



Swarm Intelligent Mobile Ad Hoc Networks

A New Mobile Communications Paradigm

Beyond Phase II Conference

Panel Briefing

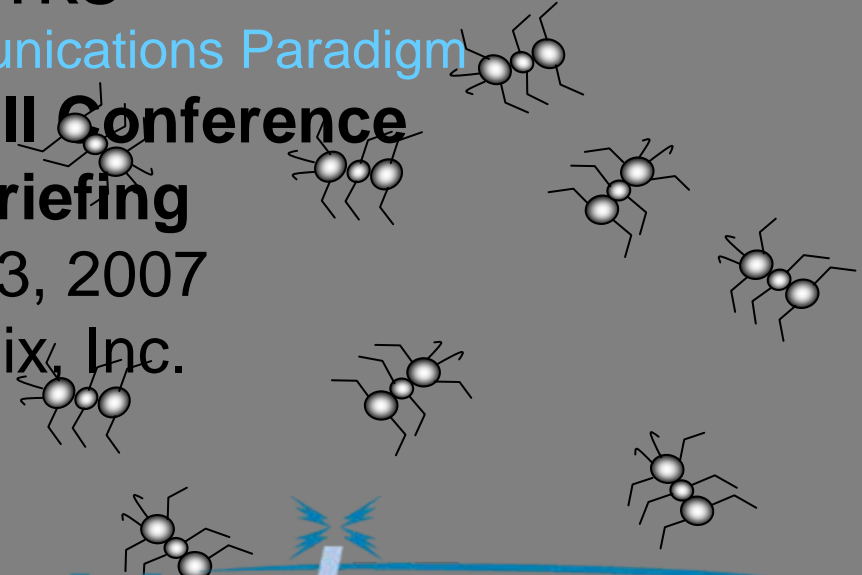
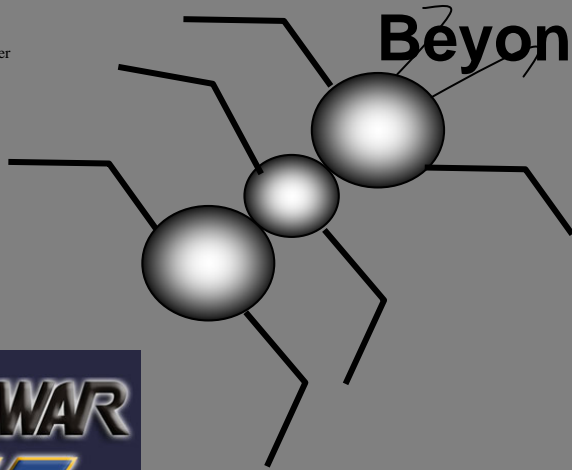
August 23, 2007

BlueIronix, Inc.

SPAWAR

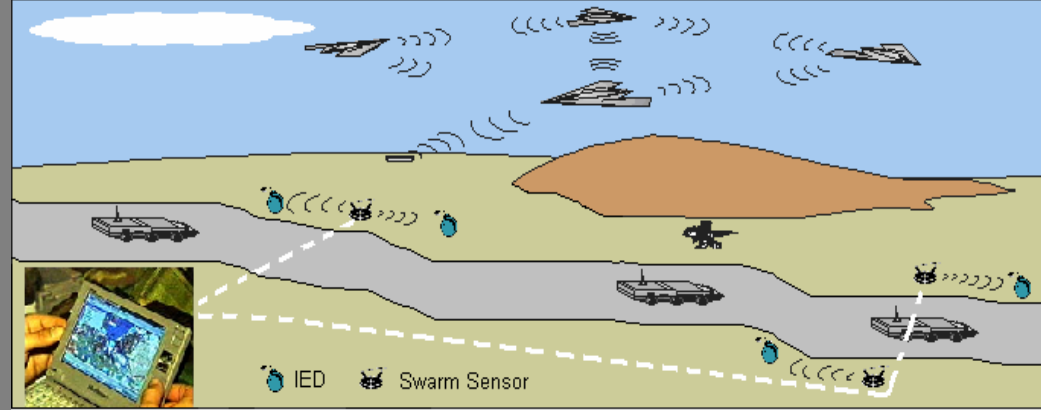


Systems Center
Charleston



Military Needs:

A New Mobile Communications Paradigm



- Dynamically connect, route, and adapt
- “Fuse and integrate” network layers
- No network infrastructure
- Self-forming, self-organizing networks
- “Intelligent” routing, not just shortest path
- Look beyond Internet to non-IP solutions
- Coexist and share with existing networks



SWARM Intelligence

• THE NEXT GENERATION OF TECHNOLOGY IS MODELED ON INSECTS

by MERIKA D. SMITH
Business Journal staff writer

WHAT IF

computers could make decisions for themselves?

