

# Smart Bandits AIR

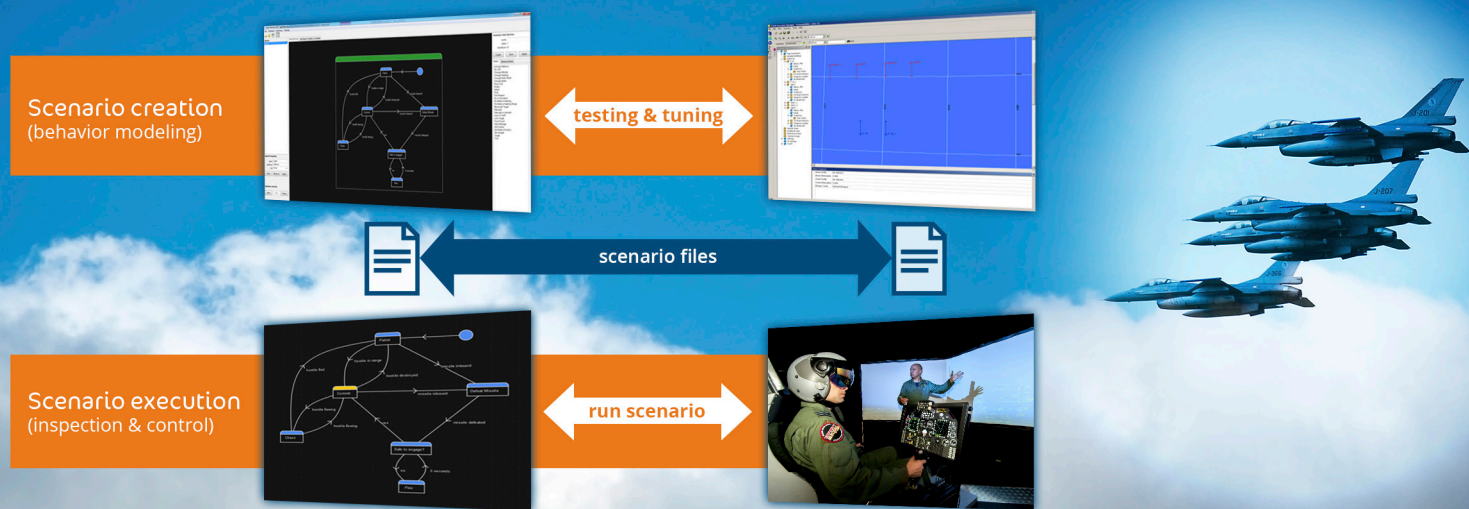
## PRODUCTS & SERVICES



# An Artificial Intelligence Module for making Enemies for Air-Air Combat Simulation

In military flight simulators the tactical behavior exhibited by virtual opponents is still rudimentary. To increase the training value of the application of such simulators, Smart Bandits AIR is designed to allow the creation of intelligent behavior models for virtual opponents, offering user-friendly modeling tools underlying state-of-the-art artificial intelligence techniques. The development of Smart Bandits AIR was initiated by the Royal Netherlands Air Force (RNLAf).





## TACTICAL MISSION TRAINING REQUIRES CHALLENGING SITUATIONS

The value of a military simulator for training is strongly determined by the extent to which the battle field can be mimicked. We can now successfully 'deceive' the human senses during simulated flight with advanced visual systems and motion platforms. However, tactical flight, such as in air combat, requires more than just perception of the tactical situation. It also requires an adequate understanding of the tactical situation. Where are the opponents? Where are my friends? Am I in danger? Last but not least, tactical flight simulation must allow the fighter pilot to anticipate on the development of the situation and to adapt his/her tactics to it.

## NEED FOR SMART VIRTUAL OPPONENTS

In tactical engagements it is indispensable for fighter pilots to be able to change their tactical plans and to adapt their behavior to the situation at hand. The training value of military mission simulations therefore increases significantly if pilots are able to practice such tactical engagements against enemy fighter aircraft. However, there is still much to gain in simulating the enemy who still exhibits rudimentary tactical behavior in nowadays training simulations. Despite the far-reaching development of artificial intelligence, also for military applications, it remains a challenge to model human behavior in real-time mission simulators. The behavior of virtual opponents ('bandits') is a key component in flight simulation. At present, these simulated opponents usually 'act' according to predefined scripts, meaning they have a limited ability to react dynamically and realistically to fighter pilots performing a training mission. Currently there is a lack of easy to use software products for creating simulated, computer-controlled opponents that can independently plan realistic attacks or take meaningful self-defensive actions.

## SMART BANDITS AIR TO CREATE INTELLIGENT AGENTS

Smart Bandits AIR is an artificial intelligence (AI) module designed to overcome these limitations. It combines state-of-the-art AI techniques with an easy to use interface for creating smart virtual agents to play the role of opponents. Behavior models can be designed using graphical editors where attack plans and self-defensive actions can be specified without the need for programmers or technical expertise. For instance, opponents can be created for different types of Defensive and Offensive Counter Air missions with different types of encounters such as 2v2 or 4v4. Behavior models are created fully independently of a specific simulation platform. These models can therefore easily be transferred across different platforms.

## EFFECTIVE BEHAVIOR MODELLING

- **Graphical modeling:** The Smart Bandits AIR software toolkit comes with an easy-to-use graphical editor through which behavior models for air platforms can be created efficiently.
- **Intuitive:** Using the AI technique of hierarchical finite state machines, behavior doctrines present in the heads of domain experts can intuitively be translated to computational models *without the need for programmers or technical experts*.
- **Predefined content:** Smart Bandits AIR comes with predefined content in the form of behavioral building blocks for aircrafts to perform maneuvers, countermeasures or missile launches, or to reason based on visual, radar or radar warning receiver observations.

## FLEXIBLE AND EASY TO OPERATE

Smart Bandits AIR can be used as an extension to any simulation platform and can be operated by instructors or domain experts to create and run training scenarios.

- **Scenario creation:** Operators can create scenarios by building behavior models of virtual opponents which can be tested directly in the target simulation platform.
- **Scenario execution:** During a training session operators can inspect and follow the mental states of Smart Bandits agents at run-time.

## EASY TO INTEGRATE

Smart Bandits AIR can be integrated within hours into COTS simulation platforms through a flexible integration process. Pre-built integrations have been created or are planned for STAGE, VBS2/3 and VR-Forces. Other platforms can easily be supported.



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for more information