Engineering Exactitude for Mission Critical & Strategic Needs

A partner with lineage of aiding the armed forces to accomplish critical missions across air, land and water

AXISCADES

Inspired Solutions. By Design

Counter Unmanned Aerial System (CUAS)

AXISCADES provides customized/tailored RF based CUAS as per specifications of the end customers. Our standard offering comprises of a Radio based detection device, jammer unit and C2 software.

The anti-drone systems are based on proven indigenous designs and are manufactured in our licensed facilities at Electronic City, Phase1, Bangalore. We have a strong roadmap of anti-drone systems including niche technology ESM and ECM techniques.

Test Solutions

AXISCADES is a pioneer in Test Solutions and ATEs. It has undertaken several Built to Spec and Built to Print assignments of Test Benches used for testing various Avionics and Ground System LRUs.

The capability includes Design, Production and Integration of Test Benches, Test Interface Units and Test Program Software for testing of Avionics, Displays, Radar and Microwave LRUs.

AXISCADES has established a partner ecosystem to produce Electronic Boards, PCBs, Component Assembly, Cable Manufacturing and Sub-Rack supply.

Avionics, Electronic Warfare & System Integration

AXISCADES Carries a long pedigree and strong domain experience in the design, development and production of avionics and electronic warfare systems.

The capability span across both On-Board and Ground-based products comes with skills including Hardware, Firmware, Software, Algorithms, System Integration, Installation, Commissioning, Maintenance, Repair, Overhaul and Integrated Logistics Support.

Flight Simulator

Flight Simulator

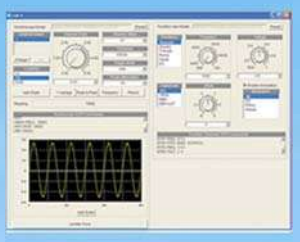
AXISCADES is a pioneer in Simulation and Simulators. We have supplied several Computer Based Trainers and Simulator for multiple applications in the Aerospace and Defence domain.

AXISCADES has taken part in Maintenance trainers for Advanced Light Helicopters and Light Utility Helicopters.

AXISCADES has participated in the development of Full Motion, Full Mission Simulator for the Dornier Do-228 aircraft including installation, commissioning, maintenance and support services.

Software

Map Management Software



Radar Simulation Software

AXISCADES has proven capabilities in Software Design and Development for Aerospace and Defence applications for OEMs and end users (Defence Forces).

AXISCADES has a well-established quality system in compliance to DO-178B standard for software design, development, verification and validation.

AXISCADES has expertise in developing Windows & Linux based System Software, User Interface and Embedded Software for Microcontrollers and FPGAs.

Ground Support & Ground Handling Equipment

AXISCADES has established GSE/GHE practice through which several products belonging to Complex Mechanical, Hydraulics, Pneumatic, Electronics and RF Technologies such as Handling Tools, RF load, Optical Benches, Hydraulic Test Benches, EW Test Platforms etc have been delivered.

AXISCADES has put in place a robust manufacturing system, quality control process, technology compliance mechanism and supply chain management to ensure to meet OEMs requirement on quality and schedule.

Counter Unmanned Aerial System (CUAS)

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AXISCADES PRAJNA RF DETECTION

AXISCADES PRAJNA (PASSIVE RF DETECTION) SPECIFICATION	
PARAMETER	SPECIFICATION
DETECTION METHOD	PASSIVE DETECTION OF RADIO FREQUENCY SIGNAL
DETECTION FREQUENCIES	400MHZ - 6GHZ
DRONE DETECTION RANGE	• 2KMS RADIUS OR MORE • BASED ON DRONE EIRP
AZIMUTH	360 DEGREE COVERAGE
ELEVATION	UPTO ±30 DEG
POWER CONSUMPTION	BATTERY, AC 230V, DC
OPERATING TEMPERATURE	-20°C TO 55° C
AVERAGE DETECTION TIME	< 10 SEC
TYPE OF DRONE	COTS & CUSTOM
WEIGHT	MAX 15 KGS
DETECTION SENSITIVITY	-110 dBm
ANNULAR RESOLUTION	UPTO 10 DEG FOR HIGHER/LOWER FREQUENCIES
DRONE POSITION	LAT & LONG UPTO 10M
SOFTWARE	C2/C4 SOFTWARE
IDENTIFICATION	DRONE ID WITH FRIEND OR FOE LISTING
DRONE POSITION:	ABLE TO DECODE OPEN DRONE IDENTIFICATION/BEACON MESSAGE

MANPORTABLE PRAJNA
(>10 kgs)

AXISCADES PRATHAM C2

- The system offers direction finding capability across the band specified below.
- The System has built-in spectrum monitoring and recording capability to record signals to create new signatures.
  - 200+ Drone Library threats.
  - GPU Powered AI based detection.
  - Remote-ID decode on best effort.
  - API / SDK for integration to existing systems.

PRATHAM C2

Counter Unmanned Aerial System (CUAS)

AXISCADES
Inspired Solutions. By Design

AXISCADES PRAHAAR PORTFOLIO

AXISCADES PRAHAAR SPECIFICATION	
PARAMETER	SPECIFICATION
JAMMING RANGE	MANPORTABLE PARAHARR UPTO 3 KMS
	MINI MANPORTABLE PARAHARR UPTO 2KMS
	VEHICLE MOOUNTED PARAHARR UPTO 1KM
FREQUENCY BANDS	430-440MHZ
	865-925 MHZ
	1170 - 1280 MHZ
	1570 - 1620 MHZ
	2400 - 2500 MHZ
	5700 - 5900 MHZ
	5125-5350 MHZ
	ANY ISM CUSTOM FREQEUNCY
RF POWER OUTOUT	50W / 100W / 250W
AZIMUTH	UPTO 70 DEGREE
ELEVATION	UPTO 30 DEGREE
JAMMER ANTENNA GAIN	5-7 DBI
HUMIDITY	85-90%
OPERATIONAL TEMP	-10 DEG TO + 45 DEG
POWER SUPPLY	BATTERY, AC AND DC
OPERATIONAL	MANUAL , SOFTWARED BASED

MANPORTABLE PRAHAAR
(>25 kgs)

MINI MANPORTABLE PRAHAAR
(>15 kgs)

VEHICLE MOUNTED PRAHAAR
(>10 kgs)

VEHICLE MOUNTED PRAHAAR

Test Solutions

AXISCADES
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Automatic Test Equipment, Test Interface Units and Test Program Sets

Automatic Test Equipment (ATE) is solution that is capable of automatically testing and diagnosing faults in sophisticated specific/multiple electronic units of aircraft, ship, or tank.

AXISCADES is a pioneer in Test Solutions and has a long pedigree in developing Test Systems. AXISCADES has designed and developed Automatic Test Equipment, Test Interface Units/Interface Test Adaptors and associated Test Program Set Software for Indian and Global, Aerospace and Defence OEMs and End Users. AXISCADES undertakes both Built to Spec and Built to Print assignments. The core team possess decades of experience in Test & Measurement Systems and Systems Integration on multiple platforms.

Activities

- Design, Development, Production and Integration of Automatic Test Equipment (ATEs)
- Design, Development, Production and Integration of Test Interface Units (TIU) or Interface Test Adaptors (ITAs)
- Design, Coding and Testing of Test Program Software (TPS)
- Integration, Validation, Installation & Commissioning of the entire systems

Automatic Test Equipment

- Based on the Core ATE Concept
- Modular and Scalable Architecture
- Reliable and Maintainable components and systems
- Production in compliance with IPC600/610/620 standards
- Capabilities to test Digital, Analog, RF, Microwave, various communications and power signals
- Built to suit sub systems - Communication Rack, Interconnection Rack, Power Supply Rack, Safety Rack, Measuring Devices, Computers and Specific Cables
- Defined to perform configuration and specifications of critical components - Signal Generators, Data Acquisition System, Measuring Instruments, Switching Systems, Computing and Controlling Platform Communication Bus

Test Solutions

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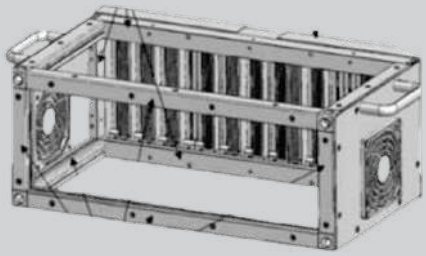


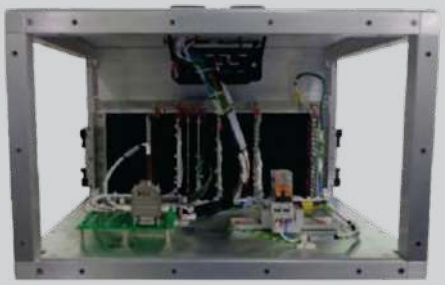
Test Interface Unit

Test Interface Unit (TIU) is used to interface the ATE with UUT.

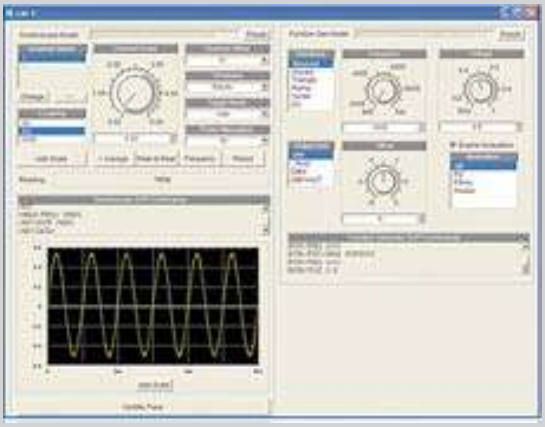
AXISCADES undertakes Design, Development, Fabrication, Assembly, Integration, and Indigenization of Test Interface Unit (TIUs) or Test Adaptors (ITAs) for Avionics LRUs.

