

Research on 4G Technology

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Abstract— Information is power, nowhere is this truer than on the battlefield, where the ability to communicate clearly and rapidly pass on information spells the difference between survival and death. The key to empowering the military with tactical broadband voice, video and data is 4G infrastructures technology. This technology adopts Wireless technology on the platform of fixed networks, advanced antennae technologies and more advanced wireless security technologies. Next thing is about the gear for the future warrior the uniform along with the armor, onboard computer which will monitor soldiers' overall physiological and psychological picture of how they are execution in the battle zone and enhanced human performance which weighs 50 pounds from head to toe against 120 pounds of the current day system present.

Keywords: 4G technology, fixed networks, wireless security technologies.

I. INTRODUCTION

The new systems include a weapon, head-to-toe individual protection, onboard computer network, soldier-worn power sources, and enhanced human performance. "The Future Warrior will be a receptive and formidable member of an unbeatable battle space team". The Future Warrior system will meet the more immediate, short-term demands of our fighting warriors in the battle space, and will remind you of an ominous creature out of a science fiction movie. This technology adopts Wireless technology on the platform of fixed networks.

II. TECHNOLOGY

The approach will support military operations across a spectrum of environments from backpacks to ships. The key technology supporting these initiatives is ad hoc peer-to-peer wireless networking, also known as a mobile mesh network. Ad hoc p2p operates by taking a collection of mobile terminals that interconnect directly with each other without the aid of established infrastructure. Ad hoc networking provides a self-organizing and self-healing network structure. Multi-hop routing terminals act as routers and relays for each other, and extend the range and coverage of communications links between individual soldiers, troop transports and command centers.

III. THE BASIC DESIGN

The military and DARPA have outlined specific capabilities for these devices. At a minimum, they will need the following setup processes that are essential for a good and effective communication between the soldier and his troops. Military engagements are often spontaneous, and a communications solution needs to be, as well. 4G Warriors bring their networks with them, and take them away when they leave. Network setup automatically begins the minute troops exit a transport, helicopter or ship. Soldiers cannot afford to expose themselves on a battlefield to acquire GPS

coordinates. GPS is also limited in that satellite signals cannot penetrate caves, underground bunkers or inside shielded buildings. Ad hoc p2p wireless has built-in geo-location using an extremely accurate form of triangulation. The 4G Warrior can triangulate his or her position, or that of another soldier, based on mesh-enabled vehicles or other devices, even when hiding in caves or otherwise out of harm's way.

This lowers the probability of detection and increases battery life. Should a device be captured, the 4G Warrior can blacklist that device to maintain the integrity of the network. The 4G Warriors is neither dependent on a single frequency nor constrained to a military band. These self-forming, self-healing networks will have the ability to instinctively and proactively reduce the probability of jamming. Communications devices must operate while vehicles or soldiers are mobile, even at speeds in excess of 100 mph. 4G Warriors can receive real-time streaming video from aircraft, such as the Predator. Modern soldiers grew up with computers and will demand the same applications and user interfaces available to civilians. The 4G Warrior, using instant messaging, can send photos of enemy positions back to the camp for analysis, and use voice over IP to communicate with nonmilitary phones in an occupied city.

IV. 4G ON THE BATTLEFIELD

All of the battlefield network devices including those embedded in tanks or other vehicles will instantly form, heal, and update the network as users come and go. That is, they will associate in an ad-hoc manner. Moreover, the devices will automatically and continuously optimize network connections as users merge in and out of the network at will. As intelligent elements, all of the devices will constantly reconfigure routing tables to determine the best network routes and, unlike cell-based solutions, network coverage and service levels will improve when soldier density increases. The network resources are better utilized because networks are self-balancing, as well. The soldiers' subscriber devices can hop to distant network access points, away from points of congestion, shifting network capacity to meet demand. Network deployment will be fast and easy because it is tower less. Communication systems providing the backhaul and the network will disappear as fast as it was formed once soldiers leave the area. This means that the same network can connect a soldier to the squad or platoon, to the battalion, and to a fully mobile division. It is the equivalent of a Bluetooth, 802.11, and 3G convergences, but in a single network, with a single device.

V. POWER OF VISION

This has been seen in science-fiction movies, a dropdown piece of eyewear from the helmet allows the soldier to see a 17-inch computer screen displaying anything relayed to the soldier. "This eyewear device is see-through, so it hangs out in space. This allows soldiers to take in all supporting data

while keeping both hands on their weapons. Soldiers wearing the new system will have no need for an external microphone to communicate. "The helmet has sensors that register vibrations of the cranial cavity so they don't have to have a microphone in my mouth. That allows the soldier to control the entire computer via voice. Soldiers will be able to cycle through onboard menus via their eyewear device.

