IABG. The Future.

Defence & Security

BNS-FAP

Bewertungs- und Nachweissystem – Future Air Power

IABG

BNS-FAP • Bewertungs- und Nachweissystem – Future Air Power

The future operating environment, full of networked systems, leads to challenging questions, key among them are defining capability gaps as well as the design and operation of future weapon systems.

The simulation-supported analysis system BNS-FAP can provide answers: it enables the German Bundeswehr to have a transparent, holistic view of the System of Systems for the Future Combat Air System (FCAS) while including cross-platform trade-off and sensitivity analysis.

This enables systematic and comprehensive examination of the parameter space to secure directional decisions and create a consistent and efficient overall network for the air force. By setting up the simulation environment to be developed cooperatively, via cross-industry and cross-Bundeswehr exchange of models, data, and results, future projects within the framework of the FCAS can be modeled. This optimizes the analysis, development, validation, and evaluation of the individual systems as well as increasing transparency of the overall system of systems (SoS).

Air combat (air-to-air, air-to-ground, ground-to-air) relies significantly on technical and tactical conditions and circumstances. Therefore, analyzing the impact of new or not yet fully developed technologies on these situations can be extremely difficult. An analysis which addresses the need to forecast the impact of varying technologies on the modern battlefield must be based on a huge amount of data as well as sound statistical methods. BNS-FAP provides a solid foundation for predicting the impact of both existing and future technologies on air combat. To set up and prepare different combat situations for simulation a structured user interface is available.

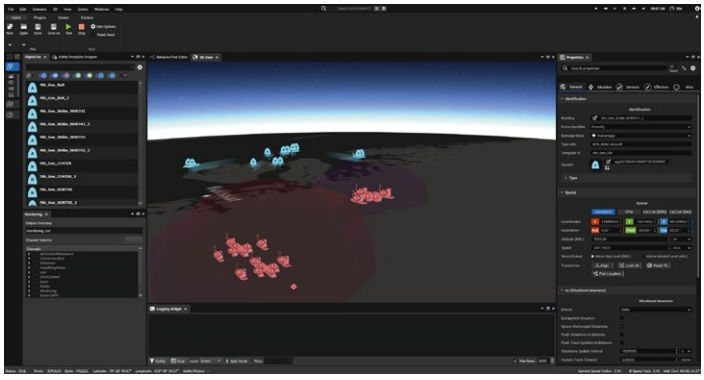
This allows for the positioning, customization of every entity/combat-participant, and the implementation of battle tactics. BNS-FAP also includes a data farming component which can be used to run a given scenario multiple times while using a wide variety of parameters and simultaneously introducing slight statistical uncertainty (Monte Carlo method) to further realism. This enables the user to evaluate the simulation results with statistical methods and thus observe technical and tactical trends.

Use Case / Workflow

BNS-FAP can be used to simulate both air-to-ground and air-to-air combat scenarios. The workflow steps are the following:

- Prerequisite / Preparation of the combat scenario and operational mission details
- Modelling of the different simulation objects as part of one's own and enemy forces: combat aircraft, ground platforms, etc.
- Modelling of their individual technical components: sensors, effectors, communication systems, etc.
- Modelling of their individual physical-logical behaviors using so-called *behavior trees*
- Modelling of the collaborative battle plan, mission and joint interactions using behavior trees
- Selection of output files to be generated automatically by BNS-FAP
- Simulation execution and visualisation
- Iterative model refinement
- Integrated data farming capabilities and compatibility with various post-processing tools
- Visualization and analysis of the output data

Graphical user interface (GUI) of BNS-FAP with demo scenario



Excerpt of Available and Implemented Model Features

- Aerodynamic motion models
- Electromagnetic spectrum environment
- Radar cross section models of varying complexity
- Kinetic weapon systems, either airborne or ground-based
- Electromagnetic spectrum sensors and effectors of varying complexity: radar, jammer, emitter locator system, laser etc.
- Communication components
- Standard simulation objects: combat aircraft (manned and unmanned), ground-based air defense systems

Available and Implemented Graphical User Interface Features (GUI)

- Three-dimensional viewer, including world map
- Visualization including flight paths, missile targeting
- Symbols as per APP-6
- Behaviour Tree viewer
- Formation editor
- Property inspector tool for on-the-fly checks
- Missile and radar performance tools
- Logging and monitoring widgets

Key Advantages

- Integrated and interactive GUI for preparation, execution, and visualisation of the simulation within a single environment
- Important parameterisation and time-saving capacities, including the possibility to create a combat-participant system from scratch as well as re-parameterising from ready-to-use templates or templates from previous simulations
- Ability to implement complex behaviour models, both offensive and defensive, as well as creating chain of events and detailed scenarios in accordance with known doctrines and case specific CONOPS data
- Scenarios and simulation models are elaborated in collaboration with IABG's Subject Matter Experts to guarantee maximal realism and plausibility of both the input and output data
- Capability to couple BNS-FAP with external execution services and other tools for data farming and post-processing
- Internal software development allows for more flexible development of new software components in step with the evolution of user needs
- Co-developed with a major defence industrial player which guarantees transparency in future simulation cooperations
- Conduct comprehensive validation testing with added value for the customer through valid analysis results
- Complete code transparency as well as simple and reliable reproduction of results (determinism)
- Open interfaces for external connections (HLA, DIS)
- Scalability with the ability to model complex behavior

AUTOMOTIVE

INFOCOM

MOBILITY, ENERGY & ENVIRONMENT

AERONAUTICS

SPACE

DEFENCE & SECURITY

About IABG

IABG offers integrated, ground-breaking solutions in the sectors Automotive • InfoCom • Mobility, Energy & Environment • Aeronautics • Space • Defence & Security. We provide independent and competent consulting. We implement with future viability and target orientation. We operate reliably and sustainably. Our success is based on an understanding of market trends and requirements, on our staff's technological excellence and a fair relationship with our customers and business partners.

For further information, please contact:
IABG • Defence & Security
Dr. Orlando Prazeres da Costa
+49 89 6088-2442 • +49 151 1173 5780
dacosta@iabg.de
www.iabg.de

Download this flyer

IABG
Einsteinstraße 20
85521 Ottobrunn
Germany
Phone +49 89 6088-0
info@iabg.de
www.iabg.de

Berlin Bonn Dresden Hamburg Karlsruhe Koblenz
Lathen Lichtenau Noordwijk (NL) Oberpfaffenhofen