

# TIGER



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# TIGER



## INTRODUCTION

The Tactical data-link Integration Exerciser (TIGER) was developed from the Multi Link System Test/Training Tool (MLST3) and the related Single Link MULTOTS for Link 16 (SLM-16), mature and proven systems used world-wide. TIGER development improved on these systems with the addition of new features and interfaces.

The Typhoon (formerly Euro Fighter 2000 (EF2000)) programme undertook the development of TIGER from MLST3 and SLM-16. The reason for this development of TIGER was to correct the deficiencies of the Multifunction Information Distribution System (MIDS) Interface Simulator (MIS) which was the original test tool used on the Typhoon project.

TIGER can readily be used to support testing of a complete system with deeply integrated Link 16 functions. TIGER can be supplied in either Rack Mountable or complete with a Cabinet (which includes housing for MIDS Low Volume Terminal (LVT), and Remote Power Supply (RPS)) format.

## SYSTEM CAPABILITIES

TIGER has many uses and can be employed:

to support terminal development and testing

to support integration of Tactical Data links into platforms

- TIGER is the only commercially available tool to provide fully realistic scenarios for platform integration, software development and testing
- scenarios can be linked and exchanged with platform sensor simulations

to support wide area multiple platform interoperability testing using the NATO STANAG 5602 Standard Interface for Multiple Platform Link Evaluation (SIMPLE) protocol

to act as Central Scenario Facility (CSF) for large single site or distributed test bed facilities

to provide a mobile facility providing basic network monitoring, recording and the ability to transmit simulated data

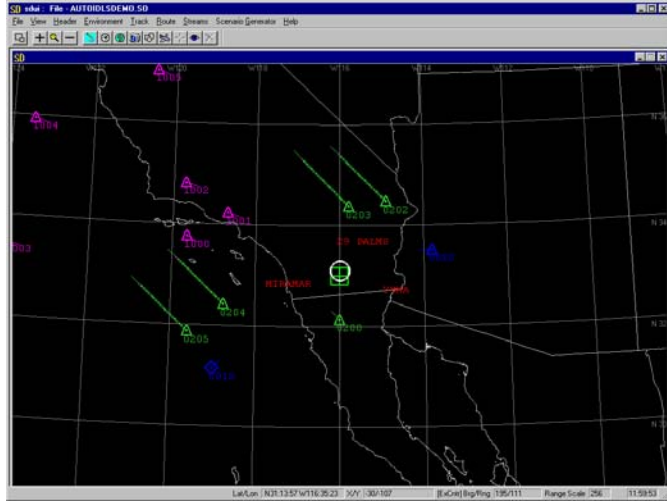
To fulfil these capabilities TIGER is supplied with a suite of software which covers pre-test, Real-time test and post-test.

## PRE-TEST SOFTWARE

The pre-test software provides a user-friendly 'Scenario Development' facility. The 'Scenario Development' caters for a number of simulation capabilities such as:

### Entity Motion

- System and user-defined motion models representing platform motion characteristics
- Motion characteristics applied as tracks maneuver during an exercise
- Realistic motion simulation provides basis for Link 16 messages



### Sensor detection

- Adaptable radar models represent sensor range and cone angle of desired platforms.
- Sensor characteristics applied to determine target detection and reporting
- Reporting responsibility shifts between simulated and live units based on appropriate link protocols, or under direct operator control

### Message transmission capabilities based on assigned unit types

The output of the 'Scenario Development' facility is a text file containing all commands required for the scenario. Depending on the level of expertise of the user this file can either be re-edited using the Scenario Developer or edited using the users' favourite text editor.

Once the user is satisfied with the scenario which has been created, the 'Scenario Generation' software is used to convert the text file into a binary file that is used as the input to the Real-time test facility.

## REAL-TIME SOFTWARE

In the Real-time state TIGER provides three modes of operation:

- Host Simulation (TIGER acts as a MIDS/JTIDS host),
- Terminal Simulation (TIGER acts as a MIDS/JTIDS terminal),
- Monitor (TIGER acts as a bus monitor for all data bus traffic).

In the Host and Terminal Simulation modes, scenario defined tracks are moved in accordance with their specified performance parameters and are objects for exchanging data link messages based on proximity of the tracks to the reporting units and the rules for reporting on Link 16.

