LOM PRAHA

Description and Capabilities

TACTICAL SIMULATED TRAINING

2020

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Overview

Flying simulators provides an economic advantage over training in a real aircraft. When fuel, weapons/ammo, maintenance, technical life consumption, shooting range/area rental, insurance costs and specific kind of training especially as Beyond Visual Range (BVR) or Quick Reaction Alert (QRA) procedures are taken into an account the simulator cost is of a few orders-of-magnitude lower than for the actual aircraft or its weapons.

Flying simulators reduces significantly the time needed for mission preparation, reduces significantly the cost of the flight training, and allows for practicing for situations that would be impractical or very dangerous in airborne training exercises, provides for pre-deployment training to unknown areas, and reduces significantly the impact on the environment.

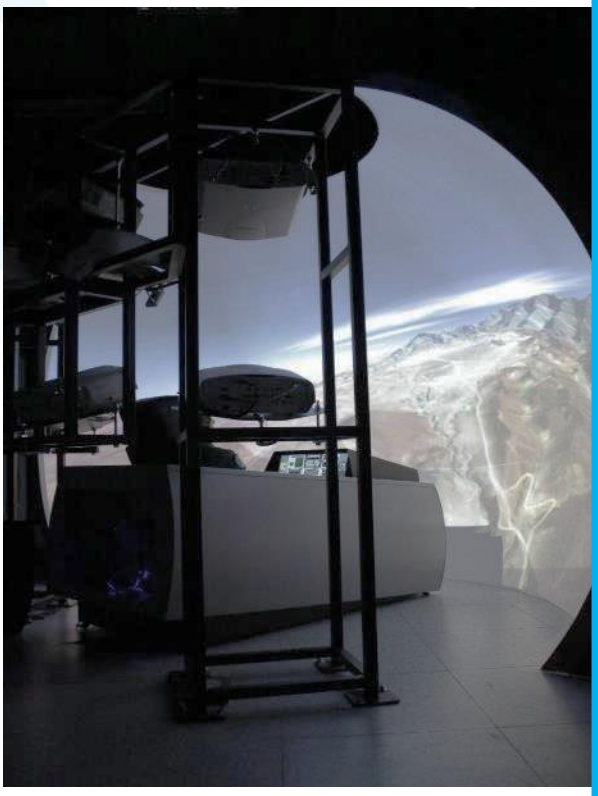
Tactical simulated training courses provided by LOM PRAHA s.p. Flight Training Center (CLV) Tactic simulation Center (TSC) at Pardubice airfield (LKPD), the Czech Republic, cover training of various tactical situations and skills devoted to tactical Air Force pilots and radar controllers (GCIs) with support by Forward Air Controllers (FACs).

TSC is equipped with the state of the art technologies allowing for close-to-reality visualization and perception. All the TSC personnel are former Jas-39 Gripen and/or L-159 ALCA military pilots. Parameters such as aircraft/weapons/radar performance can be modified according to request of a Customer. Also terrain required by Customer can be implemented. Controls and cockpit layout for a different type of aircraft can be modified, too if requested well in advance.

Cabin Tactical Simulator (KTS)

- The Cabin Tactical Simulator contains a cockpit and a display system with large visualization. Four KTSs are available.
- The cockpit is of the same size as a real Gripen cockpit, it has a simplified adjustable seat, canopy frame and stepladder.
- Cockpit is equipped with real JAS-39C or L-159 Hands-on-Throttle-and-Stick (HOTAS) replica with correct handgrip and buttons or a set of L-39 Controls.

- The visualization system has six channels with standard projectors. The field of view is approximately 180°x120°. The Head-Up Display (HUD) is integrated in the visualization system and has separate High Definition (HD) projector.
- The HUD image is superimposed on the display surface with a high contrast relative to the out-of-the-window (OTW) image.
- Aircraft control is realized by HOTAS/L-39 Controls and by simulated visualization on one 24 inch touch screen positioned in front part of the cockpit.
- Software provides simulation of JAS-39C, L-159, L-39 and a "generic" supersonic, transport aircraft, and/or airliner in an extent necessary for the training.