What if you dropped a batch of computer parts onto a deserted island and they built a civilized communication network all by themselves?

What if your doctor injected a swarm of microbots to attack a hard-to-reach tumor?

A few years ago, these were very big ifs. But a Chaplin Falls startup named **Bluetronix Inc.** says it is closing in on the technology that could make all of them possible.

Sounds crazy? Well, there's no need for a gin-and-tonic. **Tom Schwabmeyer** has you. "We're not talking artificial intelligence - just swarm intelligence."

"We're taking our inspiration from social insects," said **Douglas S. Smith**, an Alamo resident who co-founded **Bluetronix**.

At the same time, swarm intelligence is a scientific theory

based on the activities of ants, bees and other insects. It asserts complex behavior can emerge from a group of individuals - whether they're bugs or computer nodes - that follow simple rules.

Swarm intelligence isn't exactly new, but it's largely uncharted territory.

Virtually no one has developed a product that applies its principles. But the founders of **Bluetronix Inc.** say they will do it by 2006.

The **Chaplin Falls** company is writing the mathematical formulas for an all-new, super-efficient wireless network for the military. From there, Smith and company President **Mark Hollister** hope to parlay their work into other industries, such as manufacturing and supply-chain management.

They say the possibilities for swarm intelligence products are endless.

"The military has the funding, sense of urgency and need. It's a good place to start," Hollister said. "Later, we can bridge that over to the commercial world."

Biologists long ago noticed the amazing feat social insects are capable of, but swarms

Photo: Joel Beaman, 2/05



David S. Smith
Business Journal Staff Writer

Technology

- Swarming Routing Algorithms—various versions
- Swarm Location Service Algorithm
- Swarm Multicasting
- Hardware code 802.15.4
- Sensor Module Design for product
- **Patents filed:**
- Swarm Autonomous Routing Algorithm for Mobile Ad Hoc Network Communications
- Swarm Location Service for Mobile Ad Hoc Network Communications
- **Forthcoming Patents**
- Swarm Autonomous Multicasting in Mobile Ad Hoc Network Communications (SAM) 2008

Swarm Autonomous Routing Algorithm

Features, Advantages, and Benefits

Feature	Advantage	Benefit
Simple, elegant algorithm	Small code footprint	Runs fast on inexpensive hardware
No routing tables	Low memory requirements	Runs on low-end hardware
Mobility Capability	Connecting nodes on the moves	Dynamic Settings
Totally distributed approach	No central point of control	Reliable with no single point of failure
Reactive routing approach	Nodes only work when necessary	Lower cost, longer lasting power source
Very scalable	Networks may grow in size	Arbitrarily large networks

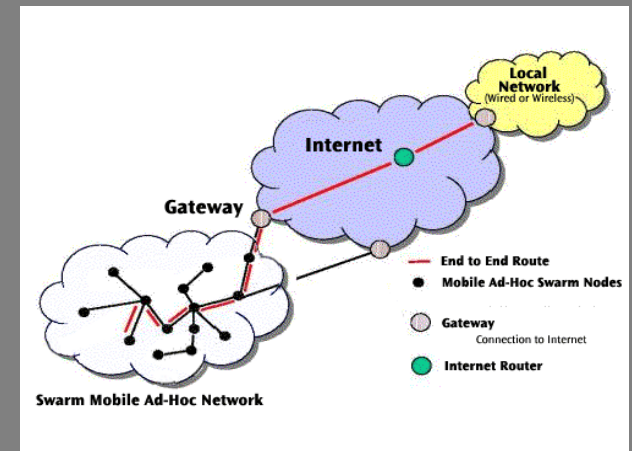
Transition-DoD

- SPAWAR—Transition Agent
- Dr. Stephen M. Jarrett
- SPAWAR--- CRADA Oct 2007
- SPAWAR--- JTRS
- NAVY---Sonbuoys ASW
- AF—Sensor Networks
- Homeland—Emergency Radios, Sensors
- SOCOM---Sensor Networks



Transition-Commercial

- Sensor Networks—Industrial Markets
- Cellular Markets--Relay/Points-Cell Phones
- Data Acquisition—Industrial, Non-Industrial
- Transportation-VANETs
- Logistics-Asset Tracking
- Emergency Back-up



Upcoming Products



- Sensor Module for OEMs
- 8-bit and 32 Micros
- IP Gateway
- GUI-3D
- Stand-alone swarm sensor module
- Software Defined Radios (SDRs)
Emergency-JTRS

