



# *Global Situational Awareness Tool (GSAT)*

*Application with*

*GeoReach*

**Steven Lufkin  
HQ AFSOC/CEV  
17 August 2004**



# **GSAT**

## ***Integrating to see the full Picture***

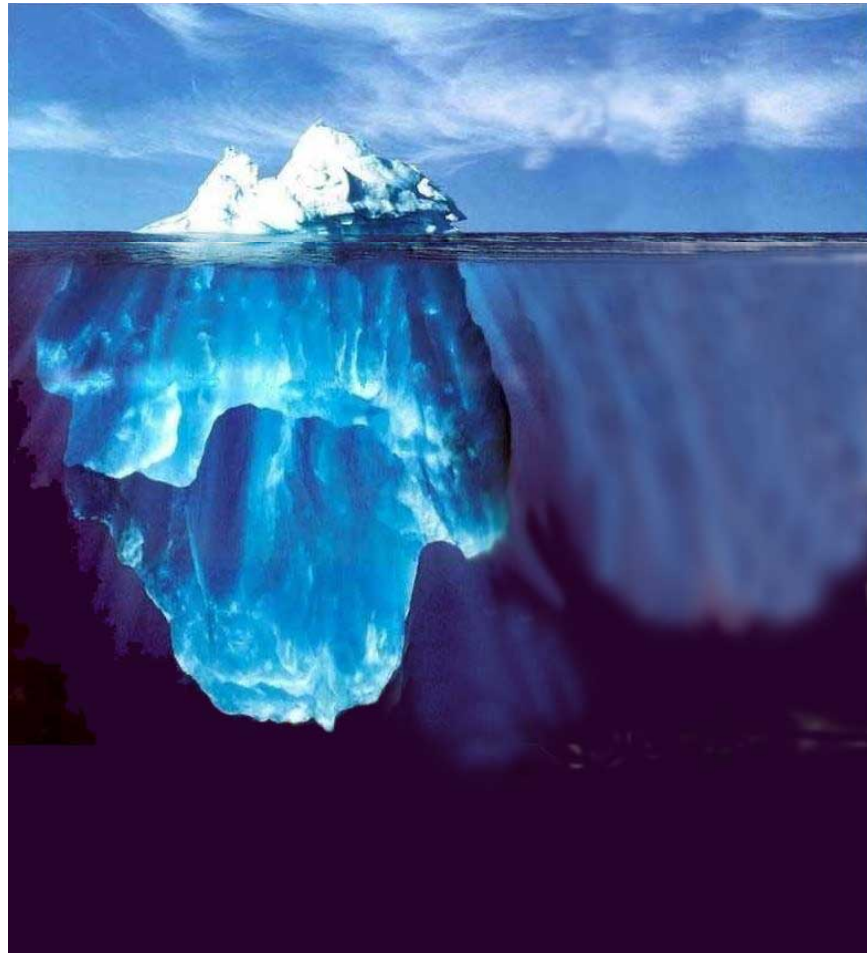
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### **Existing Site Planning Tools- GeoReach**

- Installation specific data
  - lack environmental risks
  - Smart-Maps of deployment location
- 

### **Global Situational Awareness Tool**

- Enhanced Situational Awareness
- Operational Risk Management
- Worldwide Analysis
- Site Selection
- Increased Coverage
- Crosses Functional Walls





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# ***Cross Functional Information***

