CONF PAPER / IN 116

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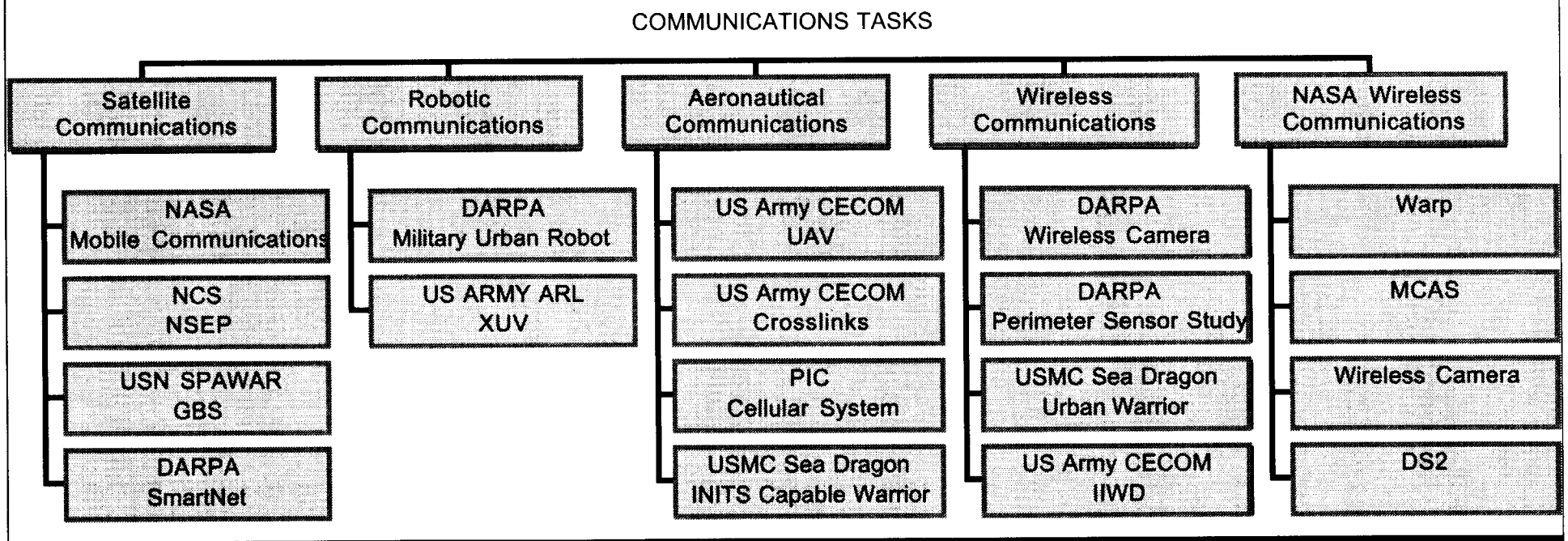
- **Wireless Sensors**
- **System on a Chip**
- **Advanced Analysis**