The activities include - Hardware Design, Hardware Development and Fabrication of Mechanical parts, Wire Harnessing, Assembly, Integration and Testing.

AXISCADES has supplied various TIUs for Electronic Warfare, Radar, Communication, Navigation, Displays, On-board Computers and various other LRUs.



Test Program Set



Test Program Set (TPS) is used to automate the testing sequence of the ATE.

AXISCADES has in-depth experience in Design, Development, Integration and Testing of Test Program Set (TPS) Software.

The activities include – Test Specification, System Architecture, Design, Coding, Integration and Testing of Test Program Software (TPS) for various LRUs.

Interfacing with Data Acquisition System, Measuring Instruments, and execution of Test Modules under different configuration for Testing.

AXISCADES has developed the TPS for Avionics Displays, Electronic Warfare, On board Computers, IFF and various other LRUs.

Radar Avionics & EW

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Avionics, Electronic Warfare & System Integration

AXISCADES carries a long pedigree and a strong domain experience in the design, development and production of Avionics and Electronic Warfare systems. AXISCADES has a well-established practice which undertakes design and production of Avionics and EW Systems. The capability spans across both On Board and Ground based products, with skills including Hardware, Firmware, Software, Algorithms, System Integration, Installation, Commissioning, Maintenance and Integrated Logistic Support.

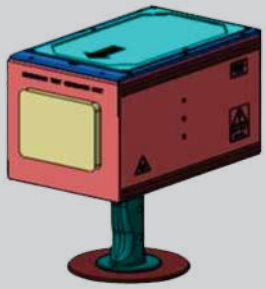
AXISCADES undertakes Design, Development, Production, Supply and Product Support based on Build to Specs and Build to Print.

Activities

- Product Specification
- Product Design
- Hardware Design and Development
- Embedded Software Design and Development
- Mechanical, Housing Design and Manufacturing
- Assembly, Integration and Testing
- Certification - MIL 810G, CE

  Packaging and Delivery

Microwave Signal Generator



- Tests the on-board Electronic Warfare (EW) systems
- Battery operated - enables the operator to carry the unit with one hand
- Ruggedized design
- Operates in two frequencies –

  6 GHz and 8 GHz
- Operator selectable Pulse mode and Continuous mode of operation
- BITE features and Self Power Measurements
- CE Certified

Radar Avionics & EW

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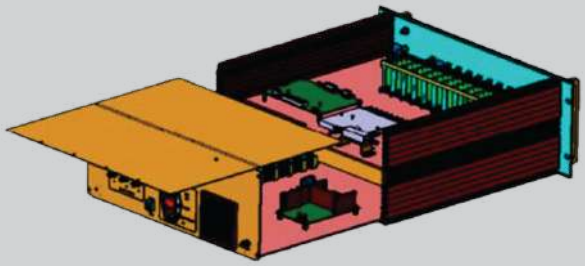
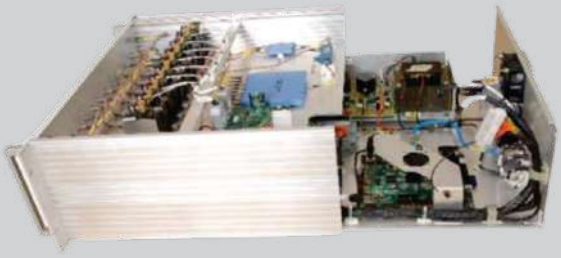
RF Signal Simulator

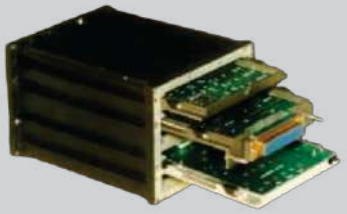
- Used to test the Electronic Warfare (EW) receivers
- Simulates radar signals from 2 GHz to 18 GHz
- Simulates directions and power levels of emitters
- Can be cascaded to simulate complex scenarios
- PC based user interface to create scenarios and operate the system





Airborne Products

- Mission Computer
- Display Processor
- Mission Preparation and Retrieval Unit
- Digital Engine Control Unit



Memory Docking Station

- Used as part of mission preparation and retrieval system
- Functions as docking station for Removable Memory Unit/Pilot Cartridges which carries mission planning data
- Compliance to SATA 2.0 and USB 3.0 interfaces
- Operates with USB power or external power
- Designed for ruggedized use
- CE Certified

Software

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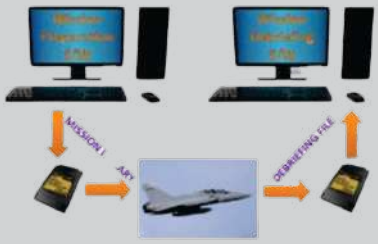
Software Development

AXISCADES has proven capabilities in Software Design and Development for Aerospace and Defence applications for global OEMs and end users. AXISCADES has a well-established quality system in compliance to DO-178B standard for software development, verification and validation. AXISCADES has expertise in developing Windows & Linux based System Software, User Interface and Embedded Software for Microcontrollers and FPGAs.

Electronic Warfare Mission Planning System



The Electronic Warfare Mission Planning System covers the following functions:

- The EW Reference Database Management
- The Mission Preparation for the Military Aircraft
- The Post-mission Analysis
- The Administration tools

Activities

- Requirements Analysis
- Solution Architecting
- Software Design
- Configuration of systems for end users
- Coding
- Unit Testing
- Integration Testing
- System Testing
- Verification and Validation
- Certification
- Packaging and Delivery
- Installation and Commissioning

Map Management Software

- Map Management Software is used in Electronic Warfare Mission Planning System
- Used to prepare the map data for the pilots
- Processes multiple types of map format

Software

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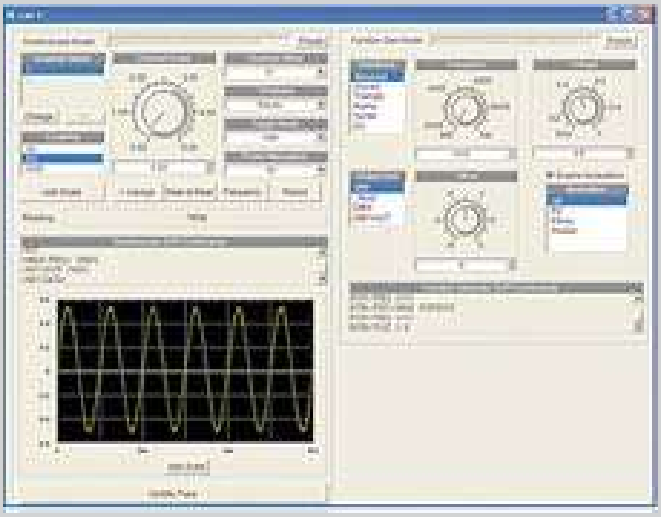
Test Software

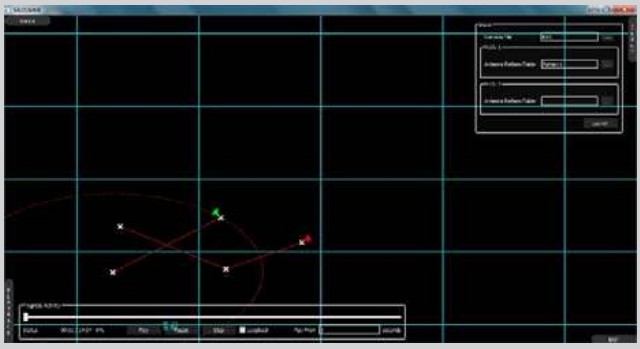


AXISCADES undertakes development of Test Program sets (TPS) for Avionics Displays, Electronic Warfare, On board Computers, IFF and various other LRUs.

The activities include – Test Specification, System Architecture, Design, Coding, Integration and Testing of Test Program Software (TPS) for various LRUs.

Interfacing with Data Acquisition System, Measuring Instruments, and execution of Test Modules under different configuration for Testing.

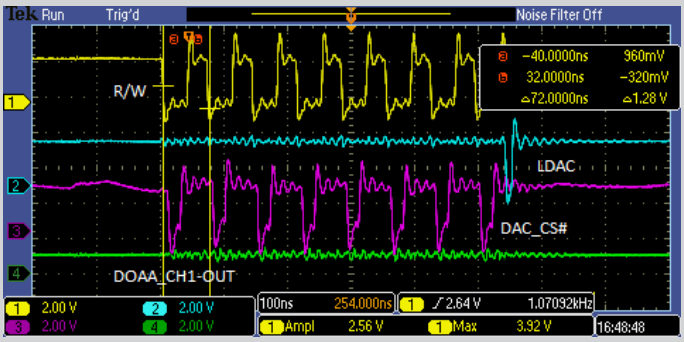
Radar Simulation Software

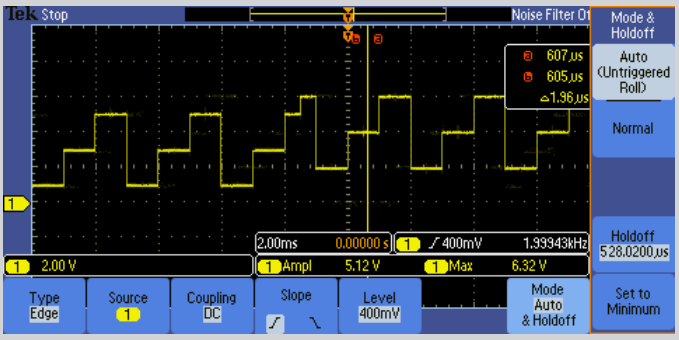


AXISCADES has in-depth experience in Design, Development and Production of Radar Signal Simulation and presentation.

