



USAF FORCE PROTECTION BATTLELAB

Information Communication

And

Presentation in Emergency Situations



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Overview

- *Force Protection Command and Control (FPC2)*
- *Combat Support Command and Control (CSC2)*
- *Coalition Rear Area Security Operations
Command and Control (CRASOC2)*



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FORCE PROTECTION COMMAND & CONTROL (FP C2)

Problem: Situational awareness for security, law enforcement and Force Protection professionals has progressed very little in the past 20 years

- **Manual plotting of situations using grease pencils and acetate situation map with acetate sheets for depicting situations**
- **Voice communications are limited to VHF/UHV radio and telephone**
- **Patrols and static posts are the eyes and ears of the controller**

Solution: Provide a computer-based command and control capability for situational awareness in the Base Defense Operations Center/Contingency Operation Command Post

- **Capable of in-putting sensor and imagery data from any source and displaying it real-time to the operator**

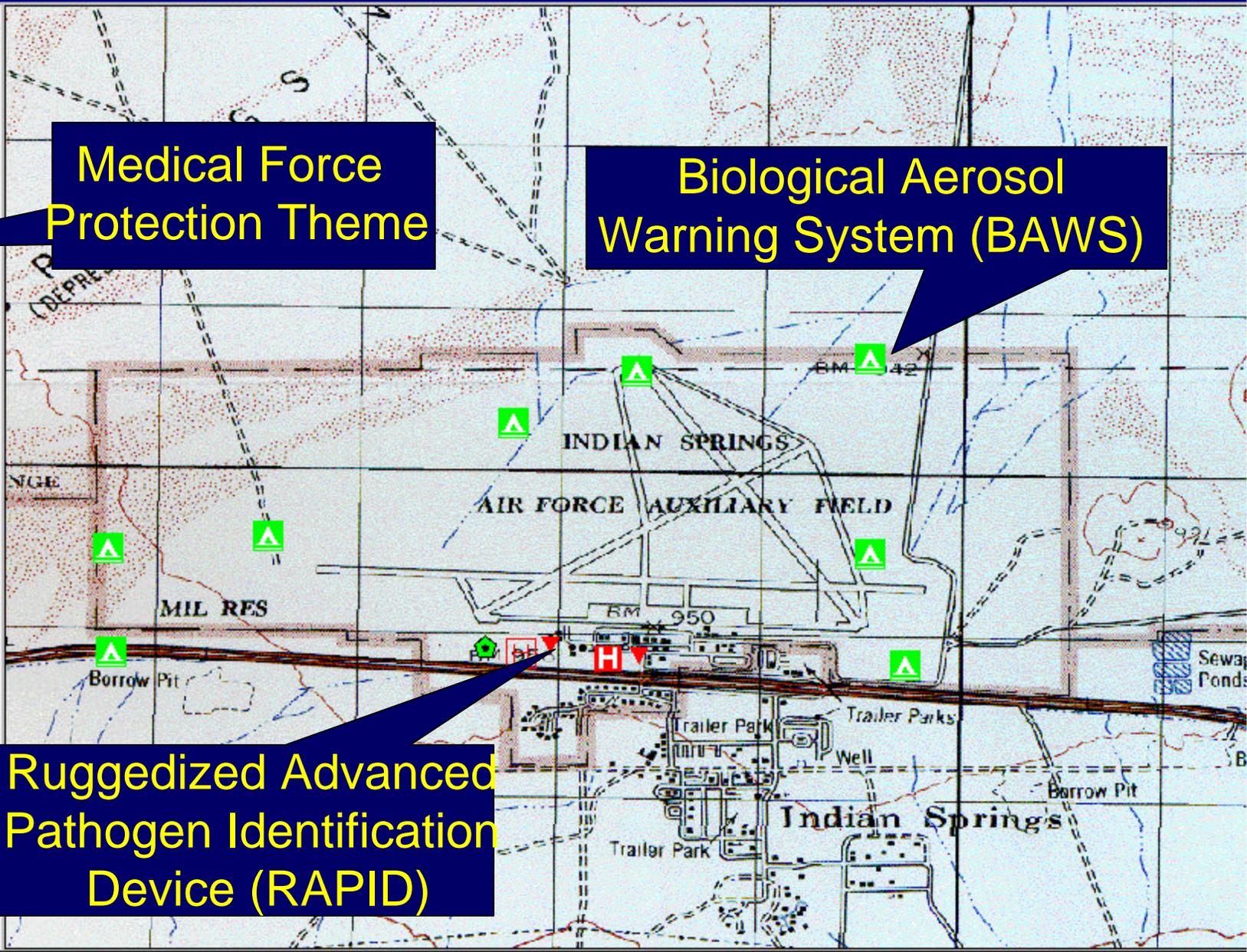
SITUATION MAP

- Base Perimeter
- TASS SENSORS
 - Alarm
 - Active
 - Accessed
 - No Contact
- Medical
 - RAPID
 - BAWS
 - Biological (BAW)
 - Aid Station
 - Hospital
 - Danger
- Perimeter Photos
- Aerial Photo
- Scanned Map
- Area of Interest

Medical Force Protection Theme

Biological Aerosol Warning System (BAWS)

Ruggedized Advanced Pathogen Identification Device (RAPID)