Simplified Tactical Simulator (JTS)

- The cockpit and display system with visualization are the same as for Cabin Tactical Simulator.
- Four JTSs are available.
- The only difference is the visualization system realization.
- In the Simplified Tactical Simulator, the visualization system has 3 channels with 60 inch screens, so it is really „simplified".

Throttle And Stick

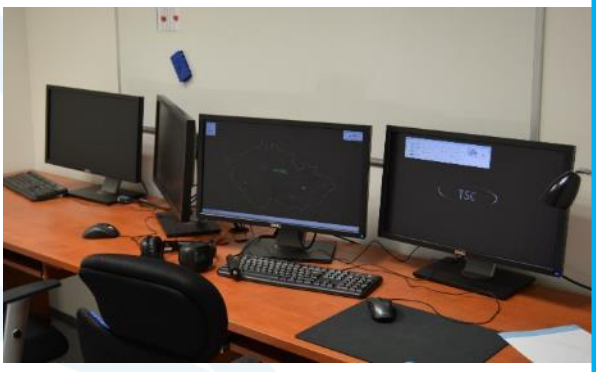
L-39

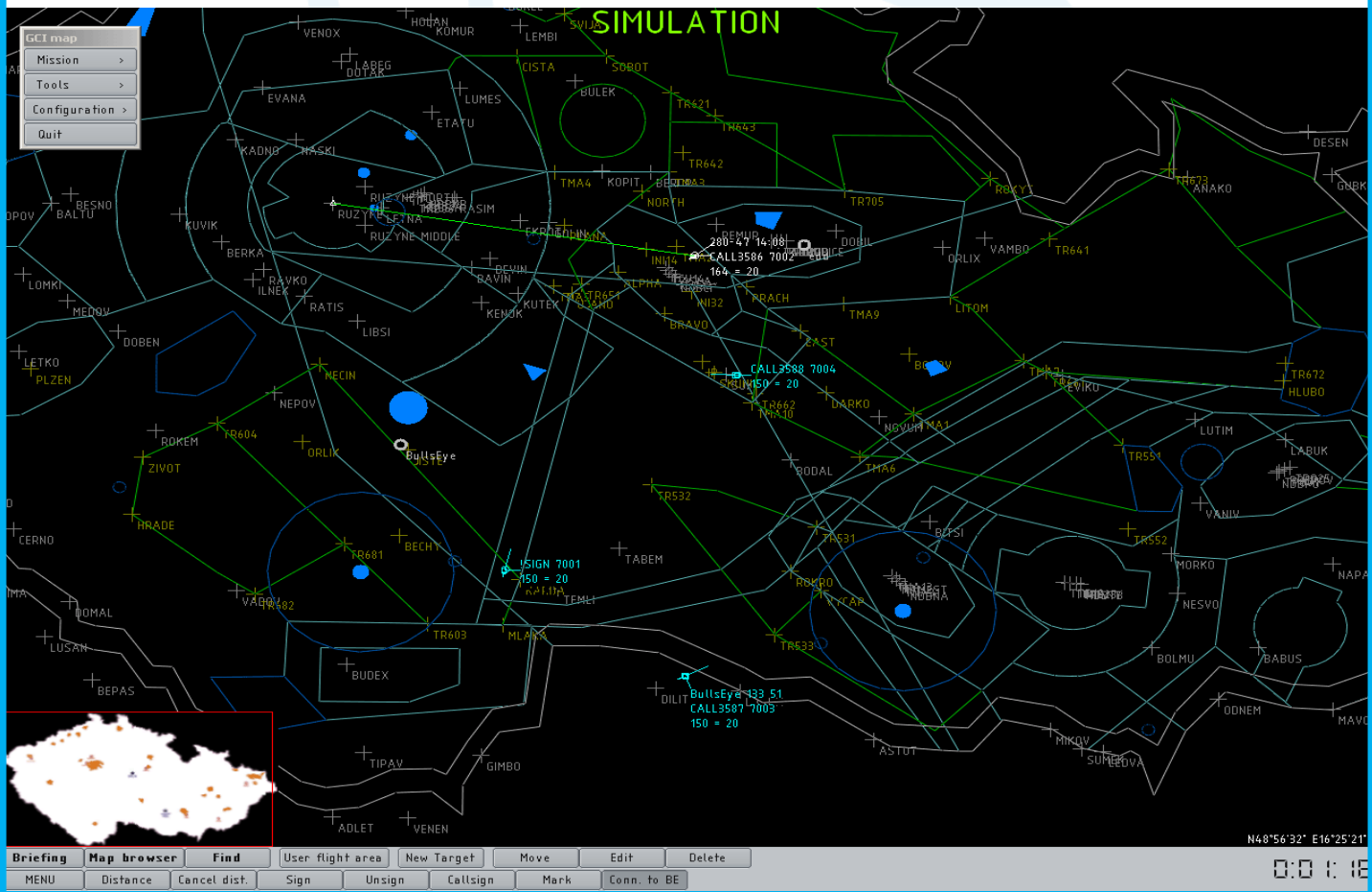
JAS-39

L-159

Fighter/Radar Controller´s Station

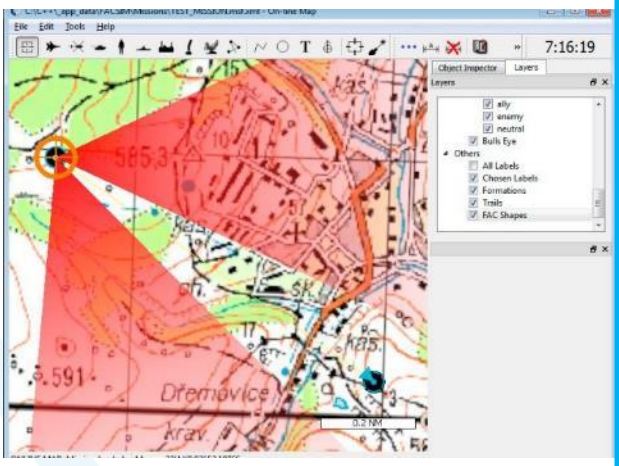
- Tactical Simulation System consists of four identical Ground Controlled Interception (GCI) Stations.
- Software provides simulated visualization of chosen GCI radar picture together with appropriate control.
- GCI application is set off from Instructor Operator Station (IOS) work site simultaneously with launch of mission in flight simulator´s cockpits.
- GCI stations are equipped with communications system.
- The same symbology as on real GCI console is used, i.e. the training environment is the same as the real one. Each station is equipped with two 23" LCDs, keyboard, mouse, headset and push-to-talk button/pedal.





