



# NRL's Neptune® C2 Software

## Enterprise Command, Telemetry, and Ground Control

### AT A GLANCE

#### What is it?

The Neptune® software is the NRL's enterprise satellite Command and Control (C2) software suite. It is used to control more than 100 DOD and IC satellites, as well as provide control and status of the ground system equipment.

#### How does it work?

The software provides full command and telemetry capability for any satellite and any set of ground equipment using a single software baseline. New satellites are added using simple databases, controlling scripts (Python), and minimal user-developed software.

#### What will it accomplish?

NRL's Neptune® software is a proven C2 solution that has been shown to dramatically lower costs and improve the reliability and resilience of satellite operations. The Neptune® software may be used during any phase of satellite development through launch and operations.

#### R&D Sponsors

ONR, USAF, USSF, DARPA, IC, and private industry partners

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NRL's Neptune® software is award-winning government-owned & managed command and control software with a rich operational heritage on more than 100 satellites set in all orbital regimes. Neptune runs at more than 10 ground stations and operations facilities providing command and control (C2) for a diverse set of missions at all classification levels. The software can support any satellite and any set of ground station equipment in one government-owned and supported software baseline. Neptune can support any satellite operations concept, from fully staffed to completely "lights out" automated.

### Modern Features and Security

New features are added to the software through a combination of mission requirements and NRL R&D objectives. Recent enhancements include a 4G scripting language (Python) for system automation and a browser-based user interface based on modern User Experience (UX) standards. The software can be run on cloud infrastructure or on-prem virtualized environments. New features are typically developed in microservices using the Go language, to take advantage of modern container orchestration for scalability and resilience.

The Neptune® C2 software can be interfaced with any mission-planning system and provide data to any payload data-processing system. However, Neptune is developed alongside NRL's Virtual Mission Operations Center (VMOC) mission planning software for advanced functionality and automation. Neptune software operates various satellites and ground equipment at NRL's Blossom Point Tracking Facility in Welcome, Maryland, in 24/7 "lights out" automated operations.

The Neptune® software is government owned and supported. The baseline is controlled using modern tracking systems. Baselines are delivered two times per year with a full test regimen, including validation with on-orbit satellites, and static code analysis with every build. The software has been accredited as part of U/S/TS systems with Authority to Operate from the Navy, Air Force, and the IC.

More information can be requested at [neptune@nrl.navy.mil](mailto:neptune@nrl.navy.mil).

Cleared for public release