TacSIM

Tactical Communications Simulator

REDONDO SYSTEMS INC

RSI's Tactical Communications Simulator (TacSIM) is an off-the-shelf PC based tactical communications simulation system supporting the systems integration, test and training missions for U.S. and allied armed forces, and major defense suppliers around the world. TacSIM has been validated by the U.S. Army for use in interoperability testing on Link 16 (TADIL J), Link 11 (TADIL A) and Link 11B (TADIL B). TacSIM is highly configurable by utilizing RSI's Simulation Core user interface package and then layering multiple tactical data link, simulation data link and/or radar interfaces from RSI's Interface Package Library (IPL). New customer application-specific requirements are easily accomodated.

Redondo Systems Incorporated (RSI) has been a leading provider of products and services in the areas of tactical data link and radar interface processing for over 20 years. RSI's product lines include fielded tactical data link and radar communications systems, radar and data link simulation systems, as well as stand-alone software packages and custom hardware solutions. RSI's major customers include:

- U.S. Army
- U.S. Air Force
- U.S. Navy
- U.S. Marine Corps
- Raytheon
- Northrop Grumman
- Lockheed Martin
- Rockwell Collins
- Thomson CSF
- EADS
- BAE
- SAIC

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TacSIM Interface Capabilities Include:

Data Links

- Link 16
  - *MIL-STD-6016E*
  - *MIL-STD-6016D*
  - *MIL-STD-6016C ch1*
  - *JTIDS TIDP*
  - *Smart Host and terminal/network emulations:*
    - *Class 2H (ADDSI)*
    - *Class 2M (ADDSI)*
    - *MIDS (LVT (J,A,D)*
    - *3011 (JREAP B & C)*
    - *S-TADIL J (SATJ)*
- Link 11, Link 11B
  - *MIL-STD-6011D*
  - *MIL-STD-6011C*
  - *STANAG 5511 Ed5*
  - *TDS and DTS/ network emulations:*
    - *NTDS (Parallel)*
    - *ATDS (Serial)*
    - *MIL-STD-188-203*
    - *MIL-STD-188-212*
- NATO Link 1
  - *STANAG 5501 Ed 4*
- ATDL-1
  - *MIL-STD-6013A*
- FAAD Data Link
- NATO Link 14
- USMTF 2000
- TIBS
- VMF
- IDL
- UDL
- MBDL
- Lateral Tell
- Forward Tell
- TESS
- ICAO

Radars

- PATRIOT
- FAAD/GBS
- CD2
- ATSERIX
- AN/APG-71
- AS/APS-138
- AN/APY-2
- AN/APX-76
- AN/APX-100
- AN/APX-103
- AN/ARN-118
- AN/ARN-118A
- AN/ASN-130
- AN/FPS-117 (LRR)
- AN/MPQ-51 (ROR)
- AN/MPQ-55(CWAR)
- AN/MPQ-57
- AN/TPS-32
- AN/TPS-43E (DAR)
- AN/TPS-70
- AN/TPS-75
- AN/TPX-46
- AN/UPX-23
- AN/UPX-27
- SPS-96/125
- SPS-48C
- IHAWK Phase III
  - *AN/MPQ-50 (PAR)*
  - *AN/MPQ-61 (HIPIR)*
  - *AN/MPQ-62 (CWAR)*
  - *M192 Launcher*

Simulation Data Links

- DIS (IEEE 1278.1)
- TCL

Data Forwarding

- Link 16 ◄► Link 11/11B
- DIS ◄► Link 11/11B, Link 16, FDL, ATDL-1

Interface Protocols & Standards

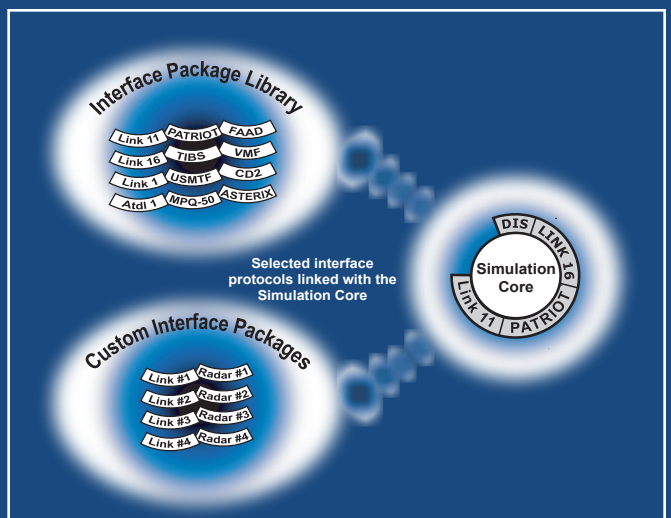
- RS-232
- RS-422
- RS-449
- RS-485
- EIA-530
- EIA-530A
- SIMPLE
- V.35
- V.36
- X.25
- HDLC
- ADDSI
- TCP/IP, UDP, MULTICAST