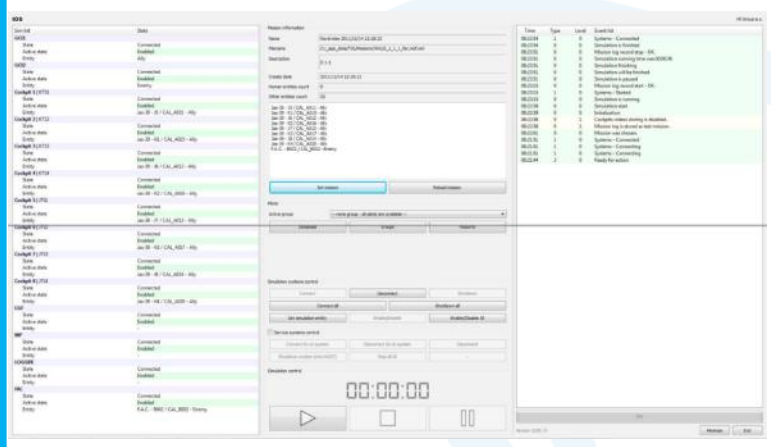
Forward Air Controller´s (FAC) Station

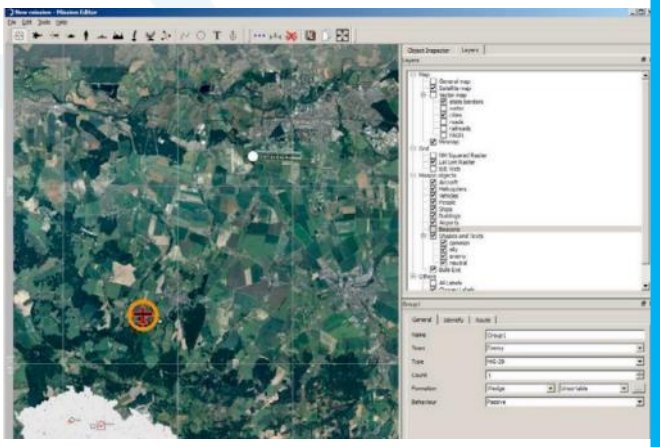
- Tactical Simulation System contains two Forward Air Controller´s (FAC) Simulation Stations.
- Note please, it is not aimed at the FAC training, but the main goal is provision of FAC support to pilot´s training.
- Two FAC consoles are composed of PC workstation with standard controls, two 23" and two 34" LCD panels and two headsets with PTT devices. The software simulates the function of FAC providing all tools necessary for target detection, recognition and communication with the pilot including simulated laser homing of guided ammo.

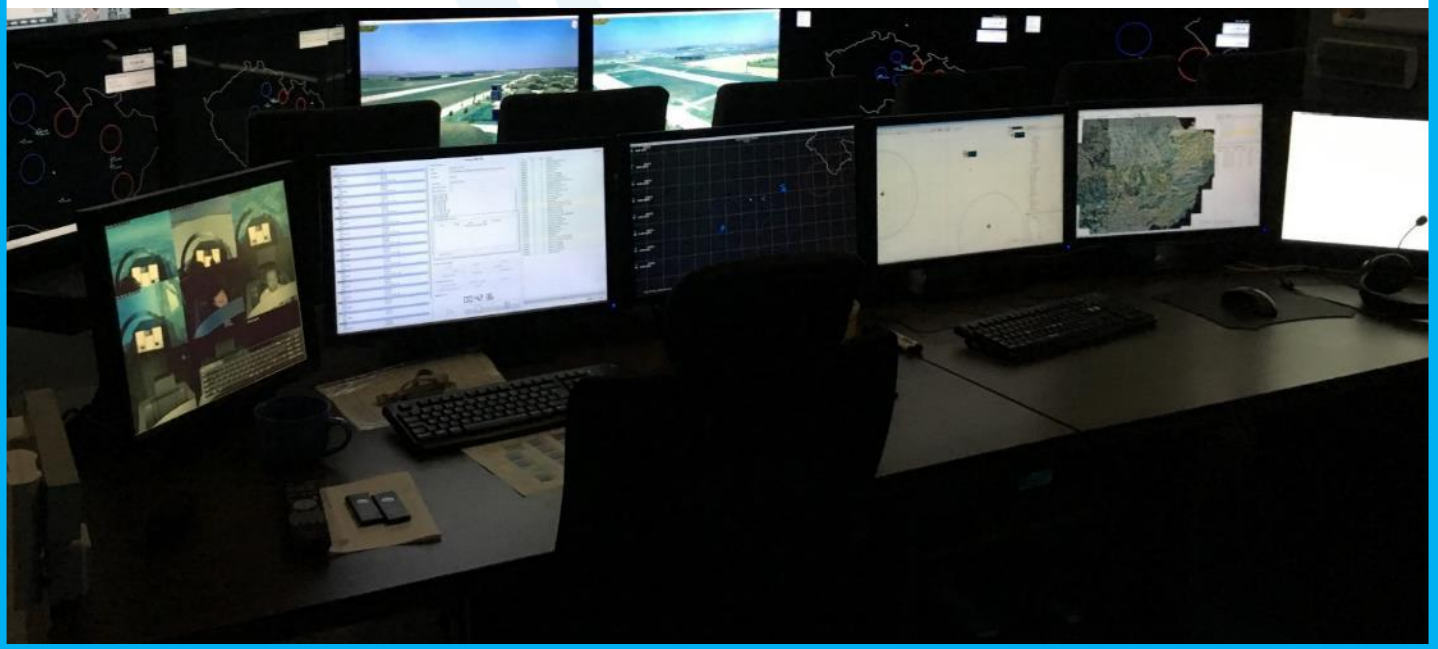


Instructor Operator Station (IOS)

- The Instructor Operator Station enables Tactical Simulation System´s (TSS) control and direction of exercise processes. IOS is composed of two work sites.
- One site is for Exercise Director (IOS-MAIN) and the second one for Operator Computer Generated Forces (IOS-CGF). IOS is collocated with After Action Review (AAR) site to allow for audio- visual supervision of exercise development.
- IOS-MAIN is equipped with two 24 inch LCD screens (IOS-MAIN computer controlled), two 19 inch touch screens (IOS-CAM and IOS- SOUND computers controlled) and control means (keyboard, mouse and head-set).
- IOS-CGF consists of two 24 inch LCD screens and control means (keyboard, mouse and head-set). Software provides for full control of TSS technology and training control.

