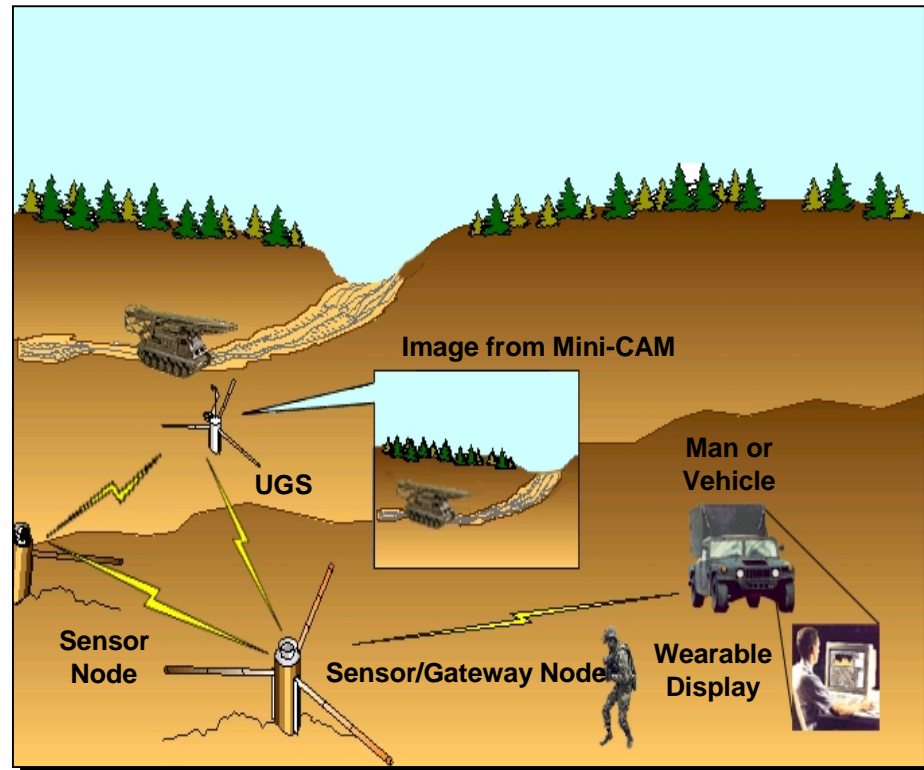


An abstract graphic on the left side of the slide consists of several overlapping circles and arcs in various shades of gray. Some are solid, while others are semi-transparent, creating a layered, geometric effect.

**Optimal placement/
density/
complexity
Stephen Blatt**

What's going on?

- Report information:
 - all events
 - specified events
 - unusual events
 - traceback
- Timeliness
 - real-time
 - near real-time
 - periodically
 - as queried

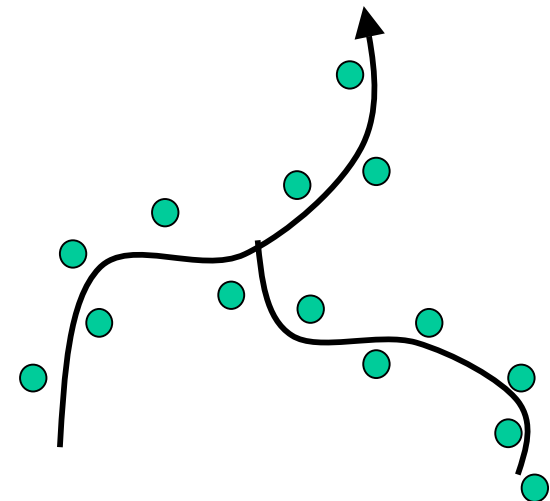


Detection ranges vs target classes

- Kilometers
 - air, ground vehicles
 - weapons
 - detect engine emissions, active systems, communications
- Hundreds of meters
 - lightweight vehicles
 - hand weapons
 - communications devices
 - detect acoustically, electronically, or visually
- Meters
 - personnel, parked vehicles
 - detect seismically, magnetically, or visually
- Target Resolution
 - limited to spacing of nodes for omnidirectional sensors

If Money and Power are no object, Ideal Laydown Patterns follow Target Behavior

- Ideal laydown is along target paths
- Multiple sensors within detection range to provide continuity of tracking
- Multiple sensors within comms range to enable comms
- Close sensor spacing to provide target resolution
- Imaging sensors in appropriate positions



Many Nodes vs Few

- More nodes are good because:
 - Better situation awareness
 - Less restrictions on emplacement
 - sensor performance
 - communications
 - Optimize sensor spacing for different target classes
 - By doubling up sensor field, can double coverage time
 - Development cost same as for fewer nodes scenario
- Fewer nodes are good because:
 - Lower deployment cost
 - Networking/routing requirements simpler

Better Performance with More Nodes

Simple or Smart Nodes?

- Algorithm complexity is not a issue relative to selection of hardware processing
 - User interface simplicity is key for the success of distributed sensor networks
 - Can't have the user look at the outputs of each sensor
 - Therefore, algorithms will be developed that can work whether the system is centralized or distributed
 - Currently available Pentium-class processors are probably sufficient to perform required algorithms

Complex processing on nodes ->

More developed outputs ->

Reduces comms complexity

Example:

Raw data: 4 channels,
sampled at 1000 Hz
8 kbytes/sec

Detection report:
100 byte/sec