M

Scale 1:22,713

-115.7
36.5

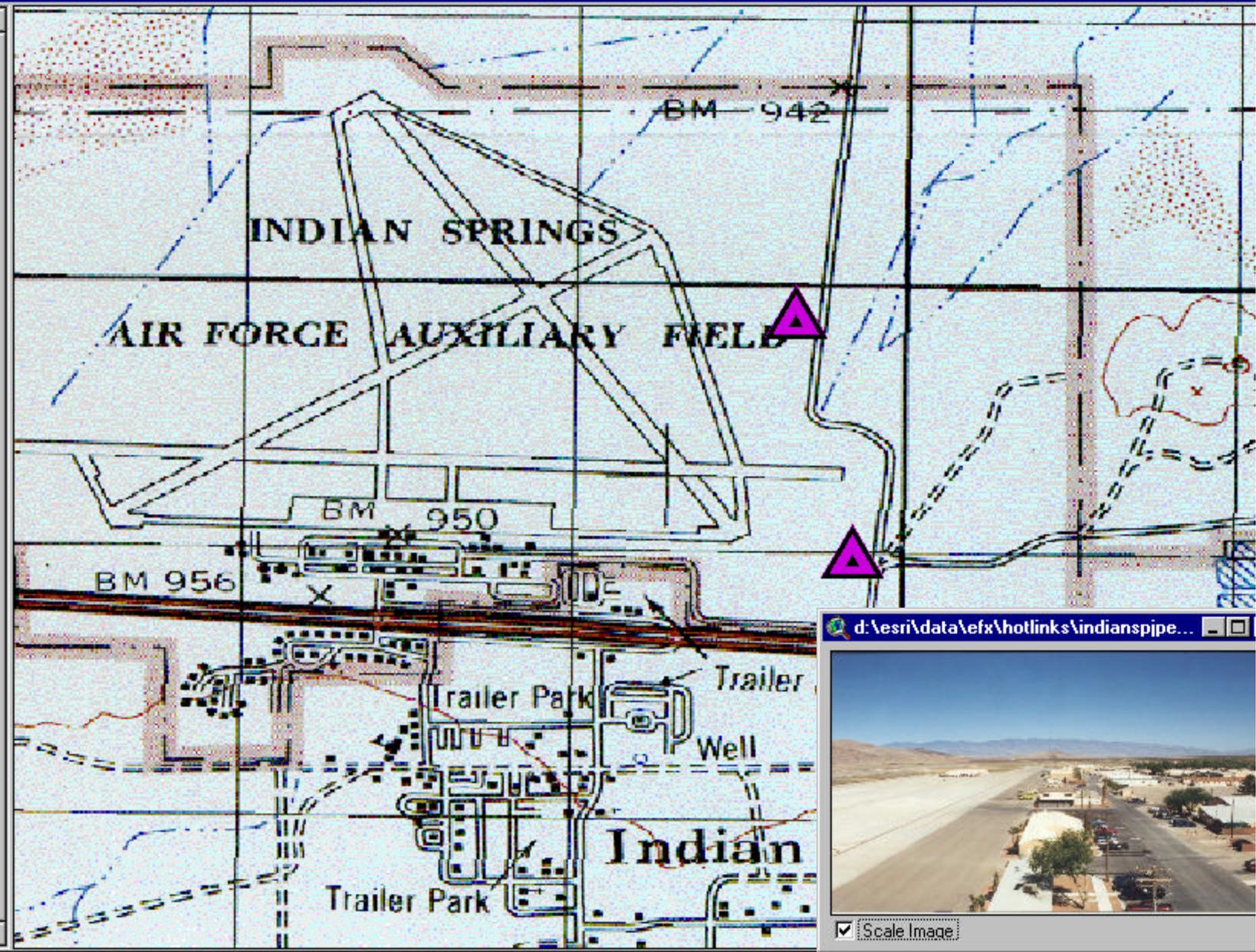