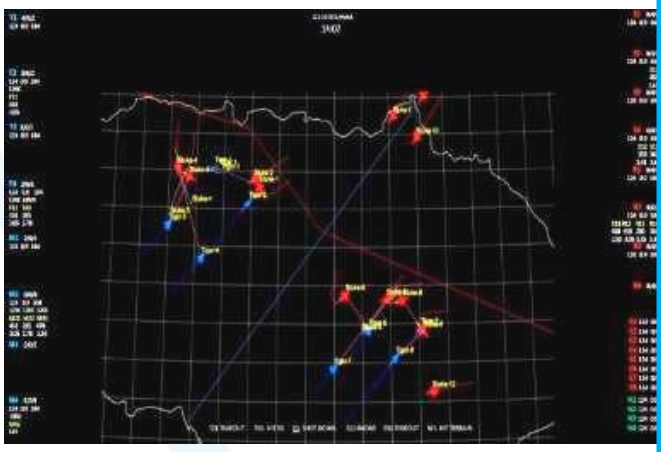






After Action Review (AAR) / 3D Theatre

- AAR site is designated for exercise progress overview and evaluation with audio-visual means of support.
- It is equipped with projector and projection screen and a number of large-screen displays.
- Sixteen chairs in front of the screens allow for open view on the screens.
- For monitoring of simulated radio correspondence the site is equipped with 20 two-channel wireless head-sets.
- AAR site allows for instantaneous after-mission debriefing including 3D tactical situation view and replay of all the eight (8) cockpit displays projection.
- AAR doesn´t have its own hardware and software. Picture on the screens is generated from KTS, JTS, GCI, FAC and IOS sites.



Briefing Room

- There are two identical Briefing (BRF) rooms available for separate preparation of exercise participants and Directing Staff (DISSTAF).
- Briefing rooms are equipped with software and hardware for creating and modification of scenarios and exercise evaluation.

Relax Room

- Refreshment (fruits, biscuits), fountain with potable water and coffee machine,
- Also a microwave own and a fridge together with free WiFi connection and multimedia center with TV set are available for the student´s comfort.
- Cloak-room with lockers and of course restrooms with shower for male and female student´s are here.

Training Courses Organization

General Planning Policy

Training planning starts with customer´s and TSC agreement on Integrated Master Plan (IMP) for the following year, in accordance with (IAW) customer´s order or contract. IMP contains overview of required (booked) training weeks with date, course identification and intent of the course and number of participants of each particular course. It is possible to plan for the unallocated courses through the ongoing year. For detailed course planning a Course Time Schedule is being developed for each training week. The Schedule contains the training windows (slots) for each day. It can be modified IAW customer´s request. Based on this Schedule and types of planned missions scenario proposals are developed. The customer approved proposal is finally worked out and loaded into the simulation system using a Mission Planner (MP).

Scenario proposals options:

- Standard scenarios – proposal are set up by TSC staff.
- Modified scenarios – TSC in cooperation with the customer.
- Customer scenarios – proposals are set up by customer and forwarded well in advance to TSC staff.

Organization and execution of a standard training week

Set up of a training week

Standard training week runs from Monday to Friday, 8:00 a.m. till 4:30 p.m. with a lunch break. Two (2) TSC instructor pilots and one (1) GCI instructor are available during whole the week. Complex NATO planning policies are followed, if applicable.