Overlays beyond line-of-sight combat identification. This allows differentiating Friend from Foe. Combat-ID is limited to line-of-sight identification, requires initiation, and encumbers soldiers with additional equipment. Unit Detection overlays identification on live targets in a soldier's scope. Exposes enemies that are camouflaged, obscured, or outside of a soldier's visual range. Enables rapid firing decisions and reduces the risk of friendly fire. Ground Guidance fuses road maps and aerial imagery to discover obstructions and generate routes. This enables commanders to cordon off dangerous areas and demarcates secure zones. This Frees commander from issuing turn-by-turn directions. This is a relief for the commanders of olden days in which they use paper maps, issue turn-by-turn directions, and suggest obstructed routes. Enables rapid selection of fire support targets and also enables a soldier to select targets using his weapons scope and range finder. It determines the coordinates of the target. Warns the commander if soldiers are near the target. Alerts friendly soldiers to the presence of targets via their scope and Coordinates. Directs the rescue team to the injured soldier, while avoiding enemy obstacles. This provides lowers casualty rates, reduces the severity of injuries, and prevents enemy ambush. Presents battery indicator, vital signs, round count. Soldiers wearing the new system will have no need for an external microphone to communicate. "The helmet has sensors that register vibrations of the cranial cavity so I don't have to have a microphone in my mouth. That allows the soldier to control the entire computer via voice-activation".

VI. BODY GEAR

The uniform system of the Future Warrior is been designed with more advanced nanotechnology. Nanotechnology deals With the creation of incredibly small materials, devices or systems with a scaled-down size of 100 nanometers or less.

A nanometer is a metric measurement equivalent to one billionth of a meter. What we hope to gain from this program is body armor that wears like a traditional textile impregnated with nano machines connected to an onboard computer, So when you shoot a round into the uniform system, it's normally pliable until it senses the strike of a round it becomes rigid, defeats the strike of the round and becomes soft again. A shortcoming of traditional body armor is that it can only absorb so many strikes from machine-gun rounds. When you have a uniform with this new nanotechnology, it can absorb unlimited numbers of machine-gun rounds. No other potential development is inserting "Nanomuscle fibers" that can actually simulate muscles, giving soldiers more strength. Fabric is impregnated with nanomachines that create the same weight, lift and feel as a muscle. So I coat the outside of the armor with a Nanomuscle fibre that gives me 25 to 35 percent better lifting capability. The uniform from the waist down will have a robotic-powered system that is connected

directly to the soldier. This system could use pistons to actually replicate the lower body, giving the soldier upwards of about 300 percent greater lifting and load-carriage capability. We are looking at potentially mounting a weapon directly to the uniform system and now the soldier becomes a walking gun platform. This also provides protection against chemical and biological agents is more realistic with a respirator tube that attaches to the back of the helmet and connects to a low-profile air purifier that forces cool air into the helmet for comfort and visor defogging. Another major change in the uniform is the addition of protruding, interconnecting black pieces of plastic on the legs that represent a lower body exoskeleton. It will connect through the boots up to the waist and enable the wearer the ability to carry up to 200 pounds. Information input and output for tasks such as navigation. The display is connected into a compact computer worn on an armored belt around the waist. The onboard computer will monitor soldiers' overall Warrior Physiological Status Monitoring System gives the soldier's body core temperature, skin temperature, heart rate, whether the soldier is standing or prone, and how much water the soldier has drunk. The psychological status monitors the brain waves such that when a friendly fire can change into an enemy. Monitoring system A medic, who can be miles away, will now be able to diagnose and treat a soldier who is about to have sunstroke, without even physically seeing the soldier. So a medic can see how the soldier's core body temperature is rising (and) heart rate is falling and the soldier then knows to go directly to the medic for treatment. The computer will drop down a map to direct the soldier where to find the medic for help.

VII. CONCLUSION

Here we have used the next technology of mobile technology- 4G for creating a fool resistant system that can be used at any place by a military force in the future. This system can be used to provide intelligent communication cum detection system using which every soldier can be virtually connected to a network that will be monitored by a mobile unit. Since the 4G technology is yet to become a reality the system may look very simple but as the technology will be applied a more complex and cost effective system could be designed.

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