

Wearable video conferencing and decision support system

SPECIAL TASK FORCES



The system includes wireless audio and video communications and access to an expert knowledgebase – all integrated into the worker’s protective outfit that consists of a helmet and discharge vest carrying rugged computer and set of sensors.

The system is built according to the modular principle, thus providing a wide range of solutions for various decision support tasks.

Basic version



The basic version supports wireless audio and video communication with the central office and in-between the workers in a team. The basic version consists of a helmet, a camera and an discharge vest with an integrated lightweight rugged computer.

Professional version

The basic version can be supplemented with additional measuring tools for gathering local information; as well as special sensors that control the physical and psychological state of the worker. All critical data and events are being displayed on the head-mounted display embedded into the worker’s protective helmet or translated to the control center. Wearable

medical devices could control vital life activity parameters, like heart rate and its regularity, temperature, ECG providing real time monitoring of the rescue officer stress condition.

Advanced version



The system supports remote media communication with the situation awareness center, where a group of experts can send spatial models and object manipulation instructions to the staff on site in real time.

The system allows interaction between the mobile catastrophe response vehicle, equipped with supercomputing resources, a departmental knowledge base, as well as other remote knowledge bases and medical centers with access to patient medical history and doctors in charge of the medical case.

In the advanced version, the system consists of a helmet, an embedded personal display and a camera. The data processing unit is integrated into a rugged case, protected against extreme environmental conditions. Biological feedback is optionally provided by wearable (wrist) medical gadgets. For the military rescues and counter terroristic officers ballistic protection could be provided.



Construction worker version

Besides audio and video communication, this version supports 3D navigation in buildings and interaction with generally accepted engineering 3D software tools, enabling:

- hands free collection, processing and transfer of 3D data about field conditions and infrastructure locations on construction sites with precision over 1 cm (if laser scanner head is used);
- easy replacement of existing manual location tools (optical measurement, measuring tapes, 2D paper schemes) and time-wasting working actions of low and medium-experienced construction worker.

Construction worker version consists of a helmet, a camera, an embedded head-mounted display and a discharge vest with an integrated lightweight 3D enabled rugged computer.



System components

The system consists of a protective helmet, a camera, an embedded display (except for the basic version), an unload vest with an integrated rugged processing unit and a power supply. Depending on the task, the surrounding environment and the required level of situation control, the worker is equipped with the following:

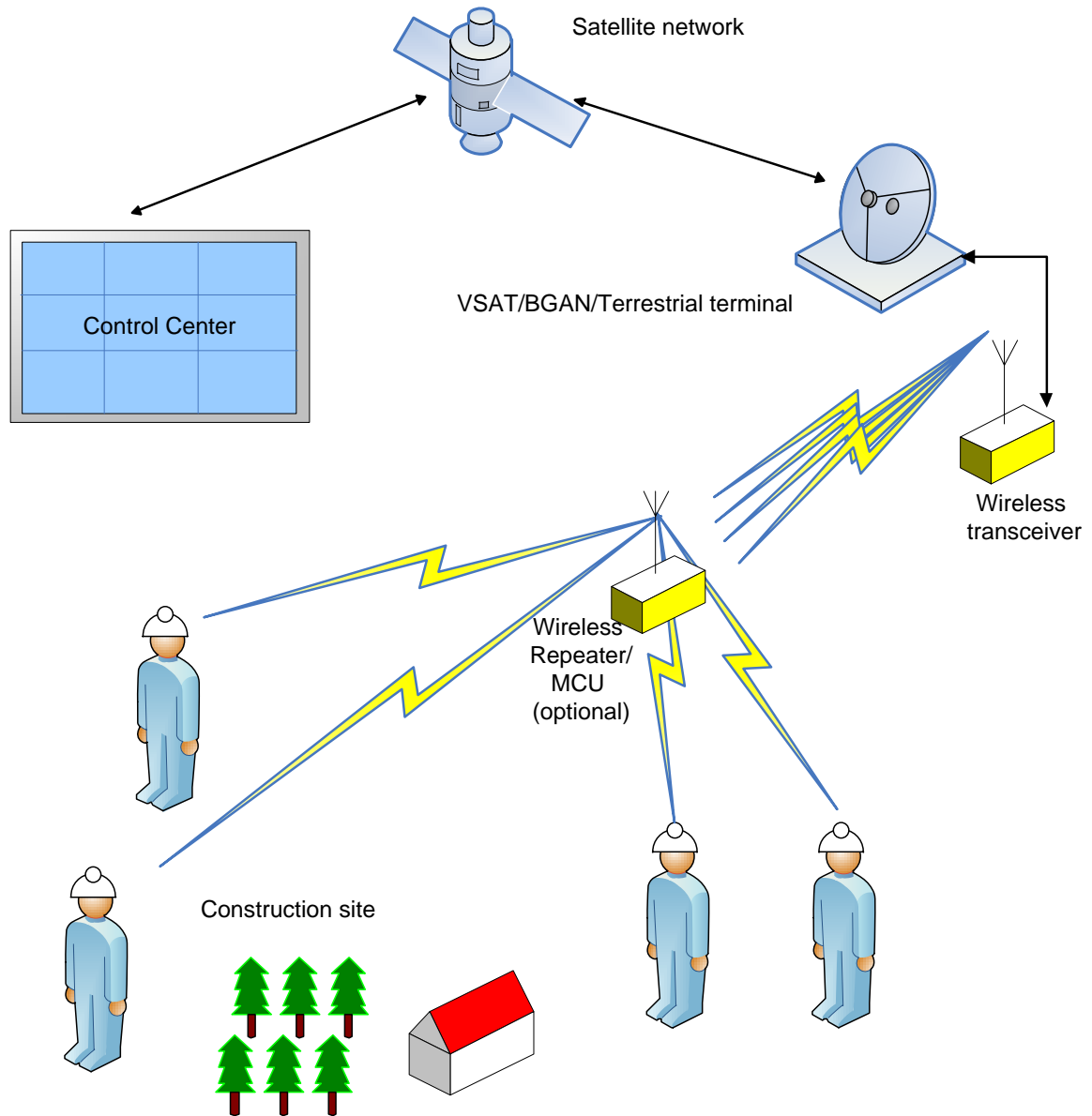
- Camera – regular, wide-angle, long-focus, Webcam, LAN (or a combination)
- Display unit – head-mounted display, lightweight video set, mono-/binocular display
- Backlight – headlight, lamp, infrared
- Unload vest – bulletproof versions available
- Other tools/equipment, such as:
 - Glove manipulator (for remote control)
 - GPS/GLONASS/GALILEO & RFID module (for worker positioning and Id)
 - Biological feedback module (for controlling the physical and psychological state of the worker)

When completing a group version, the system is configured to display the activities of the group or each member of the group.



Example of light weight monocular display

Communication scheme



Data is transmitted via a 2,4GHz radio channel. To increase the coverage area of the equipment, a repeater may be used. For multipoint communications or other vendors' conferencing solutions communications, standard H.323, SIP protocols are supported, MCU/SIP server mobile option for PRO and advanced versions is available.

Typical usage scenarios



Telemedical support in rescue operation after terroristic act, where therapist advising right first aid scenarios for the old lady form his patients list.



Control of the physical and psychological state of the officer in field operation

Conclusion

The Smartwear product line described is flexible and modular to fit different requirement and applications. Smartwear offered is built on demand and can include appropriate customization. To the described functionality another safety level could be added using ballistic protection materials for the discharge vest. We welcome you to define what is your functionality for the task force, we'd be happy to meet your requirements.