Mission planning

Missions are composed in Briefing rooms (BRF), either separately (BLUE and RED BFR), or in cooperation – IAW customer´s requirement). The situation (scenario developed in MP) is projected on a screen, own and enemy forces and aim of the mission are introduced. Whiteboards for aircrew briefing, including prearranged boards for standard NATO aircrew preparation are on hand. Aircrews analyze situation on their own or with TSC instructor pilot assistance and choose a way (course of action) of the mission execution. It is possible, based on the particular group / mission head requirements to change the basic scheme before the mission is launched, e.g. change formation design, different Air Interdiction (AI) routes, change targets ...

Missions and Debriefing

It is possible to use all the eight cockpits for training of BLUE forces with only Computer Generated Forces (CGF) as opponents. But usually some cockpits (mainly JTS) are used as more challenging human-manned RED forces. Mission lasts, based on the complexity of a scenario, from 15 to 20 minutes, and within one training slot it is possible to repeat the mission 2 to 3 times (depends on the length of the mission) except for QRA missions. Each one mission can be evaluated immediately. Composition of aircrews and allocation of cabins remains the same for the missions during this rehearsal; aircrews carry out short briefing (between-the-mission-briefing) and usually do not change tactics.

The QRA missions take approximately one hour and more (take off from QRA readiness, visual identification, QRA operations, etc.). However, the evaluation of QRA mission is usually short; it can be broken down into short elements to clarify situations or mistakes pointed out by an observer/evaluator (White Cell).

Debriefing can be carried out in several ways based on the character of fulfilled missions or on the customer´s request:

- By playing back the mission on 3D Theatre (AAR); there is possibility to stop the mission or to replay whatever part of it. At the same time all the cockpits are played back.
- By playing back the mission in BLUE or RED BRF room on a projector screen; this serves for separate debriefing of the whole group of the exercise participants.
- Separately for BLUE and RED mission; each group in their BRF room with independent play back and analysis of their mission.

NOTE: Each customer can appoint its own authority for independent assessment of a mission (White Cell). If required, TSC can establish White Cell occupied by an experienced TSC instructor pilot and/or GCI person.

Tactical Simulation System primary capabilities

With regard to the technical set-up the TSS allows for:

- Basic configuration of the simulation system amendment or extension.
- New elements production and additions.
- New elements parameter´s edition.
- New data models level of accuracy built-up (amendment of parameters or substitution of modules).
- Customer´s standard format terrain database implementation (e.g., Open Flight with WGS84 projection).

Elementary types of simulated aircraft

JAS-39 GRIPEN

L-159 ALCA

L-39 ALBATROS

L-159 ALCA (NEW MFD)

The system allows for selection of simulated aircraft by changing of software settings and swopping of HOTASes/Controls in following extent:

- JAS-39C is the basic type of simulated aircraft. For its behavior, performance, characteristics and weapons simulation and for visualized information simulation the data models matching JAS-39C characteristics in the range necessary for the tactical application are used. Cockpit visualization with MFD, HUD and HOTAS matches to those of JAS-39C.
- L-159 - the data models are matching L-159 performances, also the MFD, HUD and HOTAS correspondent to those of L-159. MFD modification is under development.
- L-39: the data models are matching L-39 performances.
- As concerns generic jet a generic information is used for simulation of its performances. Cockpit visualization with MFD, HUD and HOTAS remains as for JAS-39C. The elementary simulated performances, characteristics and weapon systems equal to a simulated aircraft in the range of their tactical application.

Three generic (fighter aircraft category) aircraft models are available:

MiG-29 Su-27 F-16

Training capacity

As regards the number of exercise participants, TSS allows for:

- Individual participant training,
- Group of up to 8 pilots,
- Two FAC supporting the training,
- Four GCIs, at a time.

The optimal/effective composition of trainees and observers for one-week training:

- Pilots: up to 9 (8 trainees plus 1 training course leader)
- GCIs: 2 to 4 personnel plus 1 instructor
- Observers: up to 2

NOTE: Four (4) GCIs are recommended if training is dedicated to GCIs.
NOTE: The above mentioned optimal capacity is also determined by environmental considerations (air conditioning capacity, restrooms, circulation space, fire protection).

Level of adherence of simulated entities and data models to reality

TSS allows in regards to its authenticity level for:

- Training with generic unclassified information.
- Training with specific or classified information up to CZE SECRET.

