorola SATCOM

- Orbital Analysts – These support personnel are responsible for
 - Interfacing with the Engineering and Analysis Team to develop engineering tools and processes to characterize the Flight Dynamics characteristics. These tools and processes include the effects of station keeping and orbit raising maneuvers on the attitude control, EPS, propulsion, and thermal subsystems.
- Senior Orbital Analysts - These support personnel are responsible for
 - Performing orbit management tasks to maintain accurate tracking station pointing data
 - Maintaining accurate on board satellite ephemeris and
 - Maintain the satellite within its orbit tolerances
- Space Vehicle Engineers – These support personnel are responsible for
 - Execution and telemetry verification performed in support of controlling the satellite constellation
 - Duties include: Real-time execution of Spacecraft commanding pass plans, performing Real-time Spacecraft state of health evaluation, supporting on-orbit testing execution and test evaluation, performing spacecraft software uploads and switchovers to updated software, and verifying the integrity of all products loaded to the spacecraft
- Telemetry, Tracking and Control (TTAC) Link Operators – These support personnel
 - Monitor TTAC operations
 - Initiate corrective action to correct TTAC Faults
 - Monitor Plan deployments
 - Monitor the FTSP transfers to the Gateways and TTACs
 - Monitor Quality of Service tools and escalate problems as required
 - Monitor the Space Vehicle Acquisition and Space Vehicle Element Set tables, and
 - Monitor the Messaging ISRP Router and switches between the Primary and Backup Network Connection
- Network Operations Specialists - These support personnel
 - Are cross-trained and have experience with Telemetry, Tracking and Control (TTAC) Link Operator and Network Controller positions
 - Have the ability to perform all primary duties of TTAC Link Operator and Network Controller
 - Proficient in the UNIX operating system, as well as standard PC usage and applications
 - Have experience with Ground Station and Earth Terminal Operations and Maintenance, WAN Network Management and Fault Management, Ground System command and control software integration, and Ground system procedure development
- Mission Planners - These support personnel are responsible for
 - Developing and maintaining ground software for the satellite-based telephone and

Government Integrator Case Study – Motorola SATCOM

- paging systems
 - Daily tasks including application development, development of productivity enhancement tools, coordination of interface and architecture issues
 - Developing tools to facilitate configuration, fault, and performance management.
 - Developing software processes to obtain ISO certification.
- Ground Systems Domain SW Engineers - These support personnel are responsible for
 - Working within a diverse engineering and development team to develop and maintain ground software for the satellite-based telephone and paging system.
 - Daily tasks include:
 - Application development of Satellite Control (SC), Mission Planning System (MPS), and Orbit Services (OS) features/enhancements and defect fixes
 - Development of productivity enhancement tools and coordination of interface and architecture issues
 - Develop tools to facilitate configuration, fault, and performance management
 - Develop software processes to obtain ISO certification
 - Support anomaly meetings to identify corrective action and/or workarounds
- Real Time Operations Engineers - These support personnel are responsible for
 - Development, testing, and console support
 - Space Vehicle (SV) Maneuvers
 - Training/simulator development
 - CFSO operations, maintenance, and troubleshooting and general RTO support (process improvement, procedure and checklist development and maintenance
 - Serving as rovers available to backfill real-time operations positions, which require execution and telemetry verification performed in support of controlling the Satellite constellation.

ADDITIONAL WORK AT MOTOROLA

The information below represents some of the different projects that we are working on throughout the U.S.

- Design and development of PCD boards, prototype boards, surface mount and flex boards
- Surface mount assembly or back end / final assembly environment
- Development of cell phone software
- Development of network software
- Brew development
- Develop requirements: Java, UML, Swing, basic java networking, relational database, GUI development, Windows XP
- Unix development
- Cell phone test
- Cell technicians (assembly, repair)
- Systems administration (Unix, XP, Windows 2000)

Government Integrator Case Study – Motorola SATCOM

- RF engineering
- CDMA/WCDMA development
- Embedded programming
- DOCSIS R and D
- Project management
- Pro E mechanical and manufacturing engineers
- Teamplay administration