Integrated Vehicle Health Management

IVHM Technologies at JPL

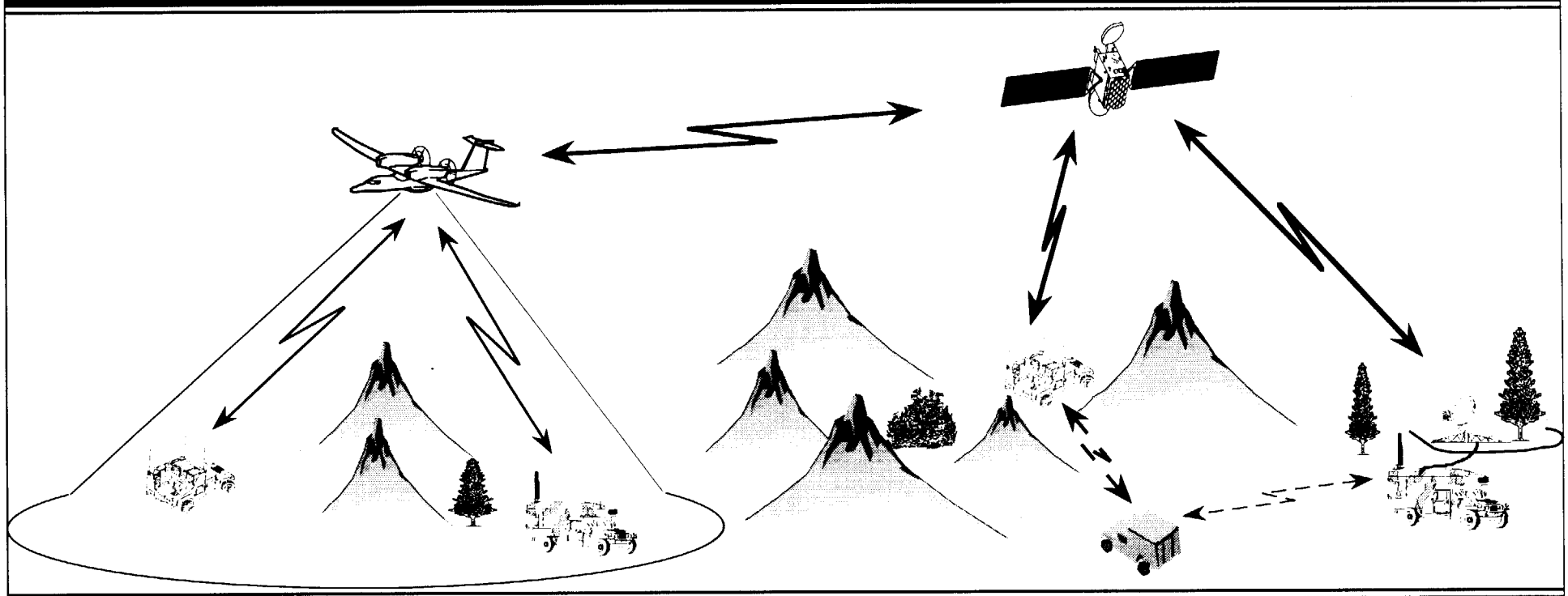
Tasks Cover Large Spectrum (UHF,L,S,K,Ka-BANDS)
Technology Development

- Modulation, Coding and Equalization
- Transceivers, Antennas
- Systems, Experiments and Deployments



WIRELESS OVERVIEW

- Hybrid System - Multiband Terrestrial and Satellite Communications
- Adaptive Network Architecture, Multi-Vehicle Control