Experience includes study and analysis of the system, developing new software, integration with the hardware.

The Radar Signal Simulation software enables the user to create the scenarios – emitter direction, distance and movement using Windows based user interface. The FPGA based embedded software generates simulated signals for further testing of Electronic Warfare receivers.





Simulators

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Simulators

AXISCADES has long pedigree in design, development and supply of Simulators and Computer Based Trainers to OEMs and Defence Forces. We have successfully delivered various simulator solutions such as Air Defence Training Simulator (ADTS), Aircraft Recognition Trainer Simulator (ARTS), Electronics Warfare Mission Planning System and Map Management Software etc. AXISCA DES has taken part in the development, supply and maintenance of Full Flight Simulator with motion system and visuals for military aircrafts.

Commercial Aircraft Simulators

- Full Flight Simulators
- Part Task Trainers
- Cockpit Procedure Trainers

Military Aircraft Simulators

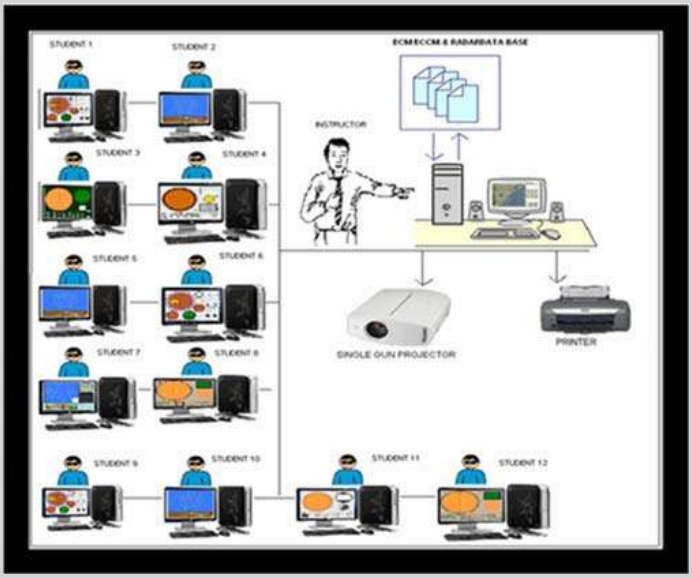
- AXISCADES has developed Full Mission Simulator for the SU 30 aircraft.
- Currently engaged in Full Motion and Full Mission Simulator for the Dornier Do-228 aircraft for the Indian Air Force.

Activities

- Data Pack Generation.
- Procurement and Manufacture of Sub Systems.
- Terrain Mapping.
- System Integration.
- Acceptance Testing.
- Documentation and Interactive Electronic Technical Manual.
- Transportation and Installation.
- Training Operations
- Warranty and Annual Maintenance.
- Project Management.
- Facility Management.

Air Defence Training Simulator (ADTS)

Air Defence Training Simulator (ADTS) simulates numerous Air Defence radars, digital terrain-based war like operational air situations with realistic emitters and platform characteristics and automatically generates relevant radar pickups to train operators in battlefield EW environment.



Simulators

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Radar Data Simulation System (RDSS)

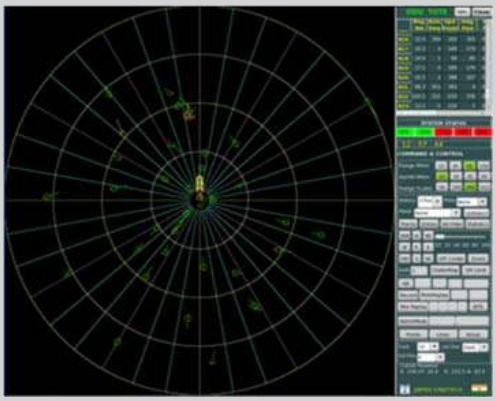
The RDSS accepts plots and reference signals from radars, processes them, filters out clutter and unwanted information, initiates tracks and updates them maintaining high accuracy of track parameters even in high maneuver situations and displays them on Air Situation Display. The RDSS can be configured for any Radar System.

Aircraft Recognition Trainer Simulator (ARTS)

In military scenarios, the need to identify aircraft is stringent as any erroneous identification can result in fratricide.

Aircraft recognition is a visual skill taught to military personnel and civilian auxiliaries since the introduction of military aircraft in World War I. It is important for air defense and military intelligence gathering.

AXISCADES has developed an Aircraft Recognition Training System that has the capability to display 3D realistic models of various military aircraft (fighters, Transporters, Helicopters and UAVs) and carry out realistic training.



Full Mission Full Motion Simulator (FMFMS)

The Do-228 Glass cockpit Full Mission Simulator (FMS) under development is a Level D simulator with six degrees of motion. It consists of a flight deck that is a full-size replica of Do-228 cockpit with front windshield and unobstructed view on all the sides.

The aircraft functionalities are accurately replicated using replica switches and controls (Guarded, Spring loaded etc.), equipment (displays and control panels etc.), observable flight deck indicators, circuit breakers, centre pedestal, properly placed bulkhead etc. Interior appearance, dimension and man-machine interface geometry is same as in the original aircraft.

81 MM Mortar Simulator

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81 MM Mortar Simulator

The 81 mm Mortar Simulator is a computer based system designed to replicate immersive real field experience for Mortar Fire Controllers and Mortar Firing Crew. Basic as well as advanced training to the MFC and Mortar Crew in the selection, prioritizing and engagement of targets can be achieved in a classroom environment. The simulator provides a structured learning environment, where the trainee progresses according to his capability where the environment can be controlled under the tutelage of an instructor. The training objectives are achievable without the lessons being disrupted by the vagaries of weather, availability of ammunition and availability

Features

- Exercise planning on a GIS engine with map support in a variety of datum, projections, coordinate systems and map file formats (raster and vector). Integrated 6 figure GR.
- State of the art Image Generator to view the executing exercise AoI in 3D.
- Realistic DEM based terrain models of jungle, desert, plains, mountainous areas
- Library of built up areas with cultural artefacts.
- Realistic modelling of 3D entities (Guns, Targets, Air OP) in the battle space with physics based dynamic behaviour.
- Integrated Range table with wind effect to compute projectile motion.
- Binocular view of 3D scene in the IG with graticule.
- Simulation of High Explosive, illumination and smoke bombs.
- Simulation of environment effects (rain, snow, fog etc)
- Integrated ephemeris model.
- Integrated audio (positional sound and Doppler).
- Particle effects like explosion, smoke, flash etc.

Fire Control UI

Mortar View

81 MM Mortar Simulator

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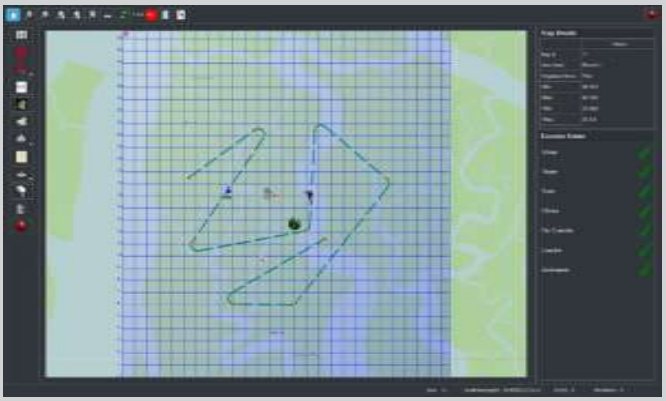


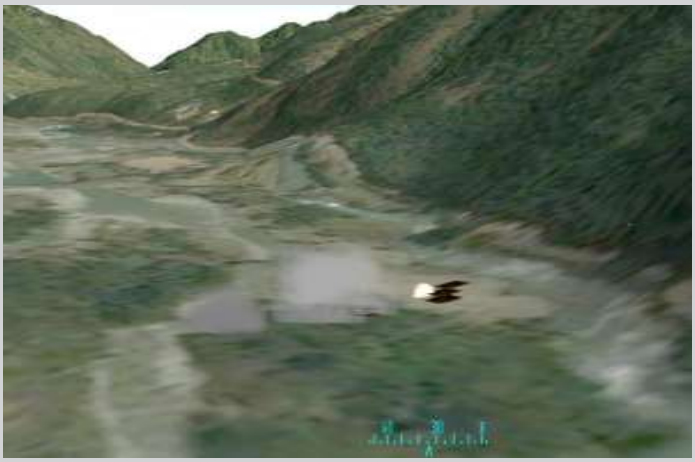
Exercise Planning Mode

Exercise Planning

- Select the Area of Interest.
- Plan mortar position, MFC position, Air OP (Helicopter route), Ground OP position, targets, and other cultural artefacts including bunkers, buildings in AoI.
- Environment planning

Exercise Execution & Fire Control and 3D Simulation

- Load a planned exercise from library
- AoI is simulated in 3D in the Image Generator and projected on a screen (12ft x 7 ft) by projection system.
- MFC views the projected AoI on screen and designates the target (6 figure GR)
- Mortar Crew trainee controls the firing sequence by applying the target coordinates passed by MFC.
- Mortar Crew trainee selects the type (HE, illu, smoke bomb), number of charges and rate of fires.
- System simulates the projectile flight path based on range table parameters and applied wind stochastically.
- Based on firing results observed by MFC, he can issue corrections to the firing crew to correct range / azimuth.