NOTE: Training with classified information/data is possible only when all legal restrictions and national legal requirements both, on the customer´s and the service provider´s side are followed. The customer is responsible for the classified information/data delivery.

Short-term training courses example – Basic Courses

The objective of a short term two-week training course is development of fundamentals of combat engagement tactics along with familiarization with and mastering of elementary principles of BVR missiles engagement. A generic curriculum proposal for two training weeks is shown below. The course content is flexible; changes according to customer´s requirements are acceptable.

Example 1: short-term elementary training course – BVR training

Introductory briefing (mandatory briefing on TSC policies and operation):

- TSC Security Briefing
- Introduction of TSC, cockpits and GCI work sites operation, practical demonstration of briefing/debriefing tools (Familiarization Flight – standard for all courses)

Elementary BVR training against non-maneuvering targets:

- Aim: introduction to cockpit and simulations during a simple mission, radar operation and missile launch, GCI – Pilot coordination

Elementary training of pairs against non-maneuvering targets:

- Aim: training of cooperation in pairs, targets allocation, GCI – Pilot coordination

Follow on training of pairs against maneuvering man-controlled targets :

- Aim: learning of command techniques in pairs, targets allocation, response to a developed situation (Close Air Patrol), cooperation with GCI

Elementary training of flights of four ships:

- Aim: practicing of command techniques in flights, targets allocation, cooperation with GCI

Follow on training in flight operations:

- Aim: consolidation of knowledge and routine in weapons (F3 - Active Missile) employment during OCA and DCA missions

Example 2: short-term elementary training course – QRA training

Self-standing training week (course) intended to train QRA procedures – elementary, follow on and/or rehearsal training meant to harden QRA routine and knowledge. This course can be scheduled independently of BVR course (no previous knowledge on BVR is required).

Introductory briefing (mandatory briefing on TSC policies and operation):

- TSC Security Briefing
- Introduction to TSC, cockpits and GCI work sites operation, practical demonstration of briefing/debriefing tools (Familiarization Flight – standard for all courses)

Elementary QRA training – Visual Identification (VID) of a target:

- Aim: introduction to cockpit and simulations during a simple mission, on target navigation, VID, orders verification, GCI – Pilot coordination

Elementary QRA training – VID of a slow-moving target at low altitude:

- Aim: VID execution on a low altitude and speed, GCI – Pilot coordination

Elementary QRA training – aircraft escort form a territory:

- Aim: contact establishment, methods of visual signalization and guidance of an aircraft, GCI – Pilot coordination

Follow on QRA training – VID of a fast-moving, maneuvering target:

- Aim: training of cooperation in pairs while visually identifying maneuvering targets on different altitudes

Follow on QRA training – assistance in emergency:

- Aim: training of assistance to aircraft when in emergency – loss of communication (COMLOSS), navigation equipment failure, emergency landing

Follow on QRA training – forced landing:

- Aim: training of forcing an aircraft to land – cooperative/uncooperative target

Follow on QRA training – RENEGADE concept:

- Aim: interrogation against a civil aircraft that was used as terrorist attack means, control, verification, conditions for using of weapons

NOTE: At the beginning of each course, it is possible to specify the detailed slot´s composition and schedule set-up. Based on our experience we offer full/part assistance by TSC instructor pilots with guidance of the course/ basic info on tactics/introduction to advantages-disadvantages of F1xF3 (Semi active x Active) missiles.

Training scenarios – Advanced Courses

Scenarios for advanced training are generally based on JOINT AIR OPERATIONS mission types:

Joint Air Operations - Counter Air Operations (CAO)

Defensive Counter Air (DCA)

- Active Air Defense
    - Ground or deck alert (QRA)
    - Combat air patrol (CAP) (SUCAP)

Offensive Counter Air (OCA)

- Attack Operations (Strike)
    - Fighter Sweep
    - Suppression of Enemy Air Defense (SEAD) *
    - Escort
        - Close Escort
        - Detached Escort
        - Slow Mover Protection
    - CAP during OCA
        - Rescue Combat Air Patrol (RESCAP)
        - Barrier Combat Air Patrol (BARCAP)
        - Target Area Combat Air Patrol (TARCAP)

