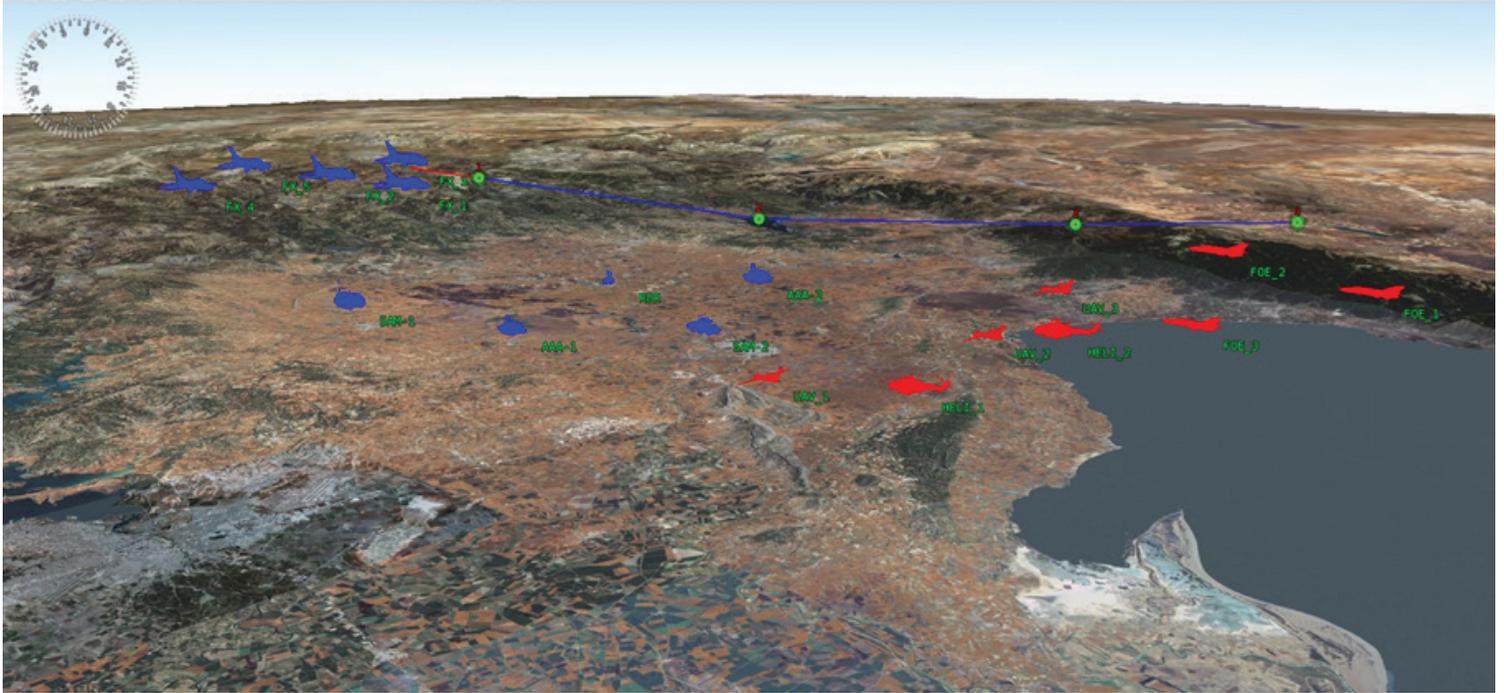# **FIVE** | Forces in Virtual Environment

FIVE software provides a realistic physical and behavioral simulation of tactical environment for many different military purposes.

FIVE (Forces In Virtual Environment) offers a cost-effective training solution for users that need tactical environment for their simulators or real platforms. FIVE supplies user needs for all kinds of threats that will be faced in real life. The trainee gets experienced with high fidelity interactive models that prevent negative training.

FIVE offers:

- Tactical environment simulation for mission simulators

- Networking capability with simulators and other simulation systems

- Embedded training system for real platforms

- Support virtual environment to engineering simulators for platform/system manufacturers

- Decision Support for Real Operations

- War Gaming for Decision Makers

- Network-Centric Operation Exercises

⬢ Modules

Model Generation Module

Model Generation Module (MGM) allows the operators to generate simulation actors through easy to use graphical user interfaces according to generic models using a customization procedure. This software can be used to generate:

- Various sensor selection along with its capabilities and limitations
- Various platforms simulating its performance
- Various weapons (guns, tactical missiles, bombs, rockets)
- CM / ECM / ECCM devices/facilities and their effects on the tactical areas. The following ECM techniques is modeled
    - Chaff
    - Flare
    - Jammers (Radar, IR, Laser, Radio)
- Communication devices
- Warning Receiver devices (RWR, MWR, LWR)
- IFF devices and codes they generate

The models created by MGM are stored in a file server so that they can be used in the next steps of FIVE operation context. The user has the ability to tailor predefined models to produce more specific models as well as to create new ones.

Tactical Mission Simulation Module

Mission Simulation (MS) simulates the mission by using the scenarios and models created in previous phases. It executes the simulation to represent the real-world platforms (e.g. tanks, ships, aircrafts), their subsystems (e.g. sensors, weapons, counter measure instruments) and their virtual operators (e.g. pilots, commanders, and navigators). So the hostile, neutral and friendly platforms interact with each other in a realistic manner, as well as interacting with weather conditions and terrain. Mission Simulation implements the rules to fulfill the Synthetic Environment. These platforms go through a sense-think-act cycle and act on the synthetic environment through influence-reaction model defined in the rules. Also the user can override the navigation parameters (speed, altitude, heading, route, formation, CAP etc.), target of interest, and weapon usage tactic of the platforms during the mission execution.

FIVE allows the instructors to visualize the environment in 2 and 3 dimensions in the scenario run phase through tactical map.

Tactical Scenario Generation Module

FIVE concept of operation forces the user to have a predefined scenario or create a new scenario before simulating a tactical mission. The scenarios are prepared by using the Tactical Scenario Generation Module (TSGM). In order to create a scenario, the scenario actors such as platforms, weapons, sensors, tactics (routes, formations or rules) should exist previously. So, the user creates/edits a scenario by using the models created before. Preparation of simulation models, preparation of the synthetic environment, formation of force structure and preparation of combat plan can be performed in this phase. The users can visualize the environment in 2 and 3 dimensions in the scenario generation phase.

The users have the capability to:

- Define weather conditions, date and time for the scenario
- Compose force structure
    - Deploy the hostile, neutral and friendly platforms on to operation area
    - Assign tactics (rules, routes, formations) to platforms
    - Assign target of interest to platforms
- Set the parameters of the platforms such as weapon load, ECM load

Rule Definition Module

FIVE enables the user to create the behavior doctrines of the platforms to simulate their virtual operators (e.g. pilots, commanders, navigators). Tactical Environment Simulation employs a rule based artificial intelligence to fulfill the doctrines within tactical missions. A certain behavior of a platform is represented in a rule. Platforms and their subsystem can be controlled through defined rules. Besides rules; different types of tactical elements such as routes and formations can be generated by model generation module so that they can be utilized during the tactical scenario generation.

After Action Review Module

After training, post-activity review and debriefing capability is provided to the user by the debriefing module. It has fast playback, pause, stop and replay capabilities. The users can visualize the environment in 2 and 3 dimensions in the after action review phase.