Defense Systems Information Analysis Center

AFSIM

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POSTED: OCTOBER 4, 2023

The Advanced Framework for Simulation, Integration, and Modeling (AFSIM) is a government-owned, open-sourced, and community-informed military simulation framework primarily used by the U.S. Department of Defense (DoD) acquisition, operations analysis, and research and engineering communities. AFSIM provides these communities with an ever-expanding toolset to ease scenario and model creation, strengthen analytical conclusions, and enrich virtual wargaming experiences.

While AFSIM provides many such capabilities "out of the box," its real value lies in its underlying framework and application programming interfaces. AFSIM's modular and extensible architecture empowers developers to write custom plug-ins or adaptors in modern C++. Plug-ins extend AFSIM's input and scripting language, allowing analysts to customize the behavior of entities in the simulated world. Adaptors help integrate AFSIM with other tools or analytical workflows. While AFSIM supports SISO standard interoperability protocols like DIS, developers can write custom adaptors to proprietary or legacy tools when needed.

The degree of flexibility and control over simulation inputs and outputs has helped AFSIM emerge as a true "polyglot" in the defense digital ecosystem. The latest versions of AFSIM provide language bindings to both Python and SysML. Supporting both "Python in AFSIM" and "AFSIM in Python," AFSIM pairs well with popular data science or machine-learning frameworks. Likewise, analysts and engineers can model complex systems and behaviors in SysML to study military or operational utility in AFSIM.

AFSIM benefits from a passionate user community that contributes directly to its development and evolution. Including broad representation from all branches of the U.S. military and affiliated U.S. government (USG) agencies, industry, and academia, this community increasingly uses AFSIM to assess and compare emerging weapon system concepts, refine operational employment tactics, and ultimately inform research investment and acquisition decisions.

Who manages it?

The Aerospace Systems Directorate of the U.S. Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base manages, develops, maintains, and freely distributes AFSIM to benefit the entire defense innovation base.

Who can use it?

AFSIM is available to all USG agencies and eligible DoD industry partners at no cost. AFRL shares AFSIM with industry partners through an Information Transfer Agreement (ITA), making it the ideal tool to support internal research and development activities. They also share AFSIM with other USG agencies through a Memorandum of Understanding (MOU).

What does it include?

Users covered by an active MOU or ITA may receive access to the following:

- The unclassified framework and core application suite (Windows & Linux)
- Full source code, documentation, and training materials
- Classified data sets
- AFRL-sponsored training events (as resources permit)
- Community development platforms and user forums

Input

Through *Wizard* - AFSIM's integrated development environment - or any preferred text editor, analysts specify models and operational scenarios in plain text (.afsim) using AFSIM's blocklike input syntax. This syntax also supports a full-featured scripting language to define logical expressions or custom behavior. Supported input formats continue to expand as the community carries AFSIM into new application contexts.

AFSIM also supports a variety of standard, domain-specific, or application-specific data formats. Examples include Digital Terrain Elevation Data (DTED), MODerate resolution atmospheric TRANsmission (MODTRAN) effects, or Two-Line Element (TLE) sets for satellite propagators. The AFSIM documentation describes each supported data format in an appropriate usage context.

Output +

Details +

Distribution +

Model Access Instructions

Please login or register to view the model access instructions.

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