Joint Air Operations - Anti-Surface Force Air Operations (ASFAO)

ASFAO in a land environment

- Air Interdiction (AI)
- Close Air Support (CAS)

ASFAO in a maritime environment

- Anti-Surface Warfare (ASUW) *

Joint Air Operations - Supporting Air Operations

Air & Space Reconnaissance et Surveillance (ISR)

- Tactical (RECCE Pre/post-strike)

Combat Search And Rescue (CSAR)

- Limited – appropriate weapon system (Anti-Ship, Anti-Radar missile) is not available yet. According to the customer´s requirements, it is possible to integrate any A-A/A-G weapons system.

Training under different tactical conditions

TSS provides for the following tactical conditions training:

- Beyond Visual Range (BVR),
- Within Visual Range (WVR); within the visualization system range,
- Different Radar Warning Receiver (RWR) capability; utilization of RWR in tactical fight,
- Communication jamming simulation,
- Radar jamming simulation,
- Tactical Information Data Link System (TIDLS) exploitation,
- Tactical data LINK 16 exploitation (if available),
- Ground Based Air Defense threats handling (SA6, SA8, etc.),
- Tactical utilization of LDP (generic navigation and weapons aiming pod) for AI tasks, BVR fight and Air
- Policing tasks – Different ROE application (Visual ID via LDP).

Standardization and unification relations

TSS supports network connectivity to other compatible simulators via standard network link DIS/HLA (Distributed Interactive Simulation/ High Level Architecture) to provide for an even larger cooperative training.

Services parameters

Simulated entities

For "Air Force Tactics with Simulation Technologies utilization Training" we offer operations under unclassified mode with generic parameters of the used aircraft and weaponry.

For purpose of this training we can simulate:

- Manned military jet aircraft JAS-39, L-159, L-39 with replica cockpit of real A/C,
- Manned military jet aircraft MiG-29, Su-27 and F-16 based on JAS-39 cockpit (modified Radar parameters and performances, appropriate armament) – generally for BVR missions as manned opponents,
- Manned transport aircraft C-130, B-737 based on JAS-39 cockpit (heavy, no Radar, unarmed, subsonic) – generally for Air Policing missions as intercepted A/C,
- Manned propeller driven aircraft Cessna-152 based on cockpit J-39 (light, very low speed) – generally for Air Policing missions as intercepted A/C,
- Different types of military jets, strike, transport, tanker aircrafts, helicopters, AWACS and other military/civilian aircraft simulated as Computer Generated Forces controlled by IOS,
- Different types of land entities (buildings, tanks, armored vehicles, soldiers etc.) simulated as CGF controlled by IOS,
- Different types of maritime entities (military vessels, cargo ships) simulated as CGF controlled by IOS,
- Armament with generic parameters: AIM-120 AMRAAM (different versions), AA-10 ALAMO (R-27), AA-12, ADDER (R-77), AA-11 ARCHER (R-73), AIM-9 SIDEWINDER, built-in gun and L-39 weapons are simulated.

Forms of the courses

Short-term: Training starts on Mondays and is concluded on Fridays (5 working days). For detailed information refer please to "Organization and execution of a standard training week", above.

Long-term: As for Short-term courses, including accommodation and catering over weekend.

Customer´s term: Based on the Customer´s requirement.

Life Support

LOM PRAHA s.p. can arrange for accommodation at a local hotel/military lodging facility, catering (full board), transportation (daily - from lodging facility to TSC and back), and also transportation from airport of arrival and back can be provided. LOM PRAHA can also arrange for travel insurance. Also the necessary and urgent health and dental care can be assisted with.

Execution and Evaluation of the courses

A Training Course Final Report is worked out upon conclusion of each course showing number of planned and fulfilled slots and overall assessment of the services. The Report shall be signed by both, the customer and TSC authorities. The Report confirms that the services were provided and consumed in a timely and due manner (a kind of transfer and acceptance document).

Practical considerations

Briefings, simulations and debriefings during the week will take place using English language. Visit request, if applicable, shall be posted four weeks in advance of a training week commencement. The bilateral planning and tender process should start no later than 4-5 months prior to the preferred training week date.

For more information

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