Target View

ARTS

AXISCADES
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Aircraft Recognition Trainer

(Installed in 88 sites of Indian Army and Indian Air force)

In military scenarios, the need to identify aircraft is stringent as any erroneous identification can result in fratricide. Aircraft recognition is a visual skill taught to military personnel and civilian auxiliaries since the introduction of military aircraft in World War I. It is important for air defense and military intelligence gathering. Axiscades Aerospace & Technologies Ltd has developed an Aircraft Recognition Training System that has the capability to display 3D realistic models of various military aircraft (fighters, Transporters, Helicopters and UAVs) and carry out realistic training.

Aircraft Recognition Training System (ARTS) is a training tool for:

- Detection of the aircraft in a realistic environment
- Identification of the aircraft as a whole
- Recognizing the individual features of the aircraft
- Evaluating the recognition capability of the trainees

ARTS Comparison Mode of Training On Similar Aircraft Type

Networked System

- Comprises of an Instructor console for carrying out web based training and testing
- Comprises of student consoles for group and individual training
- Comprises of projection system with 5.1 surround sound for realistic projection of images and sound generation with Doppler / spatial effects

ARTS

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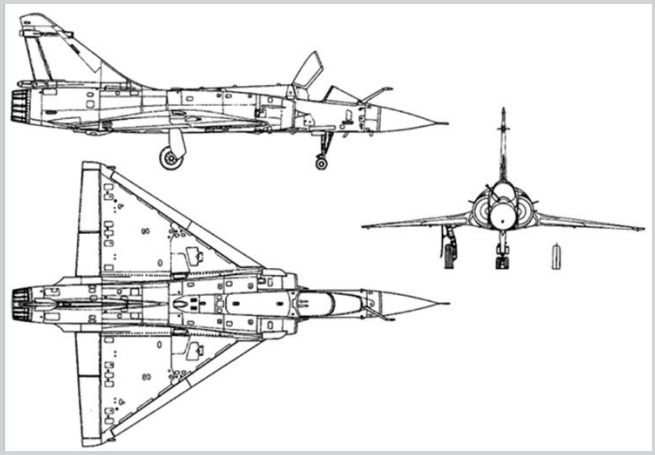
Training Methodologies

The training program involves sessions conducted on understanding the various aspects of understanding the finer aspects of flying object recognizer. The instructor can perform training in following aspects:

- Individual Feature Training.
- Individual Aircraft Training.
- Aircraft Comparison training.
- Identifying Aircraft in simulated Environment.

The instructor will perform tests on evaluating the skills of the trainee in correct identification of an aircraft in a complex environment.



View Model of Mirage 2000

WEFT Training Methodology

The system uses the WEFT training methodology to identify the major features of an aircraft. The WEFT features illustration showing Wings, Engine(s), Fuselage and Tail features of aircraft. The system consists of a database of aircraft on different category for extensive training.

Real Image of Mirage 2000

3D model of Mirage 2000

CTTS

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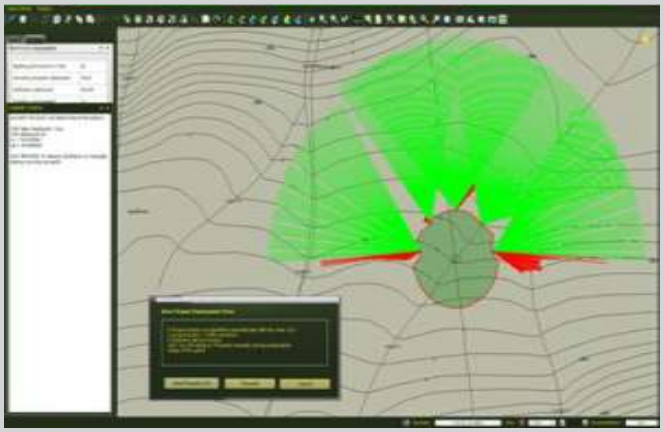
Counter Terrorism Training Simulator

A Smart and Safe Way to Train

Axis Aerospace & Technologies Ltd has developed a multiplayer networked 'Counter Terrorism Training Simulator' to aid security forces in planning Counter Terrorism operations. Players can use the tool to conduct realistic training sessions of operations in a Counter Terrorism (CT) / Counter Insurgency (CI) scenario comprising of security forces and terrorists. Major sub-systems are summarized in this brochure.



Deployment of Company Operating Base

MIS Module

Manages the backend database containing information used in operational planning and execution

- To create a MIS comprising of information such as village population data, terrorist particulars, FIRs registered, training level of security forces, important people in the area (potential targets), radio intercepts etc
- Generate meaningful queries to derive intelligence for CT operations planning
- View the results in a tabular / graphical form as well as on a digital terrain

Situational Set-up

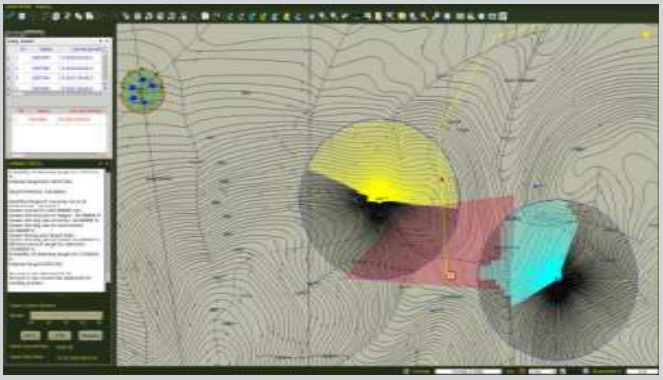
This comprises all functionalities related to the initialization and setting up of the CT / CI environment such as:

- Locating operating bases of the security forces (at selected location), considering terrain features
- Automatic / Manual placement of security picquets with the help of LOS view
- Allocation and simulation of weapons / surveillance equipment to security forces and the terrorists
- Automatic / manual route creation tool to plan and analyse routes to the target location
- Plan and analyse engagement zones and recovery after action
- Simulate weather conditions that affect visibility and engagement capability

UI displaying the information of a database record

CTTS

Gaming module - includes the game-playing aspects of the software such as:



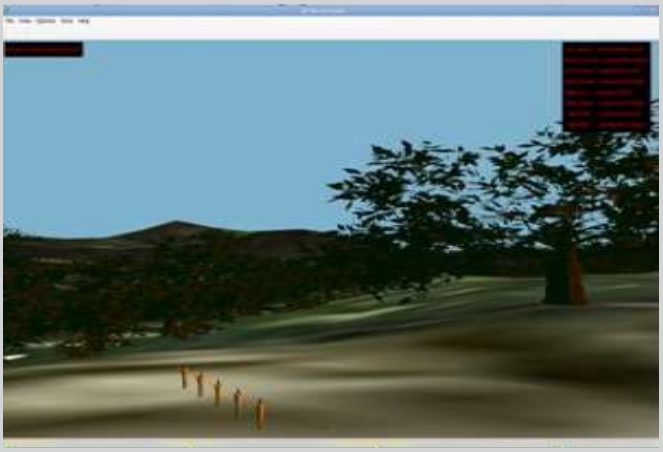
Scenario during game execution

- Movement: Movement of security forces and the terrorists along pre-set routes. The speed will be determined by terrain, environment, passage of time etc
- Detection: Inter visibility computation between the opposing forces factoring terrain, environment, night vision devices, effective area of target (posture and position), fatigue etc
- Engagement and Casualty Generation: Carry out an auto/manual engagement between entities factoring weapon characteristics, effective area of target (posture and position), SSKP etc

Visualization

The UI is built over a GIS backbone with the following features:

- Manual/automatic handling of maps and images of various file formats, datum and projections
- Layered presentation of maps in a Table of Contents and selective viewing
- Terrain doctoring using drawing tools for point, line and polygon geometry
- Change detection
- Identification of features in a loaded vector
- 3D view of the area of interest and all entities deployed within area with facility to flythrough / walkthrough navigation



3D visualization of the movement of the security forces

IGLA

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IGLA Training Simulator

A simulator to train IGLA operators in both classroom and field conditions with immersive and realistic psycho – physiological experience at the time of launch. The system comprises of realistic physical models of the launching tube, launch mechanism, missile weight model and IRHH. It also comprises of realistic software models of terrain, target aircraft, environment and physics based modeling of the movement and behavior of dynamic entities in the simulation viz. the missile and target aircraft. One Instructor station can control and monitor upto a maximum of three launchers simultaneously.

IGLA Training Modes

The training modes of the simulator are:

- Train in synthesized 3D terrain with synthesized targets displayed on a HD Tablet mounted on the Simulator Launching tube.
- Train with the background of real terrain captured by the Tablet camera with superimposed with synthetic targets in augmented reality mode.
- Train with the background of real terrain and actual friendly target (UAV with Telemetry and IR payload) captured by the Tablet camera.
- Train with a real terrain background with targets of opportunity.
- Psycho–physiological training on the launcher with realistic recoil, sound, light and blast plume effect.