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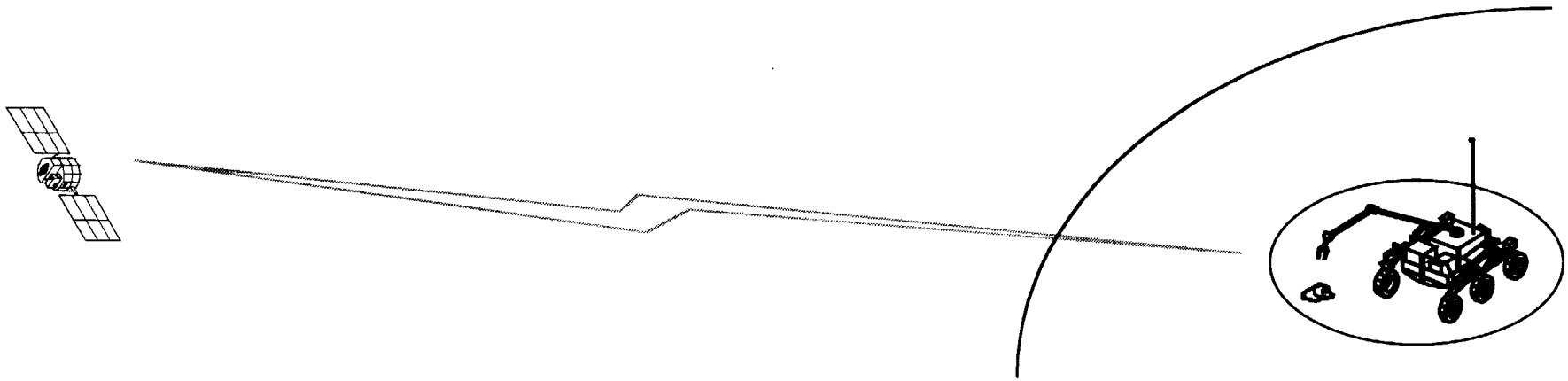
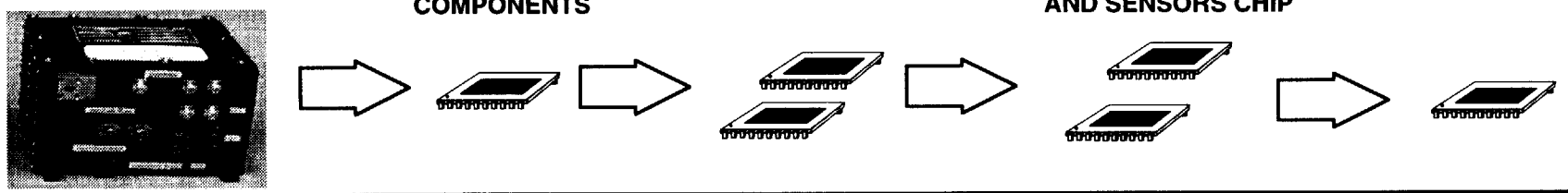
XUV ARL ROBOTICS FUTURE COMM ARCH.

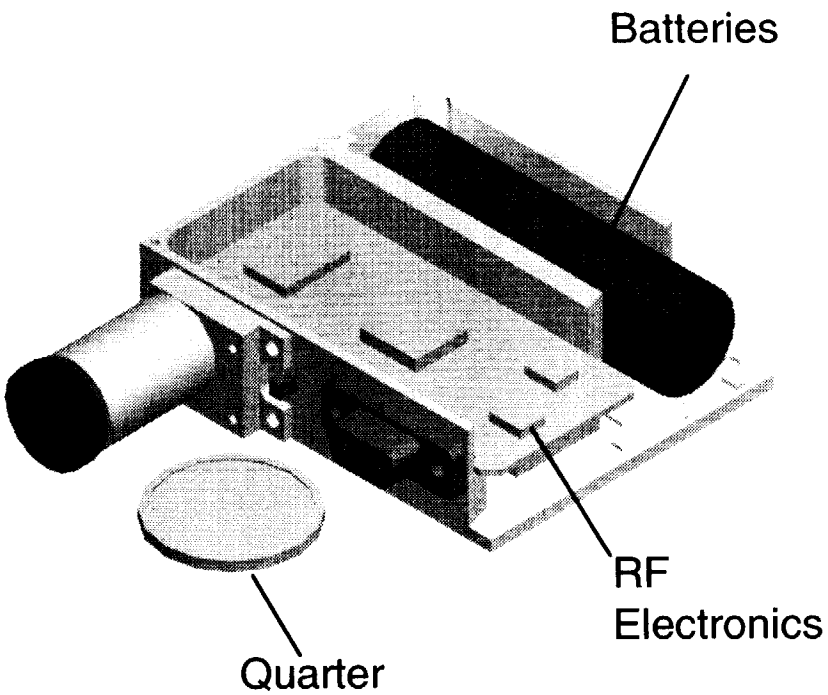
- Objective
  - Develop Chip-Level Telecom Systems for NASA's Small Platform Missions
- Results
  - Lower Power, Reduced Mass
  - High Levels of Integration, Multi-Mission
- Currently in Phase I

