Part Task Mission Trainer (PTMT)

MVRsimulation® has introduced a new portable fixed-wing Part Task Mission Trainer (PTMT), designed and built under an internal development program. The PTMT provides a low-cost, quick-deploy cockpit training solution to fill the gap in current in-use mission tactics training toolkits for military fixed-wing pilots. The system aims to maximize suspension of disbelief for trainee pilots as they practice mission tactics and coordination as part of joint training operations in networked environments. It can also operate as a standalone training solution.

Using notional aircraft hardware represented by touch-screens for conducting air-to-air or air-to-ground training scenarios, the PTMT can be configured for training for current 3rd and 4th generation combat aircraft currently used by NATO nations by easily changing the position of the specially-designed, patent-pending, flight control stick between side-stick and center-stick positions.

Part Task Mission Trainer (PTMT) with Varjo XR-3 mixed-reality system.

Two of 30 PTMTs in the NATO Tactical Leadership Programme (TLP) classroom for fighter pilot simulation training at Los Llanos Air Base, Albacete, Spain. (Photo courtesy of the TLP.)

With this cost-effective, easy-to-assemble/break down modular plug-and-play system, pilots can practice to improve skillsets such as gun runs and strafes, building muscle memory without requiring the use of an actual airframe. A pilot in the PTMT can manage complex air-to-air scenarios -- taking virtual control of any constructive player at any time, triggering scripted behaviors, and employing aircraft systems that directly mimic the capabilities of their real world counterparts, all while interacting with controls in the same manner as they would in an actual aircraft. The simulator is currently in service in the NATO Tactical Leadership Programme (TLP) at Los Llanos Air Base, Albacete, Spain.

Working closely with a US Air Force customer and their NATO partners, MVRsimulation has built the elements of a fully integrated cockpit shell that approximates the real-life physical experience of being seated in a cockpit, with touch screen displays for pilot interaction and an OTW view that can be used with a curved display, mixed reality head mounted display, or a partial dome display. To support both 3rd and 4th generation jet aircraft, MVRsimulation developed a unique adjustable mount for a flight control joystick to enable side- or center-stick configuration.

Scenarios are run on Battlespace Simulations' (BSI's) Modern Air Combat Environment (MACE) software and MVRsimulation's Virtual Reality Scene Generator (VRSG®) software, 3D terrain, and models. VRSG provides the real-time 3D out-the-window and sensor views. BSI's full suite of tools enables multi-mission virtual role playing in the air combat arena, to include tactical displays that are integrated with the HOTAS controls and emulate real world tactical systems. This coupling of MACE with VRSG provides the degree of immersion ideally suited to training, from solo part-task mission objectives to large-scale, distributed live-virtual-constructive (LVC) rehearsal of major combat operations.

To take advantage of the eye-tracking technology in Varjo headsets, MVRsimulation has developed the means to have VRSG visualize the gaze of the pilot. During a training mission, if a pilot in the PTMT is wearing a Varjo headset such as the Varjo XR-3, VRSG can track the pilot's head position and orientation, track the gaze vector using

the Varjo device's pupil tracking functionality, and then visualize the gaze of each eye independently as a color-coded 3D cone. VRSG can export this data via DIS as a PDU log, which makes the eye-tracking playback valuable for after action review.

Shell enclosure
- Welded aluminum structure made in the USA; represents a subset of the fuselage from the aircraft nose to just behind the cockpit seat.
- Adjustable mount for the flight control joystick; can be easily repositioned for center-stick or side-stick controls (without the need for disassembly/reassembly).
- External dimensions: 76.24" length x 41.36" width x 34.62" height cockpit shell without OTW monitor.
- Overall height varies, based on location of OTW monitor.
- To calculate siting, add 2' safety zone on all sides.
- Weight (without electronics) is 225 pounds.

PC hardware and accessories
- 1 computer running MACE cockpit controls and VRSG sensor pod.
- 1 computer running VRSG OTW view.
- 34" curved gaming monitor (3K resolution).
- 22" touch screen monitor.
- Varjo XR-3 mixed-reality system (with one-time, long-term buyout software maintenance).
  - Other head mounted displays available upon request.
- Adjustable mounted flight-control joystick for side- or center-stick positioning.
- Thrustmaster HOTAS Warthog.
- Dalcomm carbon fiber headsets with audio pass-through.

Software
- MVRsimulation VRSG with 3D terrain and model libraries.
- BSI MACE EW with cockpit multi-function display (MFD).
- BSI VIPER DIS radio.

## Modular, reconfigurable, and transportable
- Can be configured to replicate the cockpit of any current 4.5-generation combat aircraft for customized training.
- Two-person lift into and out of a crate.
- Easy to move to alternative locations.
- Training scenarios can also be projected onto large screens in a domed configuration.
- Network capable for multiplayer distributed simulations.
- Support for international configurations.

Low-cost commercial system
- Cost to U.S. delivery customers: $185,000.
- Cost includes shell enclosure, PC hardware and accessories, and all required software licenses.
- Cost excludes shipping, setup support, and onsite training.

VRSG real-time scene visualizing the gaze of the wearer of a Varjo XR-3 mixed-reality headset through the collection of eye-tracking data.
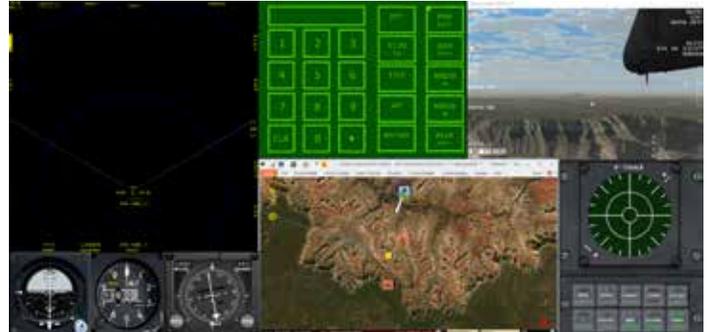
Close-up of the PTMT cockpit control panel, which in this case is not aircraft specific. The flexibility of BSI MACE's multifunction display (MFD, upper left) enables the setup of various panels and training scenarios. Controls shown here include MACE's up front controller (UFCD, top center), VRSG's simulated sensor feed (top right) with an AN/DAS-1 overlay (slewed via one of the HOTAS throttle controls) along with MACE's artificial horizon, altimeter and HSI (bottom left), moving map (bottom center) and radar warning receiver (bottom right). The UFCD interfaces with the MFD to enable input of mission essential data and control of DIS radios.
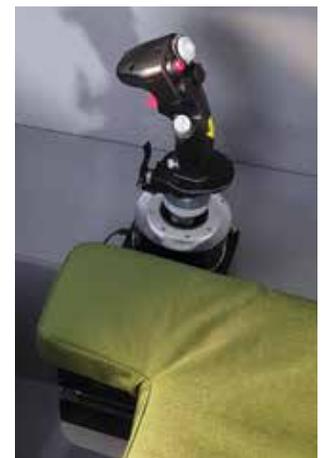
Left: VRSG view on the wall-mounted monitor shows the ability to track the pilot's head position and orientation, track the gaze vector using the Varjo XR-3's pupil tracking functionality, and then visualize the gaze of each eye independently as a color-coded 3D cone. Right: Adjustable (patent pending) control stick for side- or center-stick positioning.

Pricing in effect for November 2023. Please send a request for a quote to sales@mvrsimulation.com.