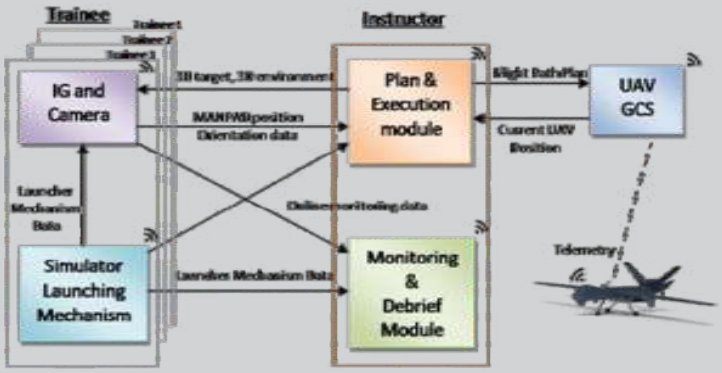
IGLA Simulator Configuration

Field Simulator:

- Instructor Workstation
- Launch tube with dummy missile
- Launch mechanism
- Launcher mounted Tablet
- IR camera

Practice Simulator:

Launcher
Missile weight model



IGLA System Configuration

IGLA Missile

IGLA

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Instructor Operations

Exercise Planning:

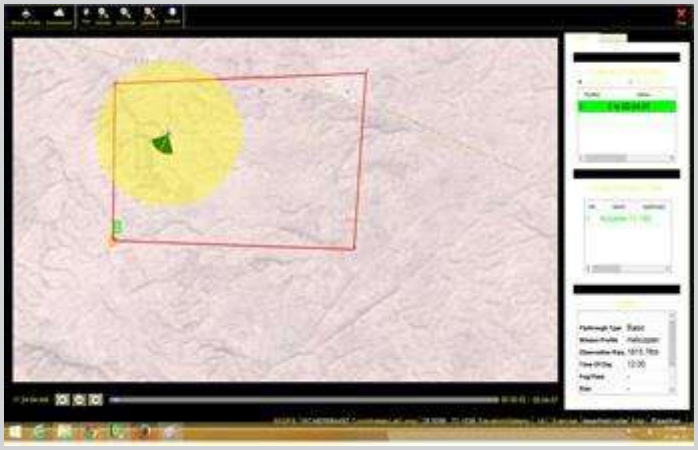
- Select Area of Interest
- Aircraft Formation planning (Single or Multiple)
- Route planning
- Environment planning
- IGLA team positioning in AOI

Exercise Execution & Monitoring:

- Run exercise on route
- Monitor actions of trainer on their launch sets
- Manually control the target aircraft as part of evasive action as required
- Release counter measures(IR Flares)

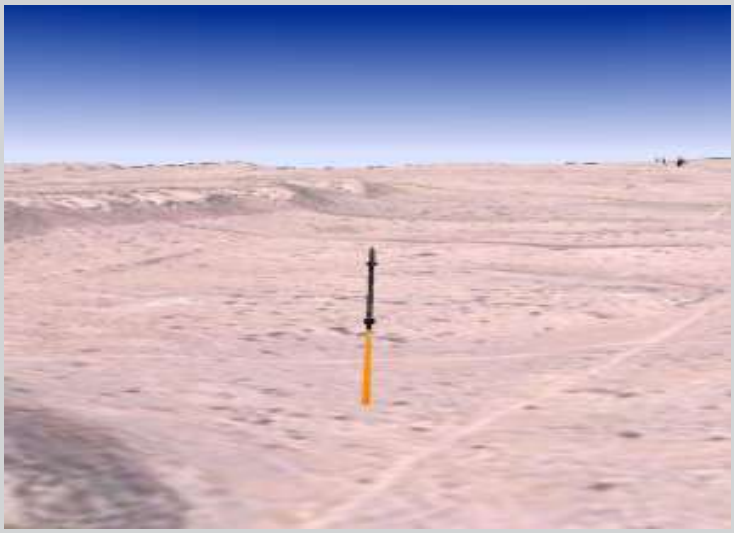
Exercise Debrief

After Action Review based on timing of various events and recorded trainee action



Trainee Operations

- Visually acquire the target on Image generator application running on the tablet
- Activate GPSS
- Slew missile from launcher axis to sight axis
- Fire Missile



IGLA Missile Launch in 3D Visualisation

RDPS

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Radar Data Processing System

The RDP interfaces with the Radar to generate real time track information of the aerial targets detected by the Radar. The RDP is configurable to interface with any type of Radar. The RDP runs on a Real Time Linux Operating system which has been developed in-house. The algorithms implemented in the RDP ensure highly accurate tracking of aerial targets under adverse environmental conditions. The RDP provides a friendly GUI for the user to customize its look and feel.

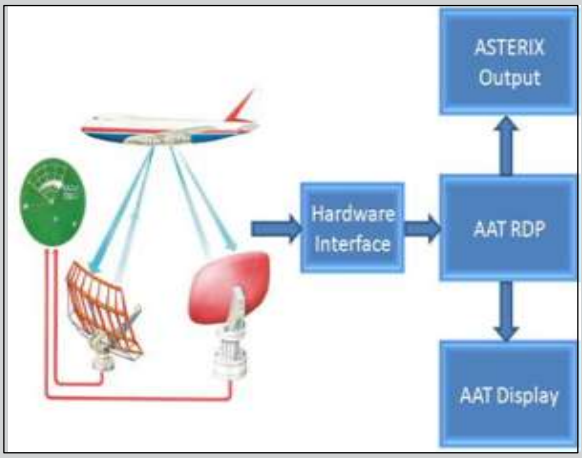
RDP Situation Display

RDP Functionalities

- Plot processing
- Clutter correlation
- Track correlation
- Track initiation
- Track resolution
- Track update
- Mirror track initiation
- DR update and kill track
- ASTERIX format output of plot, track and reference signals
- Upgradeable and scalable in plot and track handling capability ensuring desired response time

Features

- Quick initiation of real tracks
- Minimum spurious track generation
- Track maintenance even in case of turning, merging and crossing tracks
- Uninterrupted track maintenance under low PD
- Can interface with any radar including phased array radar
- Customized hardware interface
  Track output data in any user defined format in addition to ASTERIX
- User friendly GUI configurable to user's requirement
- Advanced tracking algorithms like IMM-MAT used
- Diagrammatic features to assess quality of radar output



MSTS

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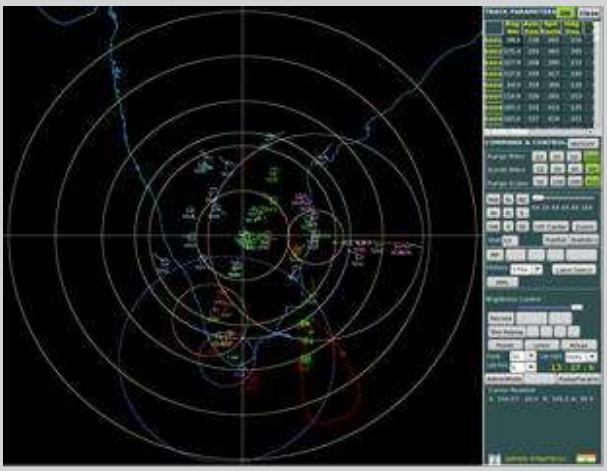
Multi Sensor Tracking System



MST Display

MST Display with Radar Coverage

Air Situational Display of Fused Data

Multi Sensor Tracking ensures effective use of the sensors by integrating the information provided by individual sensors so as to generate an Air Situation Picture of a large geographic area. It is an effective means for enhancing the situational awareness as well as optimal utilization of air space.

State of the art algorithms belonging diverse engineering disciplines like Estimation Theory, Decision Theory and Multi sensor data fusion are implemented as part of the MST system. The MST system is configurable to accept data from any ground based / air borne Radar system.

Display & GUI

The display system consists of radar air picture and user friendly GUI in the same screen. The GUI can be customised to interact with RDP system or MRDF with minimal modification. Invocation of display features like zooming / panning, picture in picture etc., can be carried out with ease. Facility to display tracks from any combination of contributing radars is also available.

Record and Replay

The record and replay module records in AVI or data format. The replay in AVI format replays the entire screen including the operator actions. Data recording of RDP unit records plots, tracks and statistical data in packets on a suitable storage medium for replay and analysis.

