

# Generating UAV Video from the Air Operations Center Training Simulation



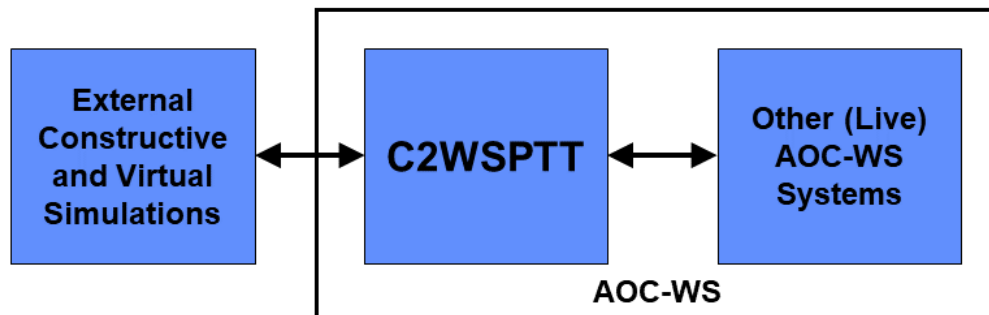
*Ternion is enhancing the USAF Air Operations Center (AOC) training simulation to support an integrated ability to generate unmanned aerial vehicles (UAV) video streams. These streams can be displayed in AOCs during training events to provide an even more realistic training experience for AOC operators.*



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## The Command and Control Weapon System Part Task Trainer (C2WSPTT)

The United States Air Force (USAF) Air Operations Center – Weapon System (AOC-WS) is the senior command center used by the Air Force component commander to exercise command and control (C2) of joint (or combined) air forces, including planning, directing, and assessing air, space, and cyberspace operations. The AOC-WS is a system of systems that incorporates numerous third party, commercial off-the-shelf, and agilely developed software applications. One of those software applications is the Command and Control Weapon System Part Task Trainer (C2WSPTT) developed by Ternion Corporation.



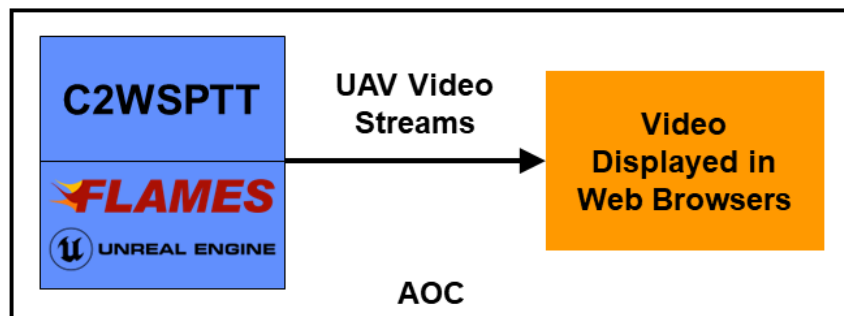
### C2WSPTT interfaces with live, virtual, and constructive systems

The C2WSPTT provides the AOC-WS with an embedded modeling and simulation capability that allows AOC units to conduct in-garrison training without the need for outside agency support. The C2WSPTT simulates air operations realistically and directly exchanges tactical data with other AOC-WS systems using native interfaces, including Link 16, and US message text format (USMTF), and direct web services messages. This allows operators to use the AOC-WS just like they would in wartime and thereby “train as they fight”. The C2WSPTT is also used by the 505th Training Squadron to provide formal training of AOC operators, by the 46th Test Squadron to test AOC-WS systems, by the Air Force Research Laboratories and other organizations to perform analysis, and in US Army Warfighter and other training exercises.

The low-cost, versatility, and over 20 year success of the C2WSPTT is due primarily to the fact that it is based on Ternion’s commercial off-the-shelf (COTS) FLAMES Simulation Framework. FLAMES is loaded with capabilities that Ternion has employed in the C2WSPTT, including support for simulating hundreds of thousands of entities in real time on a single computer, automatic scenario creation, interactive scenario control, checkpoint/restart, human behavior modeling, C4ISR modeling, DIS and HLA interfaces, and interfaces to live systems such as the systems in the AOC-WS. Ternion is currently enhancing the C2WSPTT to exploit one of the recent additions to FLAMES – the direct integration of Epic Game’s Unreal Engine, one of the world’s leading 3D content and game development platforms.

## Unmanned Aerial Vehicles (UAV) Video

During wartime operations, AOCs frequently display video streams generated by unmanned aerial vehicles (UAVs). Such video streams are used to support activities such as gathering intelligence, surveillance, target acquisition, and battle damage assessment (BDA). These video streams are usually displayed in web browsers and therefore do not require any special hardware in the AOC. Currently, the in-garrison training capability provided by the C2WSPTT does not support the generation of simulated UAV video streams. Ternion is working to change that.



### Integrated UAV Video Streaming by C2WSPTT

The integration of Unreal Engine into FLAMES will allow future versions of the C2WSPTT to generate simulated UAV video streams during in-garrison AOC training events and during other training exercises. FLAMES and Unreal Engine support this new capability in the following ways:

- Unreal Engine is unparalleled in its ability to generate and render realistic 3D worlds and vehicles. This allows the generation of realistic scenes in the UAV video streams.
- Unreal Engine can also render realistic visual effects, including smoke and explosions. This is essential to allow UAV video to support battle damage assessment.
- Unreal Engine is directly integrated into FLAMES (and hence the C2WSPTT). Therefore, the UAV video stream displays what is actually happening in the simulation.
- Because Unreal Engine is directly integrated into the C2WSPTT, video is streamed directly from the C2WSPTT. No additional software will be required. In addition, video is streamed from the server computer on which C2WSPTT is executing. No additional computers will be required in an AOC to generate a video stream.
- Unreal Engine has a built-in ability to stream video to a web browser. Therefore, no additional hardware will be required in an AOC to display a video stream. Any computer in the AOC on which a web browser is installed can display a video stream. This will also be compatible with future versions of the C2WSPTT which will be capable of executing in the cloud.

## Conclusion

The ability of the C2WSPTT to generate realistic UAV video streams of actual training scenario activity can allow for an even more realistic training experience for AOC operators. No additional computers will be required in an AOC, and no additional software will be required (other than an updated version of the C2WSPTT). Therefore, the C2WSPTT will continue to support in-garrison, on-demand training to help maintain the readiness of AOC warfighters.

## About FLAMES®

FLAMES is a family of commercial off-the-shelf (COTS) software products that provide a framework for developing custom constructive and virtual simulations and interfaces between live, virtual, and constructive (LVC) simulations. The optional integration with Unreal® Engine extends FLAMES to provide the ultimate framework for the creation of serious games and visually stunning, entity-level constructive and virtual simulations. For more information on FLAMES, visit [flamesframework.com](https://flamesframework.com).

## About Ternion Corporation

Ternion Corporation is the developer of FLAMES and an expert in developing custom, FLAMES-based simulations for government and commercial organizations worldwide. To learn more about Ternion's past projects and how Ternion can help you build your constructive and virtual simulations or build them for you, visit [ternion.com](https://ternion.com).



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