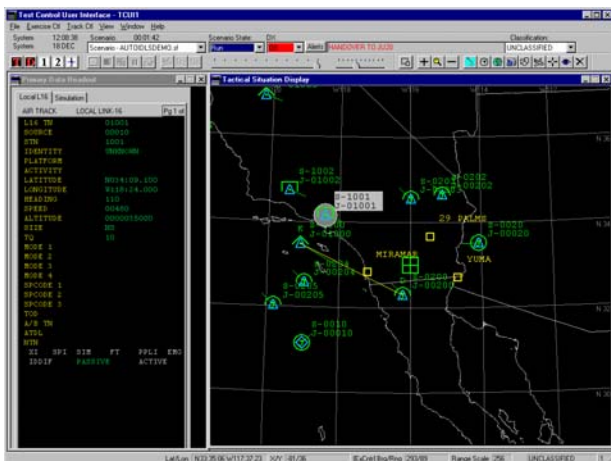
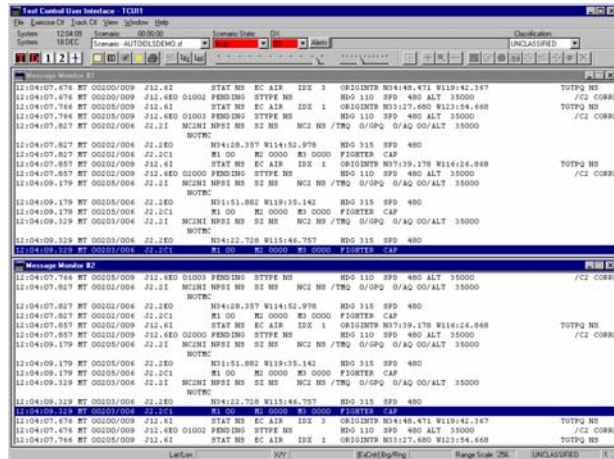
Monitor mode is used to 'eavesdrop' on the data being communicated between a real host and terminal. If a scenario is running whilst in this mode it will have no effect on the data passing between the host and terminal.

Other facilities available in the Real-time mode are:

Complete Message Monitoring functionality/filtering

Tactical Display of scenario gaming area (2 - 4096 data miles). There are numerous options available on the Tactical Display which include:

- Pan to any location on a world map and zoom in and out to any location within 2 data miles.
- Display classifications (UNCLASSIFIED, CONFIDENTIAL, SECRET) including NATO designations.
- Display range and bearing from any point on the screen.
- World map overlays of geo-political boundaries, coastlines, and latitude and longitude grids.
- Simultaneous readout of attached track and motion data.
- Freeze message display while processing continues.



Pseudopilot functionality where the user can take control of the simulated non-C2 JUs in the scenario and control all aspects of their flight characteristics.

Message Streaming capability where erroneous message field values and message sequences can be injected into the scenario.

On-line Data Analysis tools which allow statistic to be compiled on message fields, recurrence rates, recurrence rate deltas, sequence cycle time, reporting responsibility and receipt compliance.

The ability to add new entities to the currently executing scenario. Once added the new entities can be manipulated in the same way as entities created offline using the Scenario Developer/Generator.

All interface data can be recorded for post-test reduction, analysis, and replay using MANDRIL (visit <http://mandril.lm-isqs.co.uk/> for more details).

In the Real-time mode TIGER caters for a number of external interfaces the main of which are its MIDS/JTIDS terminal interfaces. The MIDS/JTIDS terminals catered for by TIGER are:

MIDS Platform A <sup>1</sup>	JTIDS Shipboard <sup>1</sup>
MIDS Platform B	JTIDS Air E-2C <sup>1</sup>
MIDS Platform D (limited Terminal Simulation capability)	JTIDS Air F-14 <sup>1</sup> JTIDS Air F-15 <sup>1</sup>
MIDS Platform I	JTIDS Air AWACS <sup>1</sup>
MIDS Platform J	JTIDS MCE <sup>1</sup>
MIDS Shipboard <sup>1</sup>	JSTARS <sup>1</sup>

In Host Simulation Mode, communication between TIGER and each of these terminal types conforms to the standard defined in the appropriate ICD for the selected terminal.

When in Terminal Emulation mode TIGER simulates the selected terminal type by conforming to the data exchange protocols defined in the ICD for the selected terminal.

As mentioned in the introduction TIGER was developed for the Typhoon programme. One of the enhancements required for this development was the addition of MIDS Platform B and D interfaces. The JTIDS/JSTARS terminal types supported were part of the SLM-16 base product. Subsequently the Platform I and J interfaces have been added.

As well as the MIDS/JTIDS terminals TIGER also caters for other additional interfaces which were added as part of the Typhoon development programme. These additional interfaces are:

Software Interface (SWIF). Ethernet connection. This interface was added for Typhoon and allows target data to be taken from the own aircraft motion and sensor simulation model. The format of the data available on this interface is defined in the TIGER Interface Control Document (ICD).