SMEMS

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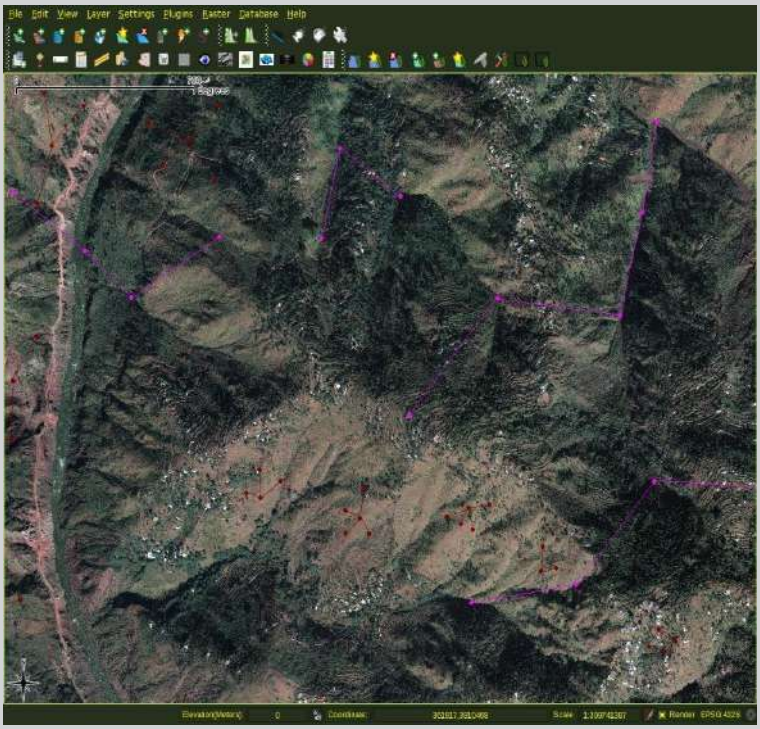
System for Management of Electro-Magnetic Space

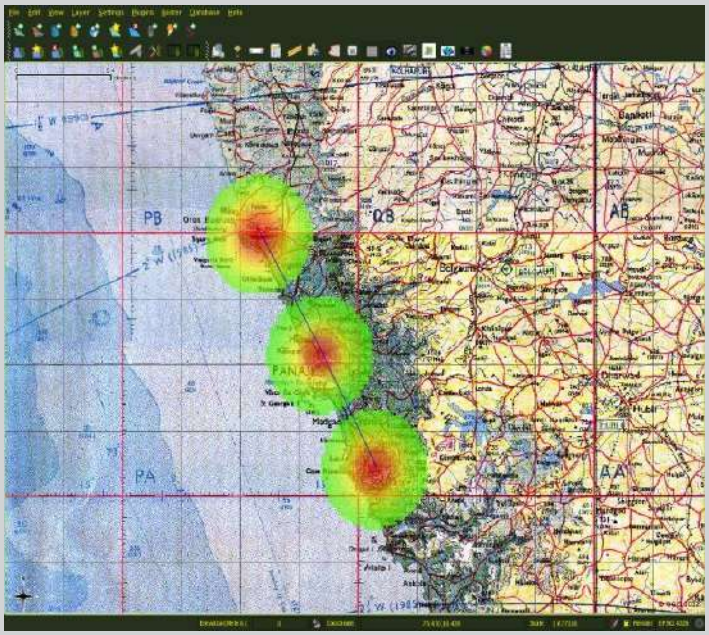
Efficient and effective spectrum management is required to ensure that the limited spectrum is fully exploited to fit in maximum number of emitters and receivers with in the geographical area of interest of military operations.

The SMEMS is a windows/Linux based system which provides client-server and browser (web) based exploitation of the services of the SMEMS core engine. The SMEMS automates the process of spectrum allocation through a spectrum assignment workflow manager. It supports operational planning as well as real time management of radio frequency spectrum by performing appropriate checks for compatibility and link engineering. The core engine simulates the spectral power density in space-time and frequency domain and ensures that there is no EM fratricide in the allocated spectrum.

SMEMS predicts and displays electromagnetic spectral occupancy at any geographic point based on selected propagation criteria.



Deployment of Radio Relays (pink) and Radio Nets (red)



Spectral Density Contours of Deployed Radio Stations

Frequency Assignment

- Handle requests, grants and denials with respect to EMS assignments
- Proposing new frequencies using engineering algorithms
- Create frequency lists for user allotments and channel plans
- Nominating frequencies for frequency hopping radio sets working in vicinity in a high-spectrum usage density environment
- Assigning optimization schemes based on Operational Research/Artificial Intelligence techniques
- Manual/automated stochastic frequency assignment
- Channel calculation according to WPC recommendation.

SMEMS

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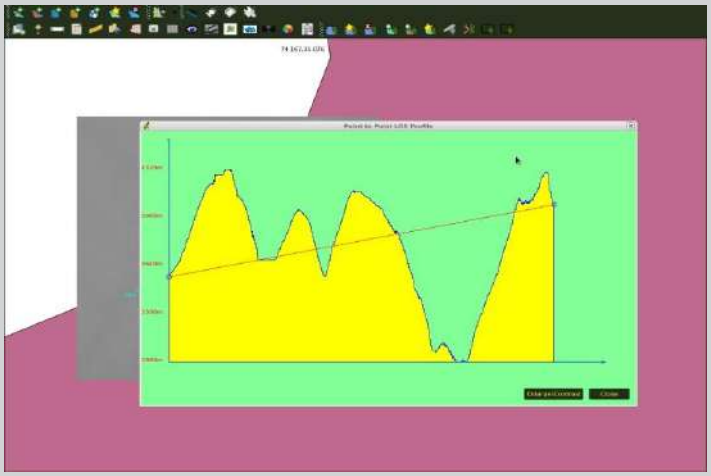
Interference Analysis

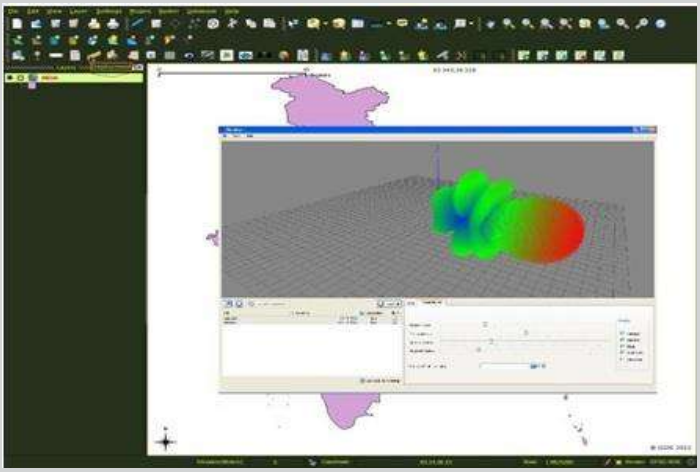
- Performing an interference analysis considering factors such as equipment characteristics, susceptibility, spurious emissions, terrain etc.
- Determines possible causes of RF interference.
- Perform adjacent and co-channel interference analysis.
- Supplement modules to analyse co-site, inter/cross modulation to get the overall interference result.
- Analyze space and band records.
- Integrated GPS receiver

Engineering Module

- Perform point to point link analysis
- Plot Radio LOS and receiver signal strength coverage of a transmitter
- Perform HF propagation analysis
- Perform satellite link engineering and predict the footprint
- Supports multiple coordinate systems such as Lat/long, military grid, geo-magnetic systems



Point to Point LOS profile



Antenna Pattern

Map and Topography

- Visualization of coverage contour of radio networks/stations on map.
- Display link between two stations in 2D/3D on map.
- Display frequency assignment defined regions and emitters.
- Display frequency and channel allotment.
- Display RF density from emitters.

Equipment Validation

- Create and maintain equipment database.
- Access to view/modify equipment information based on user privileges.
  Interface with external modules such as
- Spectrum Monitoring Systems to recognize unauthorized usage.

"IF THERE IS A THIRD WORLD WAR, THE SIDE THAT WOULD EMERGE VICTORIOUS IS THE ONE THAT WOULD BEST CONTROL AND MANAGE ITS FREQUENCY SPECTRUM"

USVAT

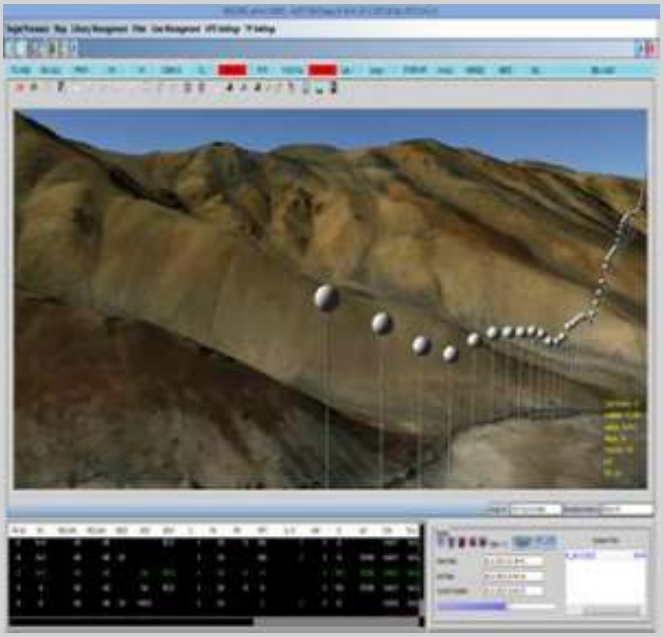
AXISCADES
Inspired Solutions. By Design

Unified Scenario Visualization and Analysis Tool

AXISCADES Aerospace & Technologies (ACAT) has developed a unified scenario visualization tool for visualization of Battle Space Entities in 2D Map View, 3D Terrain View and Tabular View. USVAT was successfully integrated in the ALOFT (Algorithms for Location Fixing and Triangulations) program of DLRL to visualize various surface and airborne emitter positions/tracks picked up by their ground based Passive Sensor Network in real time. The USVAT is available in Desktop version and API for quick integration as a scenario visualizer of battle space situation displays as well as simulators.

Key Features

- Customizable 2D Visualization Engine built over an OGC compliant GIS Engine.
- Customizable 3D Visualization Engine.
- GPS interface.
- Wide library of 2D/3D military symbols.
- 2D and 3D view synchronization.
- API support to develop scenario creators / visualizers with customized user controls.
- Support for a variety of tabular and chart views of data.
- Entity management interface for client applications.
- Integrated TCP/UDP messaging support.



