

# Python for Aerospace, Defense & Military



Python is a key asset in the toolbox of most Aerospace, Defense and Military (ADM) engineers, as well as government contractors. While Python is widely used as a general scripting language, it can challenge MATLAB as the go-to platform for statistical analysis, modeling and machine learning applications. Python can also help with a number of challenges that exist across a wide range of ADM use cases, from improving cybersecurity to implementing real time analysis of battlefield sensor data to designing foolproof autonomous targeting systems.

Additionally, Python may be key to helping military forces overcome their challenges with making computer science a core competency for enough deployed personnel to at least maintain (and preferably be able to innovate) the software assets they use in the field.

## Why ActivePython is Key

Many defense and military institutions train their personnel for years in order to become fluent in foreign (human) languages. By contrast, Python fluency can be gained in a matter of months due to its ease of use and readability. ActivePython further simplifies things for beginners by providing a recent version of the language bundled with many of the most popular packages so they can get started right away. Additionally, ActiveState automates the addition of new packages (including linked C libraries), as well as the updating of Python environments, removing key barriers to entry.

For contractors and ADM engineers already familiar with Python, ActivePython can help address a number of key ADM use cases, including:

- **Cybersecurity** - military systems need to be hardened against cyberattacks, which can lead to loss of classified information and damage to defense systems. ActivePython bundles packages that are industry standard for cybersecurity professionals, especially when it comes to malware analysis, port scanning, penetration testing and even AI-enabled counterattack tools.
- **Modeling & Simulation** - from wargaming simulation to modeling six degrees of freedom for aerial vehicles, there is a wide range of computer assisted engineering tasks that Python can help with. ActivePython is the Python distribution of choice for a number of leading engineering companies when it comes to virtual prototyping, systems modeling and simulation of complex structures and their movement.
- **Target Recognition** - Identifying the position, behavior and friend/foe status of targets is essential to battlefield dominance. ActivePython incorporates cutting edge machine learning libraries (such as TensorFlow and Keras) that can be used to help automatically learn, track and discover targets, even in complex combat environments.
- **Sensor Data Analysis/Visualization** - airborne drones and battlefield sensors provide a wealth of information that must be analyzed in real time to be useful. ActivePython provides a range of tools capable of efficiently processing large volumes of data and visualizing them for quick analysis/actioning.
- **Equipment Diagnostics** - all equipment eventually fails, but when it fails in combat the consequences can be deadly. Predictive maintenance is an emerging use case for Python that ActivePython supports by bundling packages like pandas, NumPy and matplotlib. Diagnose failures before they happen, while also cutting maintenance costs.

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## ActivePython: A Better Alternative to MATLAB?

Most ADM engineers are familiar with MATLAB, but as a proprietary tool, it has a number of drawbacks, including:

- **Extensibility** - as a closed platform, third party extensions are uncommon
- **Transparency** - you need to trust the proprietary algorithms have been implemented properly, without any inherent bias, since you cannot review the code
- **Cost** - licenses are expensive

Python by comparison is free for use, enables you to see the code of the algorithms you're using, and has a huge community of third party developers creating cutting edge libraries for machine learning and data science.

But where MATLAB includes all the packages you need out of the box, Python forces you to find, build, validate, and integrate the right packages into your environment before you can even start coding. That's where the ActiveState Platform comes in. As a Python runtime management solution, it allows you to:



Automatically build Python packages, including linked C libraries, from source code



Automatically resolve dependencies, or provide suggestions when conflicts arise



Automatically package your runtime environment for Windows, Mac and Linux

While you still need to know what you want, you no longer need to deal with building and managing your Python environment. Instead, you can get started on your project right away.

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ActiveState is the de-facto standard for millions of Python developers around the world who have been using our commercially-backed, secure open source language distributions for over 20 years. With the **ActiveState Platform**, developers can now automatically build their own Python, Perl or Tcl environments for Windows, Linux or Mac—all without requiring language or operating system expertise.

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[www.activestate.com](http://www.activestate.com)

Toll-free in NA: 1-866.631.4581

[solutions@activestate.com](mailto:solutions@activestate.com)

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