MILITARY
SIMULATION TRAINING

AWS
AIR WARFARE SIMULATION PRODUCTS

FAAC

ZAP

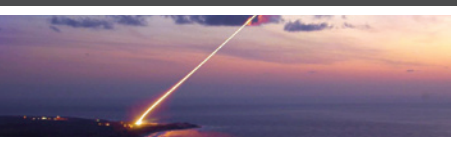
MISSILE LAUNCH ENVELOPE

Our Zone Acquisition Program (ZAP) established and remains the standard for real-time weapon performance assessment. In the form of the Zone Acquisition Program Common Weapon Engagement Zone (or ZAP Common WEZ), it has been integrated into the Operational Flight Program system of all of U.S. fighter planes (including the F-15, F/A-18, F-16, F-35, F-22 and AV-8B), where it offers pilots real-time combat decision aids and visual cues. The ZAP system was a revolutionary leap in capability for the US warfighter in both training and the battlespace, replacing low-fidelity coefficient driven algorithms with accurate high-speed simulations, calculating dynamic launch zones (DLZ), launch acceptability regions (LAR), and missile launch envelopes (MLE) by display employment cues in real-time.

ZAP - A TACTICAL ADVANTAGE

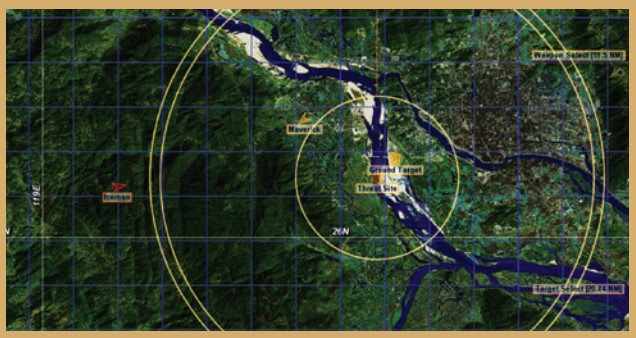
ZAP relies on faster-than-real-time 5-DOF embedded weapon simulations to determine trajectory parameters. The ZAP trajectory simulations closely match the manufacturer's engineering 6-DOF reference simulations, resulting in highly accurate display information over the entire flight envelope. ZAP provides reliable shoot cue information and allows a meaningful allowable steering error to be displayed. After launch, ZAP computes the current time to impact using actual tracked target maneuvers while continually assessing the shot quality to provide indication of predicted endgame success.

From the initial F-15 implementation, ZAP has expanded to the F/A-18, F-16, F-35, F-22, AV-8B, TA-50 and various FMS platforms. FAAC also provides the F-35 Joint Strike Fighter the ZAP equivalent software package known as the Airborne Missile Trajectory Event Modeler (AMTEM). With the expansion to the various platforms, ZAP is often referred to as the Common Weapon Employment Zone (Common WEZ) software. Common WEZ goals include reduced costs to the taxpayer, common weapon employment cues across platforms, and most importantly providing the warfighter with the best possible information to take into combat.



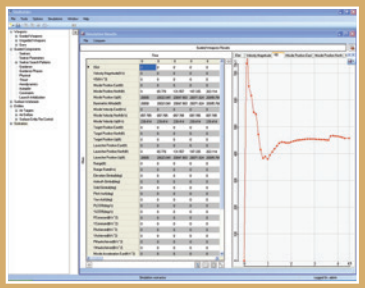
SIMBUILDER

FAAC's SimBuilder software suite provides data-driven weapon system and countermeasure simulations for Live-Virtual-Constructive training environments such as Live Air Combat Training Systems, Virtual Flight Simulators, and Synthetic Battlespace. SimBuilder provides generic simulation modules for weapon subsystems including air-to-air, surface-to-air, surface-to-surface and air-to-surface guided weapons. It also includes generic bomb, rocket, gun, chaff, flare, and jammer modules. The unclassified data-driven modules are used in combination to allow customers to formulate unclassified versions of known weapons. The design provides users with the flexibility to modify weapon parameters using their own intelligence/source information to produce simulations that meet their performance expectations and training needs. Given high-fidelity information SimBuilder can produce high-fidelity simulation results.



