Wireless Training System

As the Phase 2 SBIR winner of PEO STRI topic A07-184 entitled High Speed Wireless 3-D Video Transmission to Support Virtual Dismounted Training, RPA has developed a man wearable solution that can support up to HD (1080p) resolution video and other required sensor (head motion tracking, simulated weapons, motion control, audio, and expansion for future requirements) to provide untethered training with helmet mounted display systems.

The RPA solution removes the need for an image generation computing platform to be carried by the soldier, allowing the highest performance graphics systems to be employed. Dismounted training requires the highest level of fidelity possible given that the soldier operates in such close proximity to their environment. Maximizing scene content and detail are critical elements to providing the most realistic, immersive environment possible for the wide range of training scenarios that are required to ready soldiers for the myriad of situations they could encounter.

As a result of the progress of our research and development, RPA has recently received the following from the Army:

> *"Congratulations! RPA Electronic Solutions is one of 25 companies that have been identified by the Army SBIR Program Management Office (PMO) for participation in the Commercialization Pilot Program (CPP) for 2011, in connection with your Phase II project entitled "High Speed Wireless 3-D Video Transmission to Support Virtual Dismounted Training."*
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> *The U.S. Army established the CPP with the purpose of increasing SBIR technology transition and commercialization success."*

The honor of receiving CPP participation provides us with the opportunity to further develop the wireless system to production quality, deploying a series of systems into an active training program. The sponsoring program provides us with many different training stations, supporting tasks that could include vehicle operation, weapons operation, IED recognition, and interaction with other soldiers and characters.

The RPA wireless product will provide a combination of the highest fidelity graphics with trainee freedom of movement not available with other portable solutions. The system incorporates a modular design, standard interfaces, and expansion for future enhancement.

Multiple system options are available for varying levels of functionality to include:

• Video and Stereo Audio Uplink Only

• Video, Audio (bidirectional), Motion Tracker, Simulated Weapon and Other Sensor Wireless Interface

• Video, Audio, Motion Tracker, Weapon & Sensors, Motion Prediction and Image Latency Compensation

RPA Electronic Solutions INC.
1285 Chenango Street
Binghamton, NY 13901

Phone 607-771-0393
Fax 607-771-0658
E-Mail sales@rpaelectronics.com

www.rpaelectronics.com

Wireless Training System

Key Features:

- Support for virtually any standard video format from VGA (640x480) to HD (1920x1080).

- Standard communication interfaces to support other man wearable devices including simulated weapons, audio components, and other sensors (such as health monitoring, etc.).

- Operation at current helmet mounted display (HMD) resolutions of 800x600 or 1280x1024 or at future HD (1920x1080) resolutions will require little or no change in power consumption on the man wearable system. Power consumption has been designed to be less than 20Watts. Lower power options can be made available for special cases.

- Small form factor, belt worn portable platform.

- Uncompressed video transmission to 1920x1080p.

- Low, predictable system latency less than 1 msec with wireless frame-lock of video on the portable system.

- Options available to provide state of the art user motion prediction and image correction techniques, developed and test-ed under NAVAIR SBIR efforts, to compensate for both system image generation latency and trainee head motion.
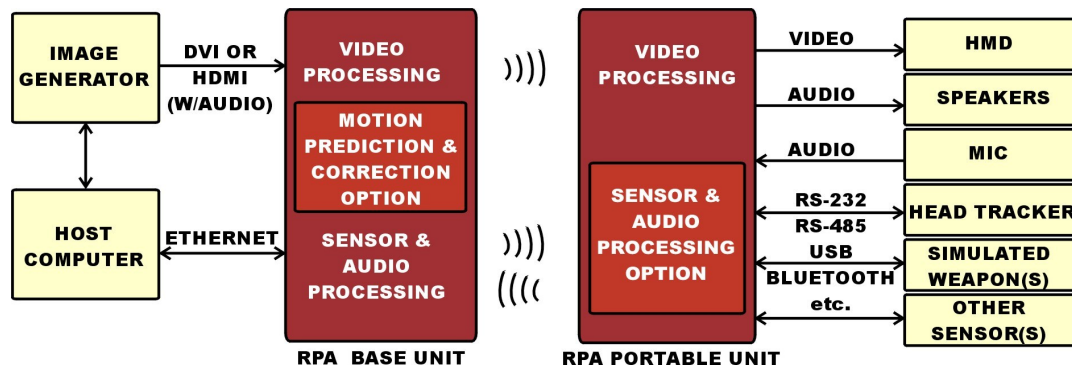
Specifications:

Range of Operation	10 meter, minimum lossless (with 2—3 obstructions), HD Transmitter to Receiver.
RF Operation	Multi-band. 802.11g,n, 802.15, UWB 2.4 – 6 Ghz
Video Resolution	Up to 1080p (1920x1080, 60 Hz)
Video Reconstruction	100% (lossless) under normal operating conditions.
Video Interfaces	HDMI or Single Link DVI. Adapters available for analog (VGA).
Continuous Operation	4+ Hour and 8+ Hour Battery Options (including typical HMD power)
Audio Support	Stereo Uplink, Monaural downlink
Motion Sensor / Simulated Weapon Support	Multiple Standard I/O ports. USB, RS-232, Ethernet.
Video Latency	< 1 msec worst case (820 μsec typical).
Portable Power Consumption	18W Typical at full HD resolution (with portable sensor & audio option)
Weight	< 3.5 pounds including 4+ hour battery