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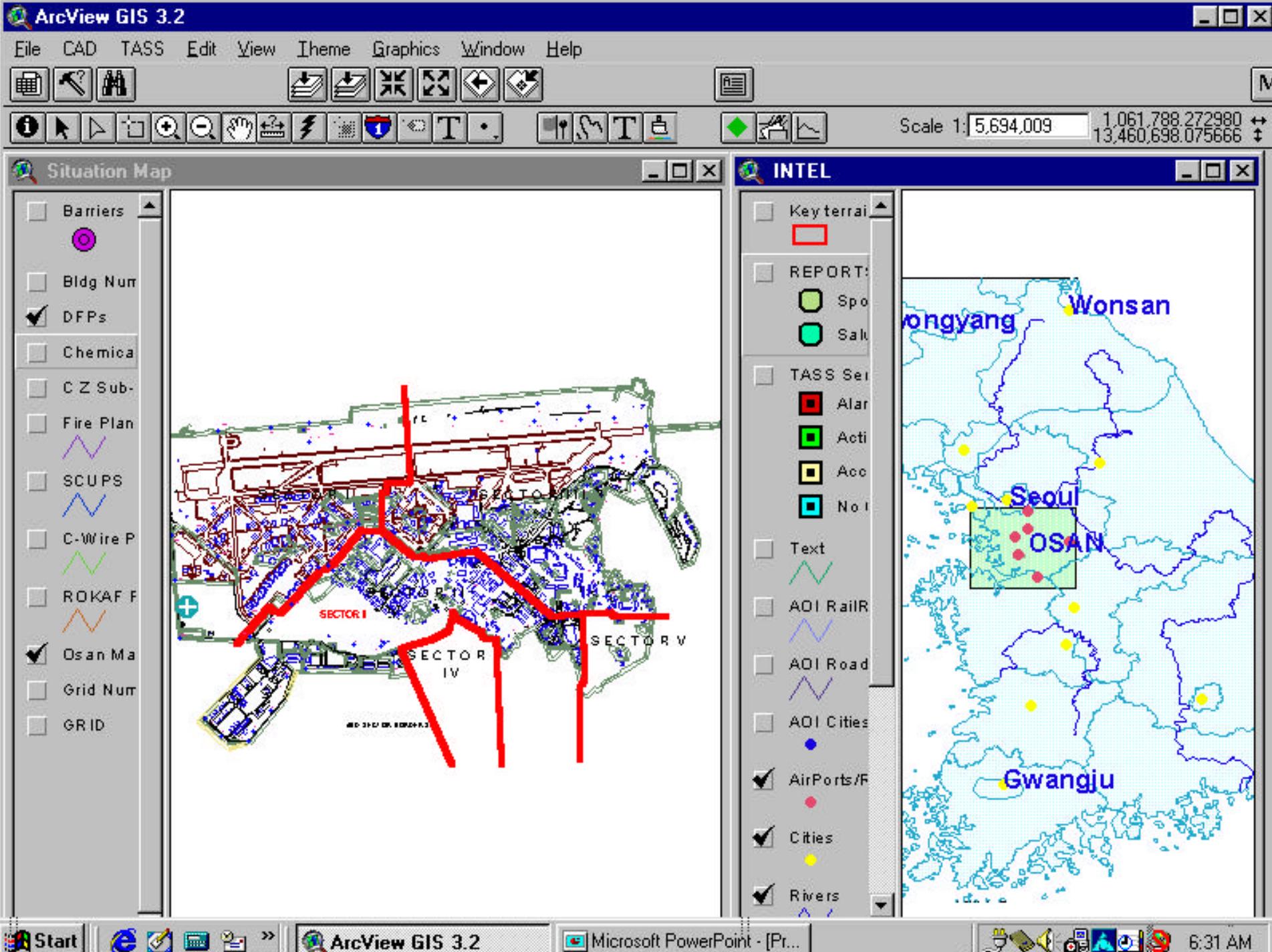