- SimBuilder simulations are compact and high-speed, suitable for use in real-time systems and resource constrained computing environments
- All simulation libraries are unclassified
- Internal weapon simulation target pairings can be performed based on available aircraft or ground sensor data
- Effects of countermeasures on weapon performance can be added by the User
- Scoring algorithms are provided for all weapon types for a variety of warheads
- Curved Earth effects model is provided for all weapon simulations
- Aircraft trajectory files can be used as input to analyze specific engagement
- Users can test the performance and interface to the weapon simulation through the GUI
- Both single trajectories and Launch Zones (Launch Acceptability Regions and Air-to-Ground Envelopes) can be generated in the GUI for comparison and analysis

SimBuilder Workflow:



Export Data File with Simulation Parameters

Algorithms in Pod

Algorithms in Pod

Algorithms in Flight Simulators

Algorithms in Ground Subsystems

Off-Line Processing
(Modify Simulation Parameters in GUI)

Real Time Processing
(Run Weapon Simulations)

THE IADS ENVIRONMENT

FAAC created two Integrated Air Defense Systems (IADS) products to meet the needs of our customers. SimBuilder IADS follows the unclassified data-driven mold successfully used for the SimBuilder weapons simulations. The second IADS product, ECEController™, builds on FAAC success in the Tactical Air Crew Training System / Air Combat Training System (TACTS/ACTS) ranges.

SimBuilder IADS provides generic, unclassified IADS entities that are data-driven. It is an expansion of the existing SimBuilder Library that is used to create the weapon models and self-protection countermeasures and includes an add-on to the SimBuilder Graphical User Interface (GUI). This allows air combat ranges operations personnel to create or modify data sets of the IADS entities in the form of Command Posts, Air Defense Sites, EW Sites, Threat Systems, and EW Search Radar Systems. The simulated forces are then used in a scenario that can be friendly, neutral, or hostile in nature and can be assigned with varying levels of competence. The simulated forces can be coordinated through simulated command and control networks that can also be set up with varying levels of complexity and competence. SimBuilder IADS supports a wide range of ECM techniques including chaff, self-protection jamming, and stand-off jamming, each configurable through unclassified parameters. The availability of different network structures, modes of operation, force affiliation, rules of engagement, and time delays allow networks to be configured to represent virtually any geopolitical situation.

ECEController incorporates an early warning network, centralized command and control, surface-to-air missiles (SAMs), anti-aircraft artillery (AAA), associated weapon system sensors including radar and electro-optical modes, EA-6B support jamming and self-protection countermeasures effects on both RF and IR weapon performance, RWR device simulation, and terrain masking. The ranges accommodate scenarios for air-to-air, air-to-ground, surface-to-air, and Electronic Warfare systems involving the simultaneous operation of up to 36 high activity aircraft (plus 100 low activity aircraft), making the TACTS/ACTS ranges the most sophisticated training environments in the world. For the ECEController™, FAAC has developed models of over 100 weapon systems, including 20 different threat air-to-air missiles, 25 different threat SAM/AAA systems, and 28 threat emitter types.

SIMCONTROLLER™

FAAC's SimController™ product is specifically designed for the purpose of aircrew weapons training. SimController has become the standard weapon simulation solution for F15, F-16, F/A-18 ground trainers, the Navy Weapon Simulation Common Environment (WSCE), Joint Simulation Environment for Joint Strike Fighter (JSF) testing, AARI test range, and the Navy TCTS II training range upgrade program.

SimController simulations take advantage of decades of improvements that make them uniquely accurate and fast enough to provide many multiple simultaneous flyouts for real-time kill removal as well as for post-mission analysis in a debrief session. The SimController interface and architecture, unlike many multi-purpose, analysis, or engineering level weapon simulations, are designed specifically to interface with launcher OFP data to provide realistic responses to the fire control and in-flight data exchanges which take place during modern weapon employment. SimController's customer base has expanded over the recent years to include a number of commercial and military analysis and test programs.

FAAC has developed an unclassified version of the SimController with the intention of providing affordable weapons capability for unclassified training, analysis, demonstrations, or as an integration tool for the classified SimController. This product has an external interface identical to the classified SimController, but the internal simulation "engine" will be FAAC's dynamically linked SimBuilder library which is a weapon parameter-driven executable for which weapon parameters can be specified or modified through a Windows GUI.