Target Interface (TIF). MIL-STD-1553B connection. The format of the data available on this interface is defined in the TIGER ICD. This interface was designed for use with Typhoon.

SIMPLE. Data available on this interface is in the format defined in STANAG 5602 Edition 2. SIMPLE can be configured over asynchronous serial, synchronous serial or TCP/IP interfaces.

Connection to the SWIF, TIF and SIMPLE interfaces are optional and their usage is controlled during the start-up of the Real-time software.

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<sup>1</sup> Cabling for MIDS Platform B and D is supplied as part of the TIGER package. Cabling for MIDS Platform A, MIDS Shipboard, JTIDS Shipboard, E-2C, F-14, F-15, JSTARS, AWACS and MCE can be supplied at an additional cost.

## POST-TEST SOFTWARE

Post-test analysis is catered for using MANDRIL.

Visit <http://mandril.lm-isgs.co.uk/> for more details.

## SYSTEM ARCHITECTURE

The diagram shows an example architecture for TIGER whether Desktop or Cabinet. The diagram shows the test rig configuration for TIGER when employed on the Typhoon programme.

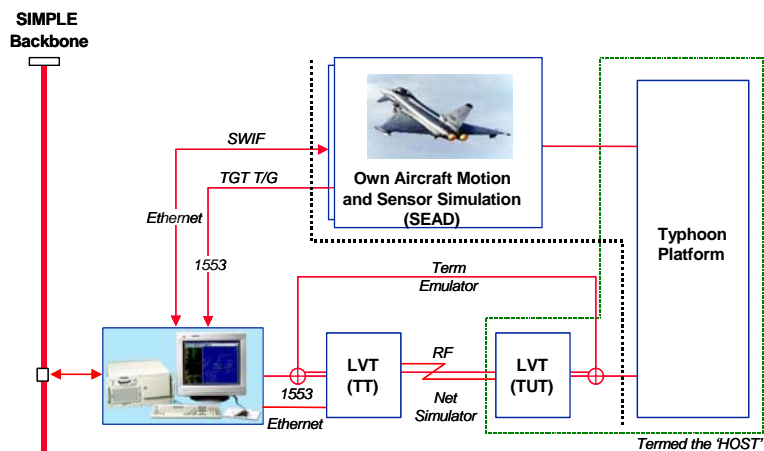
### COMPUTERS

TIGER is supplied with:

- Two computers (one dual processor – TIGER Server, one single processor – TIGER Workstation) each with 19" Flat Panel Displays, mouse, keyboard, removable hard disk, CD/DVD re-

writer, power leads (suitable for the destination country) and the latest version of Microsoft Office™ (for use with MANDRIL data analysis software);

- Colour Printer;
- Ethernet switch for interconnection of computers.



### CABINET OPTION

This option for TIGER is based on a commercially available 19" (49cm approx.) cabinet which is designed to house a MIDS LVT, MIDS RPS, air blower and TIGER computers. The displays, keyboards and mice are mounted externally.

Cooling for the MIDS terminal is provided using the supplied air blowers which provide the required cooling as defined in the MIDS ICD.

### CABLING

As part of the TIGER package the system is supplied with cables for connection to the relevant hardware. Cables are provided for connection to the SWIF (Ethernet), TIF (MIL-STD-1553B) and MIDS Terminals (Platform A, B and D). As mentioned earlier cables for connecting to MIDS Platform A,

MIDS Shipboard, JTIDS Shipboard, E-2C, F-14, F-15, JSTARS, AWACS and MCE are provided as an option at extra cost.

The cables supplied are for Terminal and Network Simulation modes. When in Terminal Simulation mode TIGER is supplied with a MIDS Terminal (MT) J3 socket connector<sup>2</sup>. This allows the host system under test to use its standard MIDS J3 plug connector to connect to TIGER (no cable modifications from the host are required).

When in Network Simulation mode (TIGER acting as a host) TIGER is supplied with:

- Cable to MT J3 connector for host communication, support port communication and terminal address setting. Two cables are supplied:
- One to cater for Platform B (MIL-STD-1553B) and
- One for Platform D (Ethernet).
- Cable to MT J7 to supply Power On/Off/Standby control, Voice port 1 and 2, PTT and Crypto zeroise.
- Connectors for MT J2 and J8.
- Cables to connect MIDS RPS J1 to J4 to the MIDS LVT if Cabinet option for TIGER is procured.

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<sup>2</sup> Currently only MIL-STD-1553B is supported.

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