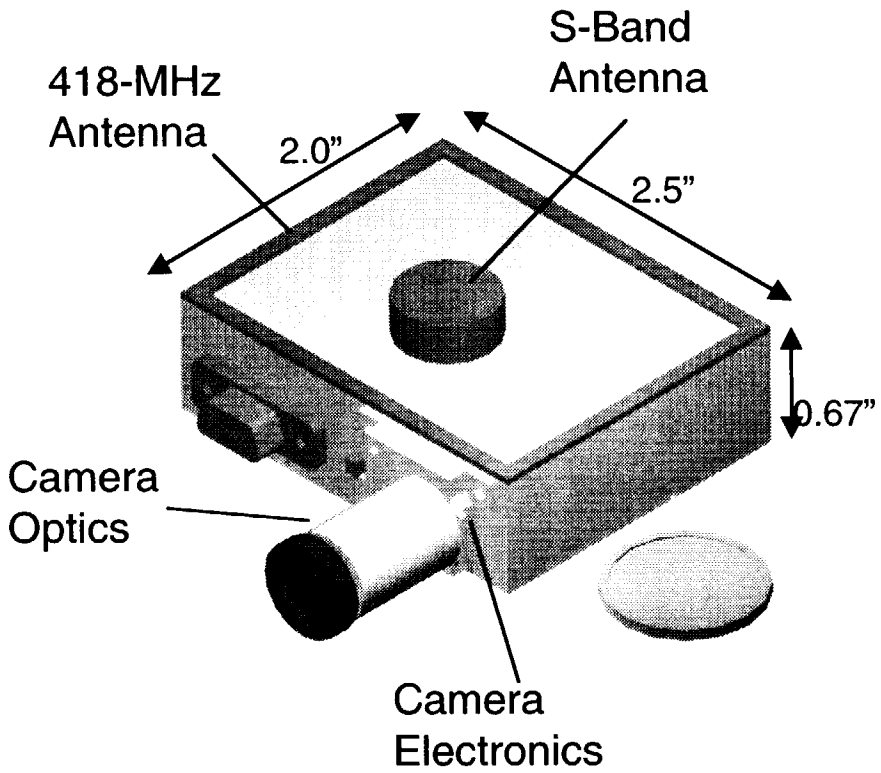




MICRO COMM & AVIONICS SYSTEMS (MCAS)

- Wireless Camera in ~1" Cube, APS Camera Chip
- 2.4 GHz (2.5 MBPS) Transmitter
- 418 MHz (1.2 KBPS) Control Link





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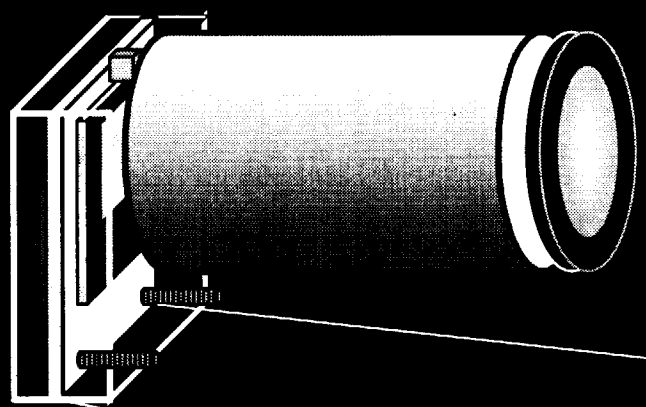
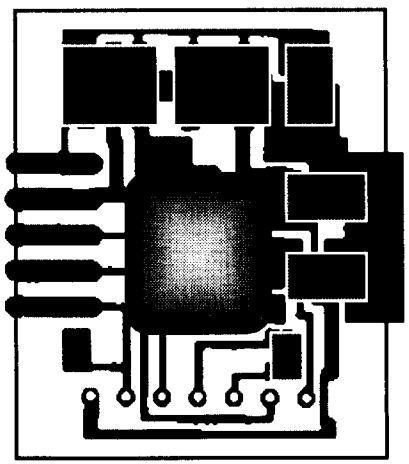
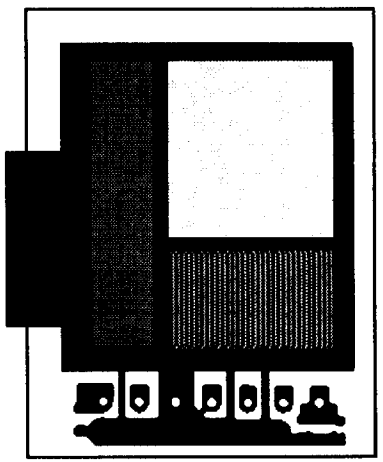
NASA/DARPA WIRELESS CAMERA