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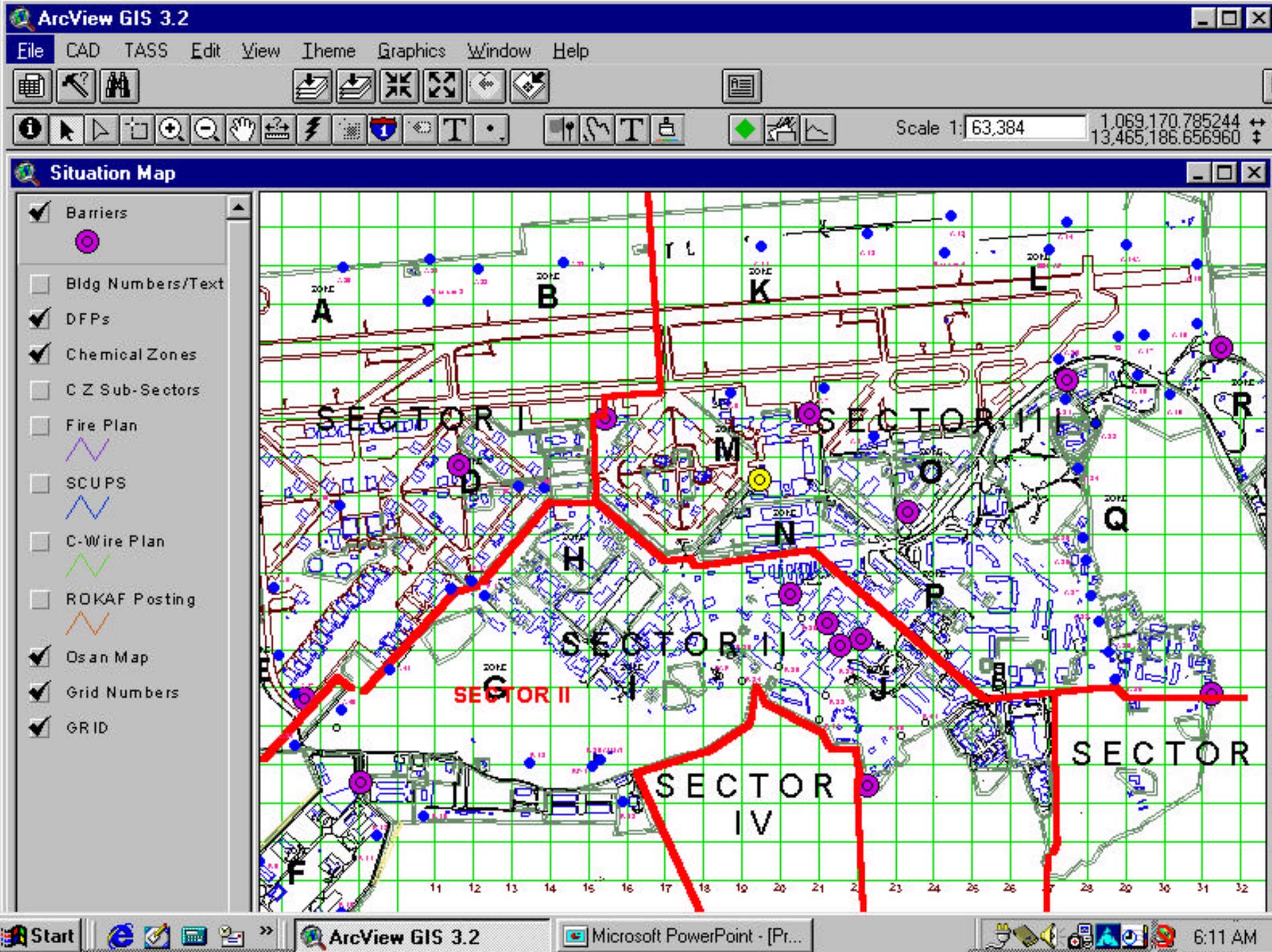