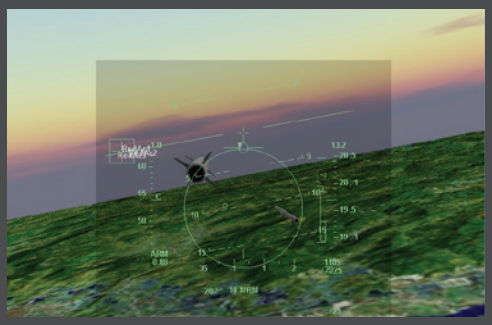
FACETT

The Right Tools for the Most Realistic Training

The FAAC Air Combat Environment for Testing and Training (FACETT®) is a desktop software solution for simulating air combat engagements for weapons testing, tactics development, and post-combat debriefing. The first-person flight simulator employs 3D graphics and accurately emulates in-craft Multi-Function Display (MFD) and Heads-Up Display (HUD) systems. Not only can you create hypothetical air-combat scenarios to evaluate weapon employment tactics, you can also replay real events from TSPI data or even network FACETT with live systems for real-time weapon employment assessment. FACETT is fully compatible with the SimBuilder weapon simulation software.

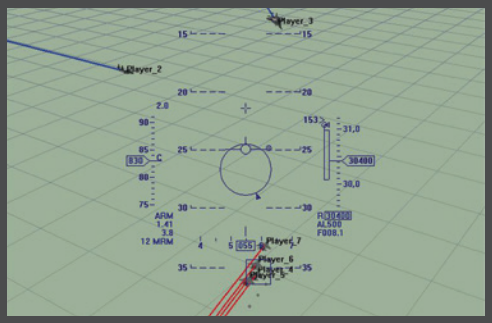
Scenario Building

- Drag and Drop combat entities onto mission map
- Define target aircraft and surface entity behavior
- Set-up Stand-Alone or Network Scenarios
- Load/import mission specific maps
- Select different aircraft flight models for the ownship aircraft
- Assign joystick configuration per aircraft type



Recording and Replay Capabilities

- All scenarios can be recorded for later replay and analysis
- Run with recorded TSPI data from an alternate training device
- Alternate Ending – Whether running from a FACETT developed scenario or alternate source TSPI the user can jump into an aircraft and take full control of the aircraft and weapons employment
- Timeline window displays all key events for quick jumping
- Plotting and analysis of weapon performance data



Network Capabilities

- Multiple FACETT stations can be networked together to allow multiple, separately controlled aircraft to be flown together in real-time against each other or against autonomous aircraft
- Network scenarios can be recorded
- Can be networked with other systems to provide WEZ displays and weapons simulations driven from alternate TSPI sources

KC-135 BOSS

The U.S. Army Program Executive Office for Simulation, Training & Instrumentation (PEO STRI) selected FAAC to build the Air National Guard's (ANG) Boom Operator Simulation System (KC-135 BOSS). The KC-135 BOSS is a high fidelity trainer for the ANG boom operators that replicates the KC-135R Block 40 boom pod.

The KC-135 BOSS provides an immersive simulation environment utilizing realistic computer-generated images, head tracking technology, and high fidelity boom and aircraft physical models with an emulation of the actual aircraft boom controls.

The KC-135 BOSS is designed to support a complete boom operator training curriculum, from initial qualification to mission certification and instructor training. It is designed for squadron level training and to be operated by unit personnel with the option of dedicated on-site contractor personnel.

Our 50+ Years Of Weapon Simulation And Software Development Experience Is Used To Provide Our Customers With The Best Training And Tactical Software Possible.

FAAC Incorporated Air Warfare Simulations

The Air Warfare Simulations of FAAC today represents the original core of our company, founded in 1971 to provide high-speed accurate weapon simulations for the original training range USN/USAF Air Combat Maneuvering Instrumentation (ACMI) systems developed to better prepare pilots for combat operations. This has grown into supporting newer generations of training ranges, such as P5, TCTSII, TACTS/ACTS, AARI, and other systems.

Our weapon simulation technology established and maintains the standard for real-time weapons assessment. This capability was eventually brought from the training world to the tactical world through the incorporation of the Zone Acquisition Program (ZAP) into the fighter's Operational Flight Program. ZAP was a revolutionary leap in capability to the US and FMS warfighter, replacing low-fidelity coefficient driven algorithms, with accurate high-speed simulations.

Our 50+ years of weapon simulation and software development experience is used to provide our customers with the best training and tactical software possible.

Air Warfare Simulations Goals

- Provide high quality software and support our customers with integrity and professionalism, going beyond what is required to do what is right
- Provide the warfighter with the best training and tactical weapon system software in the world

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