Lens:	8.5 grams
Electronics:	1.5 grams
Housing:	5.0 grams
Total:	15.0 grams

5 wire interface:
- power
- ground
- data in
- data out
- clock





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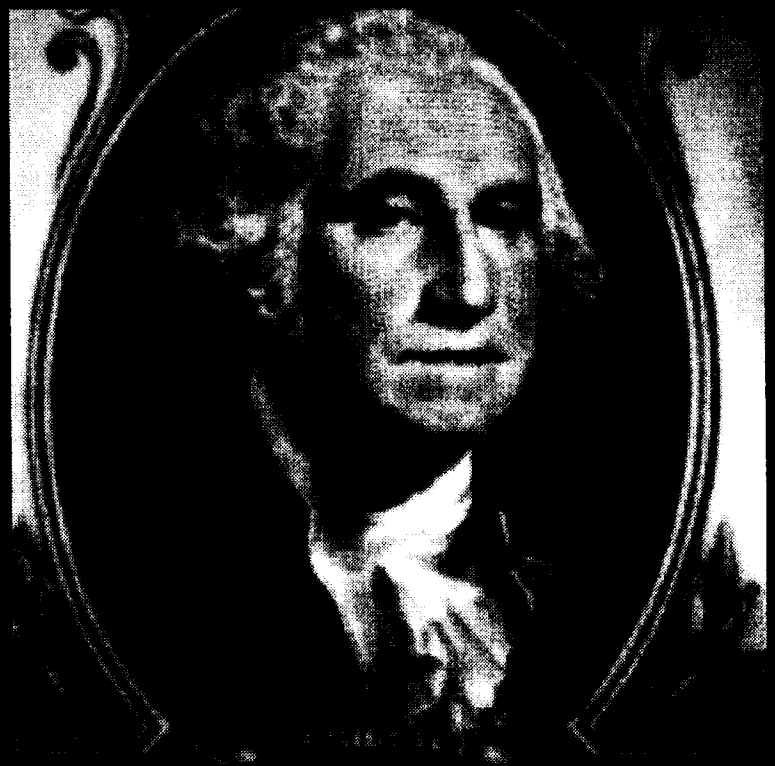
WIRELESS CAMERA ASSEMBLY

- On-chip Timing and Control
- On-Chip 10-bit column parallel ADCs
- 13 10-bit programmable registers
- 256 x 256; 20.4 mm pixel pitch imager
- Initially 256^2; designed for 1024^2
- 1.2 mm, 5 V. HP n-well CMOS Process
- 9.3mm x 11.2mm Chip
- Requires 5 wires for operation
- Programmable: resolution, windowing, exposure, etc.
- Low power: 20 mW; 40 uW (standby)



8 BIT, 256 x 256, APS IMAGE

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WIRELESS CAMER APS FEATURES

ORIGINAL IMAGE 1

ORIGINAL IMAGE 2

SHARPENED IMAGE 1

SHARPENED IMAGE 2

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IMAGE EXAMPLES FROM CAMP LEJEUNE

- Uses Commercially Available Lithium CR-2 Camera Batteries (2) Provide 3V Each with Capacity of 800mA-H

BATTERY LIFETIME ESTIMATES

SLEEP TIME (s)	RECEIVE TIME (s)	TRANSMIT TIME (s)	PICTURES RETURNED	BATTERY LIFE (DAYS)
64	2	0.937	16009	12.4
64	2	0.937	10661	82.6
64	2	0.937	2456	190.3
512	2	0.937	12649	75.4
512	2	0.560	18076	107.7
0	0.25	0.937	16927	0.233
0	0.25	3	5296	0.199