TacSIM System Features

- **User Interface**
  - Multiple Tactical Displays
  - Multiple Hook Readouts
  - Real-time Data Reduction
  - Operator Input Dialogs
  - System Status
- **Hardware Configuration**
  - Ruggedized chassis
  - Rack mount option
  - Off-the-shelf I/O Cards
  - Dual display monitors
- **Simulation Object Database**
  - 2000 objects (minimum)
- **Network Support**
  - Multiple workstations
  - Distributed processing
  - Integrated situation awareness
- **Scenario Processing**
  - Automated creation
  - Nested scenarios
  - In-line documentation
  - In-line operator prompts
  - Selectable playback rate
  - Perform all manual actions while scenario executes
  - JTIDS network download files
- **Data Recording**
  - All message traffic
  - All operator actions
  - Errors recorded for analysis
  - Millisecond accuracy time tags
- **Data Analysis**
  - Real-time statistics
  - ODBC database source
  - Can process recorded data
- **Data Reduction**
  - Real-time and post-test filters
  - Prose, hex, octal and binary
  - Operator actions
- **GPS Interfaces**
  - GPS Synch, IRIG-B
- **Motion Modeling**
  - Default motion profiles
  - Real-time operator control
- **Route Planning**
  - Aircraft/Missile characteristics
  - Terrain following using DTED
- **Radar Simulation**
  - Line-Of-Sight, Field-Of-View
  - Probability of Detection
  - Rotating/Non-Rotating radars
  - Jamming
  - Tracker module (optional)
- **Playback**
  - Processes recording files
  - Recreates tactical displays
  - Recreates online DX
- **Negative Testing**
  - Hex/Binary/Octal messages
  - Transmit/Receive filters

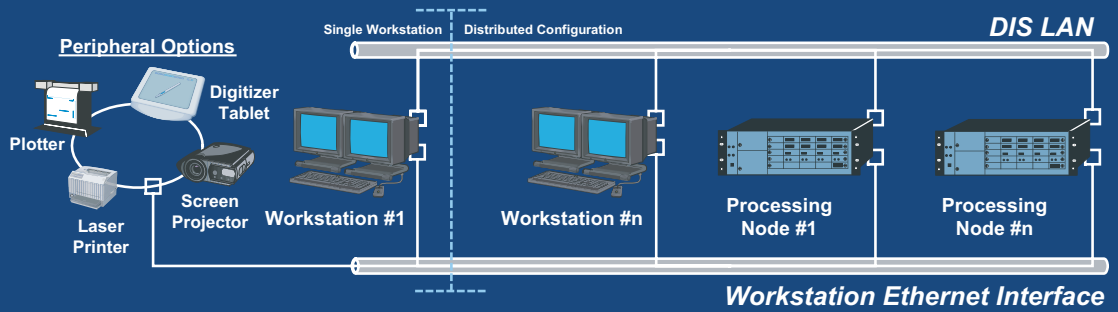
TacSIM System Description

TacSIM is a PC based tactical communications and radar simulation system that uses ruggedized, commercial off-the-shelf hardware configurations for enhanced reliability and durability. TacSIM functions much like an actual Tactical Data System (TDS) except that the Simulation Object Database from which messages are generated is initiated through manual operator actions, scenario events, and/or simulation data link input (e.g. DIS) instead of from sensor inputs. External interfaces configured into the TacSIM independently scan the Simulation Object Database and generate the appropriate primary and amplifying messages for each object. Message generation is based on the visibility of the object (e.g. radar coverage area), availability of data, and requirements of the associated specification (e.g. MIL-STD-6016E). Data received over a configured external interface is validated for errors and processed for automatic link responses (R^2 shifts, ID conflict processing, command processing, etc.), presentation of new data in hook readouts, real-time data reduction, and automatic alerts. Non-periodic message traffic such as Data Update Requests, ID Differences, etc. are generated in response to operator actions (and scenario events) as well as in response to received messages.



The Interface Package Library (IPL) is a risk reduction technology providing an object-oriented suite of interface protocol packages which can be easily integrated with a Simulation Core package to create custom system configurations. IPL packages and the Cores are implemented using the Ada programming language ensuring high reliability and reusability.

Pull-down and context specific pop-up menus facilitate definition of the simulation environment which comprises moving and stationary entities. Entity types include air, land, surface, and subsurface surveillance objects, unit platforms/radar sites, missiles (ballistic and non-ballistic) and EA/ES objects. Pre-defined world maps, user defined map areas, and digital terrain maps provide enhanced visualization. Extensive user-friendly controls allow operators to filter the tactical situation displays as well as both real-time and post-test data reduction providing optimal data visibility for observation and analysis. TacSIM's scenario generation facility allows users to automatically capture all operator actions as a scenario. Scenario files are plain ASCII text and are easily modified with any text editor. Users retain full interactive control of TacSIM during execution of a scenario and may perform any mix of scenario driven and manually initiated events providing real-time control of the simulation environment at all times.



TacSIM is normally configured as a single workstation supporting multiple radar and data link interfaces. The number of external interfaces supported by a single workstation is limited only by the number of hardware slots available for interface cards. When more external interfaces are required, TacSIM can be configured as a distributed network supporting multiple integrated workstations and processing nodes. In this configuration, TacSIM provides distributed processing and operator controls while maintaining fully integrated situation awareness and data availability at each workstation. Additional processing nodes can easily be added when elements of the system-under-test are physically separated.