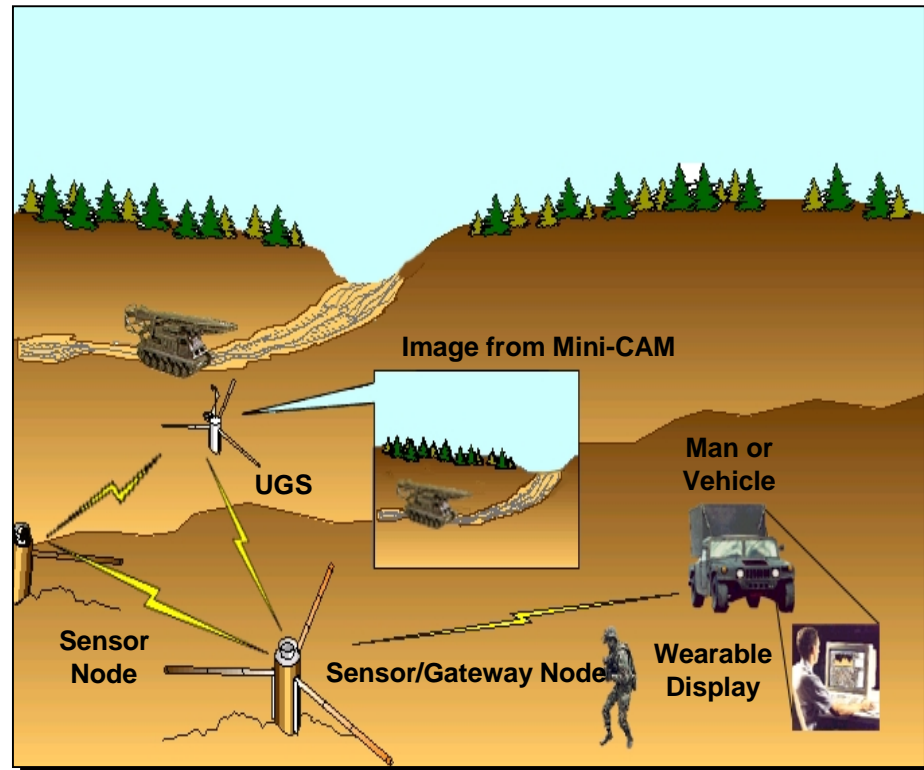


An abstract graphic on the left side of the slide, featuring several overlapping circles and arcs in various shades of gray. Some circles are solid, while others are outlines. The lines are smooth and curved, creating a sense of depth and complexity.

**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

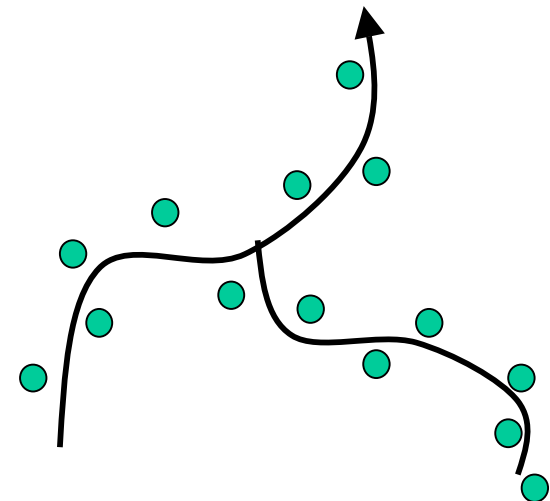


Detection ranges vs target classes

- 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