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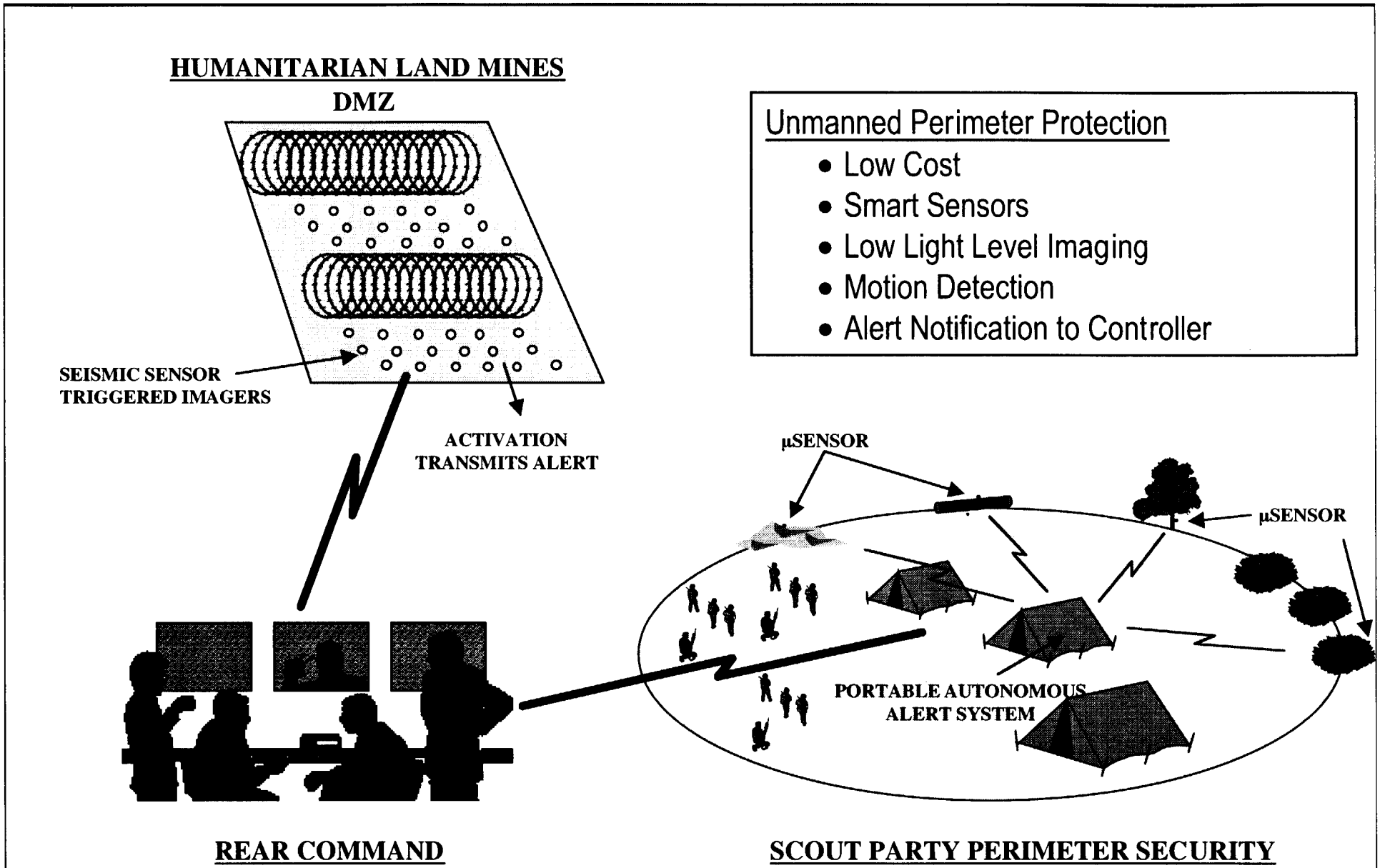
WIRELESS CAMERA BATTERY



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DARPA PERIMETER PROTECTION