2D Map View

USVAT

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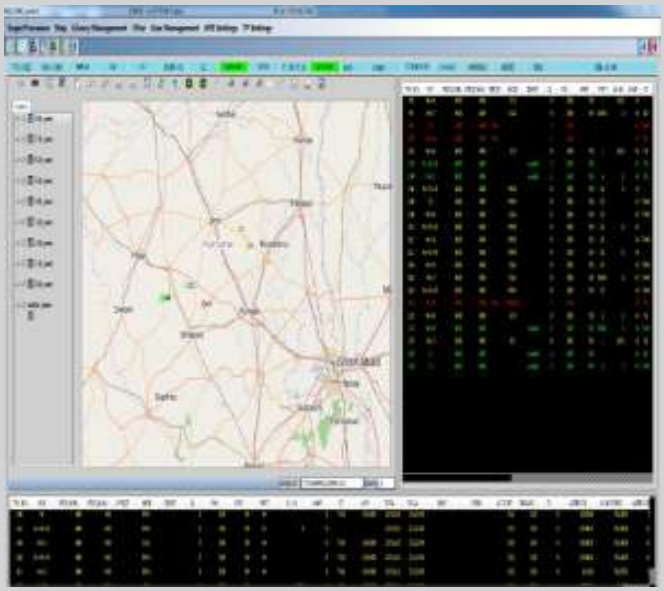
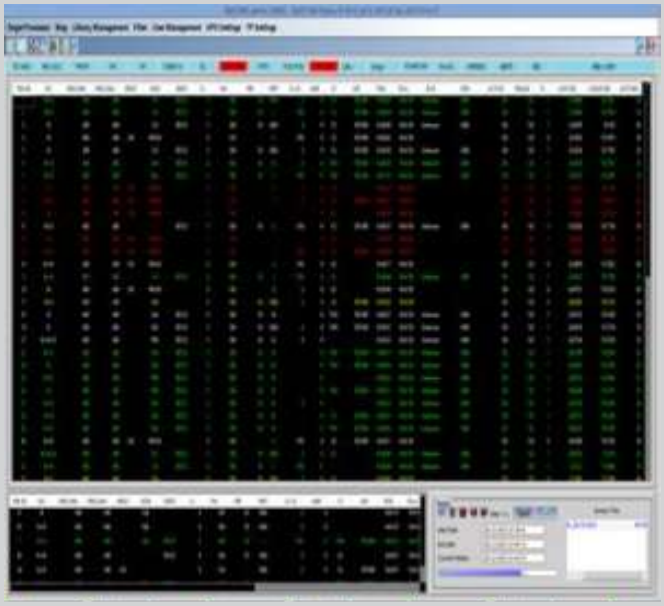
Map Based Display & Controller of ESM sensor network application (DLRL) developed on USVAT platform

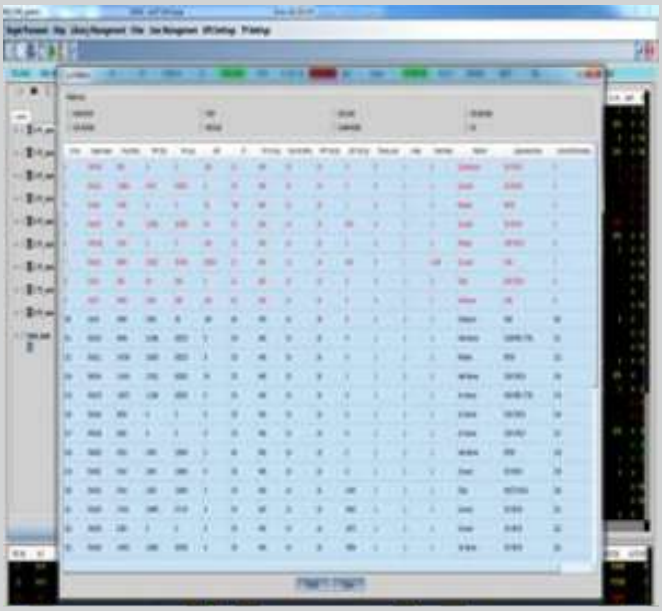


Open Street Map in 2D View

Emitter movement in 3D Map



Emitter Report Window



Emitter Database

VRAS

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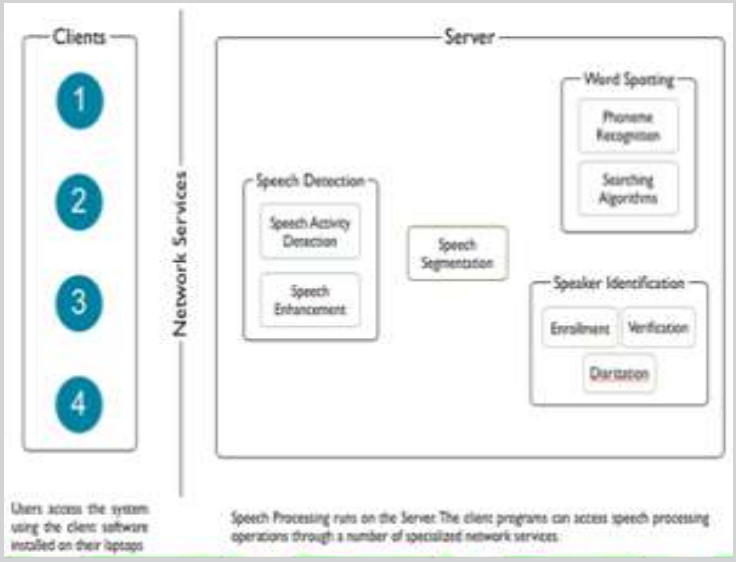
Voice Recognition and Analysis System

VRAS is Windows OS based solution consisting of a server that hosts the speech processing algorithms. The system architecture allows parallel access to the voice processing algorithms. System users are able to access voice recognition and analysis functionality using their laptop computers. The client program facilitates the users to log into the system, upload audio files and perform voice processing functions like speech enhancement, pause removal, speaker identification, key word spotting, etc.



VRAS System Architecture

User Interface

System Features

- Audio conversion and standardization of incoming audio signal
- Rule based speech activity detection system employs a number of speech features related to spectral structure, pitch and energy and speech-pause interaction. Extremely effective in noisy as well as clean environments
- Effective and efficient algorithms for quick speech enhancement
- State of the art GMM-UBM (Gaussian mixture model-universal background model) based speaker identification technique
- SVM (support vector machine) based super vector classifier for highest quality speaker identification
- Hybrid word spotting system that combines phoneme recognition based approach with language modeling based approach

VRAS

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Speech Detection

Speech enhancement for noise Suppression
Speech activity detection for pause Removal feature
Audio edit feature such as deletion, cut, copy, paste and merge including annotation of the portion of recorded data into another file to make a compile data file
Speech detection will be done in 1:15 i.e. Signal of 15 minutes duration will fully processed in one minute

Speaker Enrollment

Speaker Identification (SID)

Speaker enrollment for building speaker voice biometric models
Speaker verification for confirming/rejecting identity of a speaker
User configurable threshold level (Confidence level)
SID will be done in 1:8 i.e. Signal of eight minutes duration will fully processed in one minute

Keyword Spotting (KWS)

Phoneme recognition for converting audio into speech sound units
Search algorithms for spotting words in the audio file
User configurable threshold level (Confidence level)
KWS will be done in 1:3 i.e. Signal of three minutes duration will fully processed in one minute

Speaker/Keyword Search Output

GSE / GHE

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Inspired Solutions. By Design

Ground Support Equipment and Ground Handling Equipment

AXISCADES has established Ground Support and Ground Handling Equipment (GSE / GHE) portfolio through which several products belonging to Simple Mechanics, Complex Mechanics, Hydraulics, Pneumatic, Electronics and RF Technologies, have been delivered. Handling Tools, RF Load, Optical Benches, Hydraulic Test Benches, EW Test Platforms, etc are to list a few.

Handling Tools

Handling Tool -1

Handling Tool -2

Activities

- Product Design
- Engineering Analysis
- 3D Modelling
- Detailed Drawing
- Assembly Process Definition
- Manufacturing Files Preparation
- Product Manufacturing / Fabrication
- Surface Treatment
- Assembly / Integration and Testing
- Packaging Design
- Delivery

