

Geek Chic and the Future of Space Systems

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Pervasive computing embraces a vision of information that is situated, continuous, and registered. *Situated information* is appropriate to the current context and the state of the environment --- in other words, it is information that may be sensitive to any and all of your personal preferences (who you are), your immediate associates (who you are with), your activity (what you are doing), the time of day (when it is done), the locale (where it is done), and the action (how it is done). *Continuous information* is always available irrespective of location or circumstances. *Registered information* overlays the virtual atop the physical, allowing the virtual world to inform physical objects, events, and persons, and the physical world to act as anchor points or structure for virtual representations. Wearable computing is the intimate apparel of pervasive computing --- body-worn sensors, devices, computing engines, and software that interlink personal and public space.

What does this have to do with space systems? The answer --- everything. Hidden away in automobile air bags, Game Boys, and cell phones are the technologies that will revolutionize the design, construction, deployment, and management of space systems.

By systematically exploiting three basic principles:

- Replace physical structure with information
- Build small and think big
- Transport energy and information, not mass

and repeating the mantra of pervasive and wearable computing --- tune in (situated information), turn on (continuous information), drop out (registered information) --- we can create space systems of extraordinary grace, beauty, and utility that look, behave, and operate like nothing on earth.

In this context I will offer selected grand challenge problems whose solutions will profoundly impact both earthbound and spaceborne systems.