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Combat Support Command and Control (CSC2)

Initiative Name: Combat Support Command and Control (CSC2)

Demonstration Mission Statement: Demonstrate the utility of a computer-based command and control system for expeditionary and main base Combat Support operations. This initiative is intended to prove an innovative concept to significantly enhance combat support command and control from the beginning of an expeditionary force deployment, through mission execution and in the recovery stages of expeditionary operations.

Force Protection Applicability: All combat support functions impact the force protection realm. Fused situation awareness for these functions improves force protection capabilities by allowing more effective and efficient decision making.



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Required Operational Capability

- **This concept demonstration will provide C2 terminals for four functional areas (SG, SF, CE, IN) at the Unit Control Center and a C2 terminal for the Combat Support staff**
- **Distributed data sharing across C2 nodes**
- **Accept sensor data from other organic sources (TASS, JWARN, BAWS, overhead imagery, and assessment devices)**
- **Graphic situation information shared real time between nodes laterally and up/down the chain of command**
- **Incorporates a Personnel Alerting and Warning System**
- **Incorporates vehicle and personnel tracking**



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Coalition Rear Area Security Operations Command and Control (CRASOC2)

The Joint Rear Area Coordinator is responsible for coordinating the overall security of the Joint Rear Area. The JRAC requires a command and control capability that enables coordination and integration of surface area security requirements.



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Rear Area C2 Capabilities

Peacetime Situational Awareness

- **Status tracking of vulnerability assessment data**
- **“Drill down” to detailed base defense shortfalls**
- **Imbedded data within the Geographic Information System**
 - **VA report, imagery, etc., hyper linked to icons**
- **Information sharing between JRAC and BCCs and**

Contingency Situational Awareness and Response

- **Coordinate reaction forces**
- **Coordinate area damage control assets**
- **“Drill down” to detailed base level tactical picture**
- **Near real time information sharing between Joint Rear Area Coordinator and Base Clusters**



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Base Level C2 Capabilities

Peacetime Situational Awareness

- **Base Cluster Defense**
- **Detailed base defense shortfalls**
 - **Imbedded data within the Geographic Information System**
 - **VA report, imagery, etc., hyper linked to icons**
- **Information sharing with Japanese Prefectural Police, Regional MSA Headquarters & Regional JSDF**

Contingency Situational Awareness and Response

- **Coordinate reaction forces**
- **Coordinate area damage control assets**
- **“Drill down” to detailed base level tactical picture**
- **Near real time information sharing between Japanese Prefectural Police, Regional MSA Headquarters & Regional JSDF**



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Conceptual Solution

- **Distributed computing concept**
 - **Each computer is an independent node**
 - **Ring-Buffered Network Bus (RBNB)**
 - **All-Java-software data server**
 - **Makes the network appear to be, simultaneously**
 - **a shared-memory server**
 - **a data acquisition system**
 - **a distributed data base**



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Conceptual Solution (cont)

- **Geographic Information System (GIS) software package**
 - **Windows environment**
 - **User defined features**
 - **Flexible applications**
- **Sensor fusion at the lowest level**
 - **Inputs from base level contribute to a “bigger picture”**
 - **Everyone is a sensor contributing to situation awareness**



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Where Are We Going



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- ***An array of sensors capable of 360 degree environment awareness***
 - **Capable of terrain analysis (depth perception ?), weather analysis, threat analysis including chem/bio threats (nose ?), visual analysis of the area of regard (eyes ?), acoustic receptors (ears ?), capable of detecting motion (feeling ?).**
 - **Mobile (robotics, air-dropped, unmanned aerial vehicles?). Can operate while moving or static.**
 - **Sensor inputs provide the extended eyes and ears of the emergency response force.**



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Long range sensor capability

- **Satellite sensing capability - Chem/Bio threat detection**
- **Remote detection and assessment - NASA flies by a planet at 18000 miles and determines the content of the atmosphere**
- **Behavioral prediction capability - Who has the intent?**



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Wearable sensors

- **We rely on our senses to collect raw data that we compile, compare, distill and take action on**
- **The ability to extend the capabilities of our senses – sight, smell, touch, hearing, and even taste**
- **Transmitting the data in an uncompiled and a compiled form to another person, group, or to a C2 node**



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Distributed communications

- **The radio frequency spectrum is rapidly being overloaded and overtasked**
- **We're going wireless. Future efforts in this area should explore further dividing the spectrum to allow for wireless communications capabilities**
- **Hybrid wireless/internet capability**



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Virtual reality, immersive, 3-D display technology

- **Combined with extended sensors, and wearable sensor systems the operator will be presented with a virtual situation that accurately represents the situation on the ground**
- **Each sensor becomes an extension of the operator**
- **Enhanced sensory perception**



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Conclusion

The right information to the right person at the right time to make informed decisions is the essence of command and control.

The efforts underway at the Force Protection Battlelab are focused on exploring sensor fusion, data integration and presentation of information in a manner that supports the decision making process.

We look forward to working closely with our partners in industry to move forward in this promising area.



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