Handling Tool -3

Handling Tool -4

Radar Support Trolley

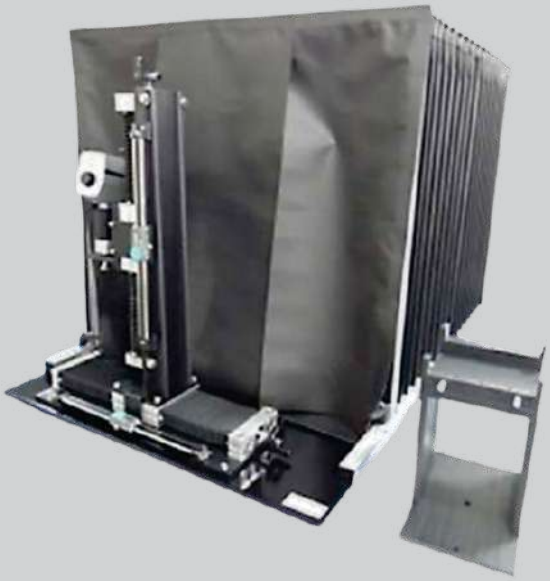
Filling Device

EW Test Platform

GSE / GHE

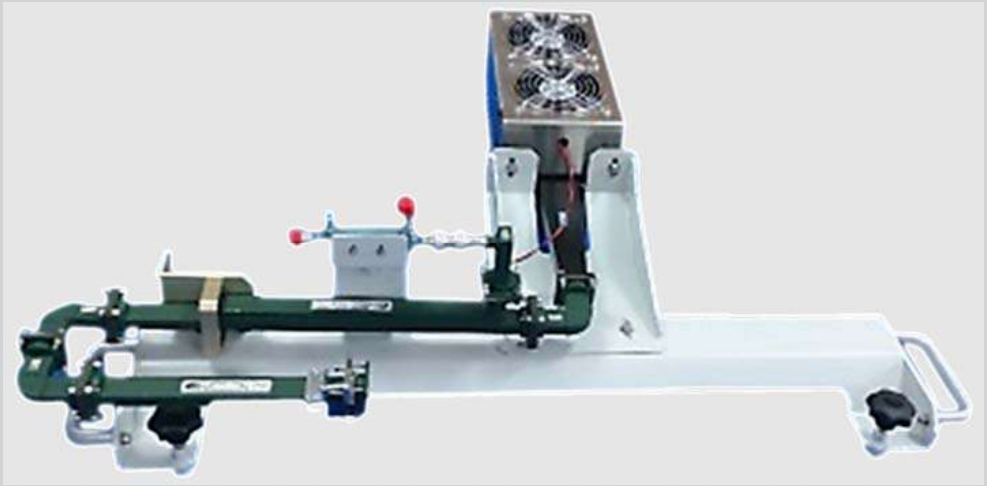
AXISCADES has created a manufacturing partner eco-system through which the products are manufactured and delivered.

AXISCADES has established a robust Quality Management System (QMS) and process framework comprising of forms, templates, checklists and procedures for Preliminary Design Review (PDR), Critical Design Review (CDR), Production Readiness Review (PRR), Incoming Inspection, Stage Inspection, First Article Inspection (FAI), Final Inspection, Packaging and Delivery to the satisfaction of global OEMs.



Optical Test Platform

Pneumatic Test Platform



RF Load

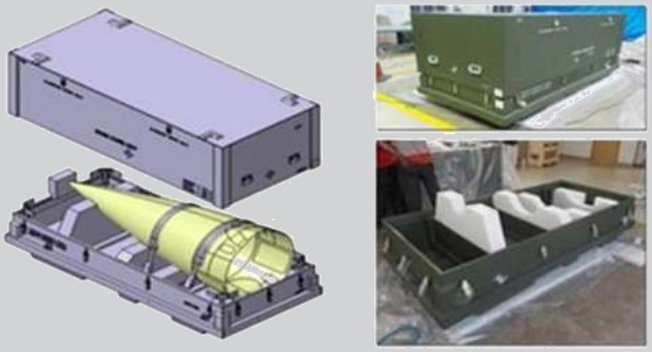
Ruggedised GFRP Containers

AXISCADES
Inspired Solutions. By Design

Ruggedised GFRP Containers

To extend the shelf-life and safety of airborne avionics LRUs during the transportation under severe conditions, AXISCADES has designed and manufactured ruggedized Glass Fiber Reinforced Plastic (GFRP) containers. These containers have undergone various qualification tests as per relevant Mil STD / ASTM / GAM EMB1 standards. Various types of GFRP containers designed & manufactured by AXISCADES are shown below.

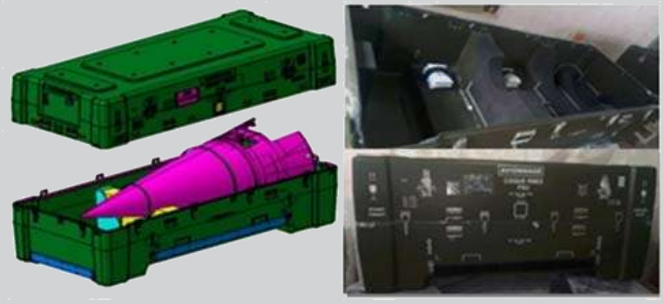
GFRP Containers



Container - Wood with FRP lining

Activities

- Product Design
- Engineering Analysis
- 3D Modelling
- Detailed Drawing
- Assembly Process Definition
- Manufacturing Files Preparation
- Product Manufacturing / Fabrication
- Surface Treatment/Painting
- Assembly / Integration and Testing
- Packaging Design
- Delivery



Types of FRP Containers

Ruggedised GFRP Containers

AXISCADES
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Types of FRP Containers

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Internal View of FRP Containers

AXISCADES
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Maintenance Repair and Overhaul - MRO

AXISCADES undertakes Depot Level Maintenance (DLM) of Airborne Missile Launchers of Defence Forces as a part of Maintenance Repair and Overhaul activities.

AXISCADES has built world class infrastructure required to carry out such Maintenance. This is for the first time that Depot Level Maintenance activities of Airborne Equipment is carried out by a private sector defence company in India. This forms the best demonstration of Atmanirbharta.

AXISCADES has set-up an Operational Capability to carry out the maintenance activities, which mainly comprise Infrastructure, Maintenance Equipment, Formulation of Maintenance Procedures and Documents, Provision of Tools, Spares and Consumables, Training of Resources, Evaluation and Deployment. Sophisticated Automatic Test Equipment, designed and manufactured by AXISCADES, certified by the OEM, are installed in the facility to carry out the activities.

The Maintenance procedure comprises of the following: -

- Incoming Inspection: Ascertain the status of in-service product due for maintenance.
- Electrical Tests: Check the electrical continuity and isolation using dedicated set of Interface boxes.
- Functional tests: Launcher is connected to the Test Bench with dedicated set of harnesses and the automated test is performed.
- Mechanical tests: Check for alignment of rails, Safety pin operation and other Mechanical functions as per checklist.
- Pneumatic tests: Check proper functioning of high-pressure component using Pneumatic Test Benches.

Besides the maintenance activities, AXISCADES undertake minor repairs of the Launchers.

AXISCADES plans to replicate the above model on various equipment available with Indian defence forces, in collaboration with the OEM where relevant.

MRO

AXISCADES undertakes Depot Level Maintenance (DLM) of High-Pressure Bottles used to eject the Missile from the Missile Launchers of Defence forces as a part of Maintenance Repair and Overhaul Activities. AXISCADES has built world class infrastructure required to carry out the Depot Level Maintenance of High-Pressure Bottles in India.

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The DLM activities comprises of the following: -

- Incoming Inspection: Ascertain the status of in-service product due for maintenance.
- Electrical tests before disassembly: Check the electrical continuity, isolation and integrity of the in-service product due for maintenance using dedicated Interface box.
- Stamping tests: Testing of the Cylinder under high pressure using Stamping Bench.
- Disassembling and Reassembling of the Electrical assembly to replace the EOL parts.
- Leak Test: Check for Leak of the High-Pressure Bottle.
- Final Electrical tests: Check the electrical continuity, isolation, and integrity of the in-service product due for maintenance using dedicated Interface box Electrical assembly acceptance: Electrical and Leak Check of the Electrical assembly.

Besides the maintenance activities, AXISCADES undertake minor repairs of the bottles. The repair activities are as follows: -

- Replacement of Safety wire.
- Replacement of Temperature probe.
- Replacement of Pressure sensor.
- Replacement of Breakable plug.
- Replacement of Cone.

AXISCADES plans to replicate the above model on various equipment available with Indian defence forces, in collaboration with the OEM where relevant.

AXISCADES – A Niche, Strategic Technologies Company

Aerospace, Defence and Security companies worldwide are facing unprecedented challenges to strike a balance between innovation, time to market and government regulations. A global partner, who can seamlessly integrate into company's supply chain, provide holistic solution to its customers' needs, add value to its product development process to get an early edge in the competitive business ecosystem is an absolute necessity.

AXISCADES is India's leading Aerospace Defence and Security solution company with vast experience and expertise in handling large and complex programs with end-to-end capabilities in Technology, Infrastructure, Investment and adds value as a Business Partner. AXISCADES is a major player in Defence Offset, Make in India and IDDM programs. Being a licensed Defence manufacturer, AXISCADES is the Indian Partner for many programs including Mirage Upgrade & Rafale and delivered high technology systems. AXISCADES aims to be a significant player in the upcoming Buy (Global), Buy & Make (Global/Indian) and IDDM programs.

Product and Solutions Offerings

Radar, EW & Avionics

- Radar Data Processors
- Integrated EW Systems
- Airborne Products
- Digital Engine Control Unit
- Mission Preparation Retrieval Unit
- RF Signal Simulator
- Microwave Signal Generator

Software & Simulators

- Multi Sensor Tracking
- Map Management Software
- Radar Simulation Software
- Air Defence Training Simulator
- Aircraft Recognition Trainer Simulator
- Radar Data Simulation System
- Full Mission Full Motion Simulator

ATEs, Test Solutions & GSE/GHE

- ATE - VXI, PXI, CPCI
- Test Programs
- Test Automation, Controls, PLCs
- EW Test Platform
- Optical Test Platform
- Radar Support Tool
- Handling Tool

Drone and CUAS

- Detection Unit
- Electronic Countermeasure
- Command & Control

AXISCADES **Aerospace &Technologies Pvt Ltd.**
No. 14/15, 2nd Cross, 2nd Main, Electronic City Phase 1,
Bengaluru – 560 100 INDIA.

Tele : 91-80-4932 4444
Fax : 91-80-4932 4455
email : milaero@axis.aero
Web : www.axiscades.com