HETEROGENEOUS SENSOR MANAGEMENT SYSTEM FOR SURVEILLANCE AND FORCE PROTECTION, Part I

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As the Army moves forward with the deployment of ever greater numbers of unattended and autonomous sensors for surveillance, detection, classification, identification, and force protection the need for sensor and sensor field management as well as intelligent data fusion grows as well. A sensor field is often heterogeneous – a combination of best-of-breed devices with varying interfaces and with data rates spanning the range from a few bits per second to mega-bits per second and beyond. Custom Manufacturing & Engineering, Inc. (CME) has developed a generic architecture for unattended ground sensor networking, communications, and power management. This system architecture incorporates sensors, modular communications systems, PC based mapping, charting, geodesy and imagery (MCGI) as well as advanced power systems, power management, and display technologies. The hardware to support this generic architecture has been developed with careful consideration of the needs inherent in the Army's transformation. The hardware is evolving into a single small, light-weight, low-power, reconfigurable computing module with modular support resources to span the interfaces alluded to above. This multi-function module addresses the issue of sustainability by greatly reducing the overall logistics impact of deploying sensors. It does this by providing a high degree of adaptability to the mission requirements. The same module is capable of providing high performance computing and signal processing (image processing, detection, identification, recognition, beam forming…) as well as ultra low-power operation for simple tasks (message relay, trip sensor, sensor cueing…). Aggressive power management within the module as well as the overall sensor power management made possible by the CME architecture will dramatically reduce the battery requirements for unattended and autonomous systems further reducing the logistics footprint. The CME architecture and its supporting hardware are designed to foster agility – missions may be updated at any time and the broad capability of the hardware makes a wide variety of mission types continuously available. Deployability is enhanced through the low part count made possible with the CME hardware. The CME architecture facilitates the plug-and-play assembly of sensor fields. Legacy sensors and sensor systems are made CME compatible through the use of a hardware module operating in a mode known as the Logical Common Sensor Interface (LCSI). Broad capabilities can be brought to a sensor suite in this way. For example, a single imager can be transformed into a cueing and surveillance device with identification capabilities. The versatility and small logistics footprint translate into improved responsiveness. Since this architecture and hardware lend themselves to Force Protection as well as Surveillance and Reconnaissance, a force so equipped will have improved survivability. The large reserve computational capability of the hardware makes ubiquitous data and information fusion possible leading to higher confidence in identification, classification and sensor-to-shooter applications. This improved information quality translates directly to improved lethality for the future objective force. This paper presents this generic architecture, the status of its development, the results of recent field test and demonstrations and a brief look forward into the future system development and hardware capabilities..