

Persistent Surveillance for Asymmetric Warfare on the Roadmap to FORCEnet.

Naval-Industry R&D Partnership Conference

4 August 2004

Panel Members

- Bobby Junker, Office of Naval Research
- LtCol Chill, US Marine Corps
- Martin Kruger, Office of Naval Research
- Lenny Rudin, Cognitech, Inc
- Larry Davis, University of Maryland
- Alexander Stoyen, 21st Century Systems,
Inc

Agenda

Introduction: Bobby Junker

Requirements and Needs: LtCol Chill and
Martin Kruger

Image Analysis: Lenny Rudin

Autonomy and Control: Larry Davis

Initial Applications: Alexander Stoyen

Threat / Target Characteristics

- Non-distinct humans (no uniforms, gender unknown, size unknown)
- Behavior
- Cultural differences (i.e., values counter to ours)
- Unbounded rapidly changing TTP (driven by target's variables)
- Low S/N for targets (high clutter)
- Highly dispersed forces & tactics
- Space/time advantages to attacker
- De-centralized leadership (local resilient structure)
- Infiltration potential (infrastructure)
- Innovative use of commercial technology

Bimodal Target Sets

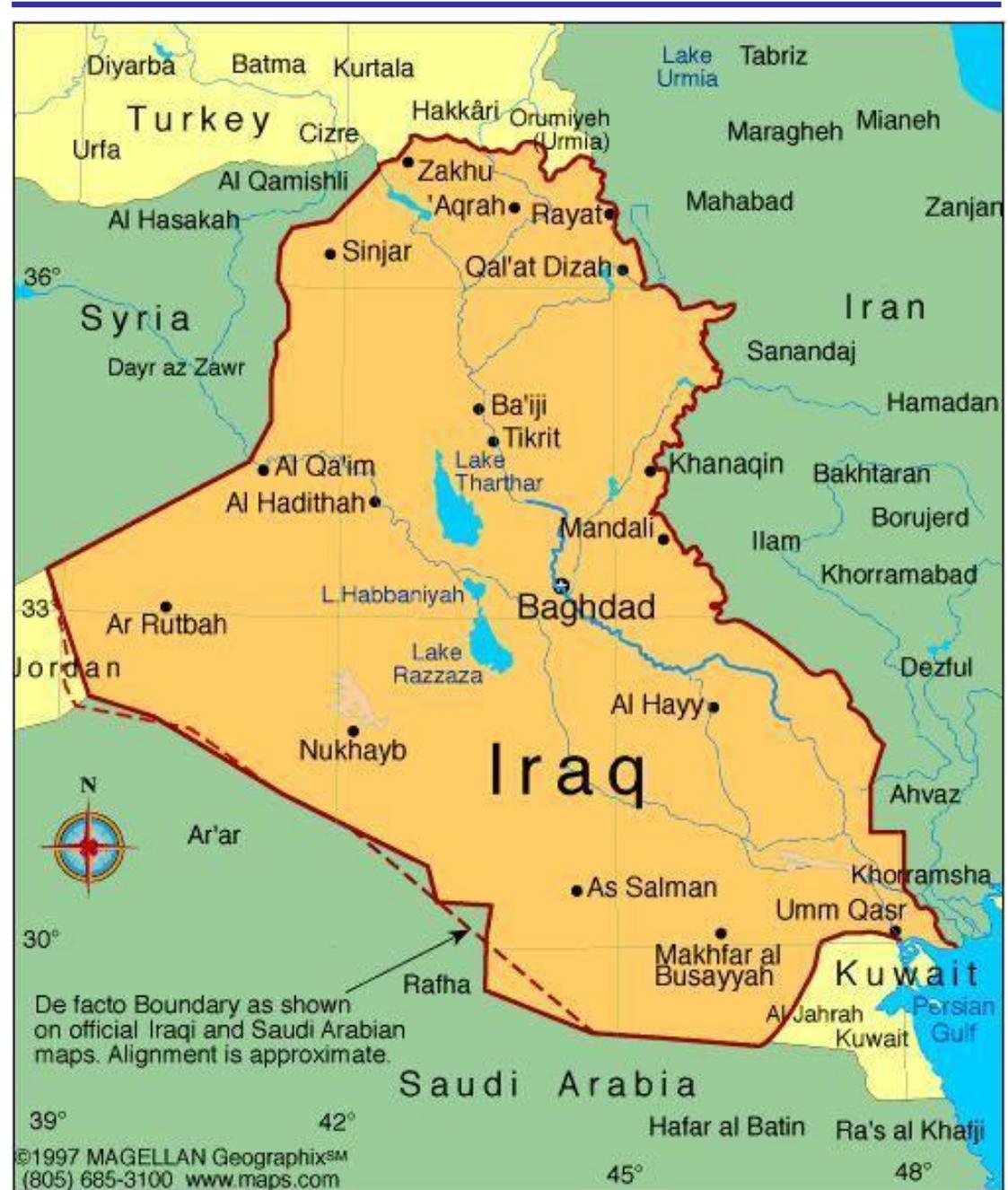
- **Seconds (IEDs, suicide bomber, attacker, etc)**
- **Days, hours, months (leadership, bomb manufacturing, logistics, etc)**

Current and Desired Sensing Modalities

- Sensing Modalities:
 - Imagery: EO, IR, Video, HSI
 - Active Imaging (3D): Lidar, SAR, ISAR
 - ACINT: Signatures
 - HUMINT:
 - Elint, Sigint: Interferometry, signatures
 - Biometrics (DNA, fingerprints, retina scan, voice, face, gait)
 - Psychological profiling
 - Chemical / Biological
 - Netted sensors
 - Coherent change detection
- Desired sensing capabilities
 - Contents inside of structures – buildings, containers, etc
 - Torso Density profiles
 - Chemical composition profiles
 - Intentions
 - Covert Non-cooperative tagging

Scope of Big Picture

Area: 200,000 sq mi
Altitude 1000ft: viewing
area 1800 sq mi
HDTV: 4 in2 / pixel at
2000x2000 pixels / picture
implies .004 sq miles/picture
implies 450,000 pictures / second
to cover 1800 sq mi and
5 tetrabytes of memory
/ second (captures car
moving 60mph every 30 ft)



Critical Considerations

- How do we size the problem(s) / application(s) so that we have manageable networks of sensors from which to grow to more comprehensive network solutions
- Can we use integrations of multiple sensors as well as integration with intelligence to extract targets from background
- How do we do all of this with fewer people for managing sensors and sensor data and for analysis of sensor data and intelligence