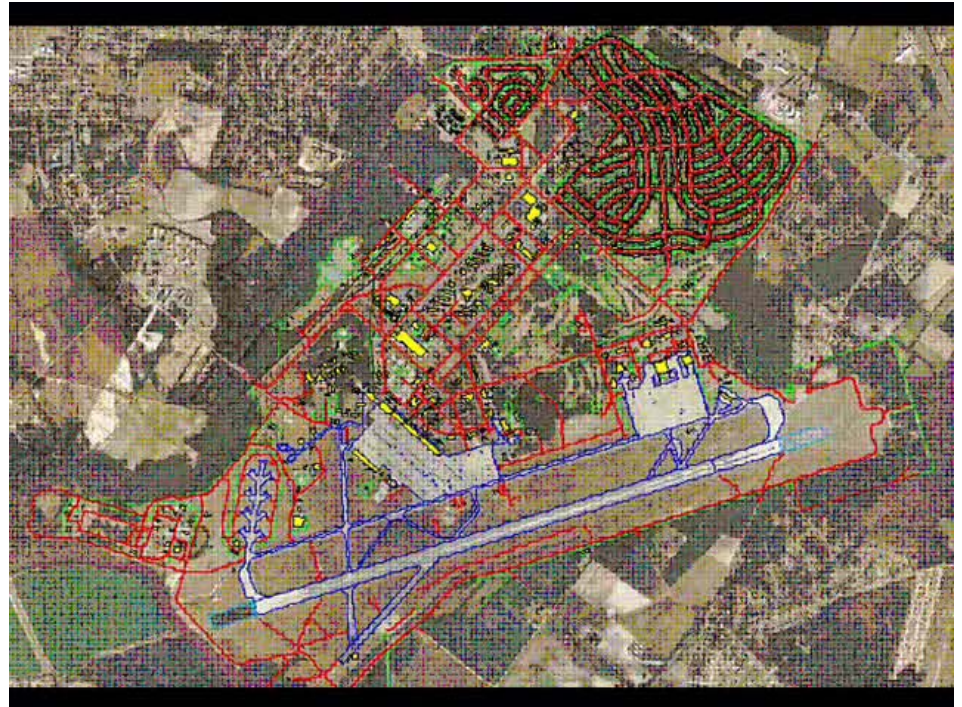
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# ***GeoReach Common Installation Picture (CIP) Extracts Features***

- **Imagery**
  - 1-meter
  - Commercial Satellite
  - Unclassified
- **Feature extraction:**
  - Airfield Surfaces
  - Buildings
  - Towers
  - Roads
  - Fuel Storage
  - Entry Control Points
  - Water Features
  - Munitions Storage
  - NAVAIDS







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*Tell GSAT where you are going...*



**GSAT**







# GSAT Overview

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- **GSAT is geo-spatial analytical tool developed by HQ AFSOC to determine operational and environmental safety and occupational health (ESOH) risks to forces in theater**
- **Satisfies HQ AFSOC and USAF requirements:**
  - **Deployed Environmental Monitoring and Hazard Mitigation, AFSOC-284**
    - **Processes, analyzes and fuses data intelligence and environmental products MC2.2**
    - **Formats and disseminates environmental products MC2.2**
    - **Assess & Plan for Environmental Affects MC3.2, MC3.3**
    - **Force Application-CSAR LZ location selection MC5.3**
  - **AFSOC MAP Medical Support Needs #269, 275, 276**
    - **Detect Health and CBRNE Threats MC7.1**
  - **AFSOC MAP Civil Engineering Needs #199, 232**
    - **Converts Raw data to usable information MC2.1**
    - **Communications- stores, retrieves, processes data MC4.2**
    - **Operating Location Assessments MC8.1**



# ***GSAT Core Competencies***

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- **Enhances AF core competencies:**
  - **Information Superiority**- Machine-to-machine interface of C2ISR systems through horizontal integration of manned, unmanned, air, surface, info
  - **Agile Combat Support**- ability to deploy with significantly reduced forward support footprint
  - **Homeland Security Task Force CONOPS**- **Real-time Medical Surveillance**-Need for integrated real-time medical threat, epidemiological, & environ. intel designed for force health protection...

**Follows USAF Transformational Flight Plan for Global Mobility  
and Agile Combat Support**

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# GSAT Analyzes

- Theater Imagery/Charts
  - NGIA any scale
  - Unclassified/classified
- Analyzes Features:
  - Soils
  - Pests
  - Diseases
  - Cultural
  - Industrial Risks
  - Floodplains
  - Wetlands

Summary Impact Report for AFSOC Missions and Activities

Mission ID 4-5-02 4/5/2002

Impacts to Mission

	base ops	Low level	ops area
3.1.1 TOPOGRAPHY	Y	Y	Y
3.1.2 GEOLOGY	G	G	G
3.1.3 SOILS	Y	Y	Y
3.2 NOISE	G	G	G
3.3.1 CLIMATE	Y	Y	Y
3.3.2 AIR QUALITY	G	G	G
3.4.1 GROUNDWATER	G	G	G
3.4.2 SURFACE WATER	R	G	G
3.5.1 STORAGE AND HANDLING AREAS	G	G	G
3.5.2 DISPOSAL	G	G	G
3.5.3 CONTAMINATED ITEMS	G	G	G
3.5.4 RANGES AND ORDNANCE	G	G	R
3.6.1 VEGETATION	G	G	G
3.6.2 TERRESTRIAL WILDLIFE	G	G	G
3.6.3 AQUATIC SYSTEMS	G	G	G
3.6.4 WETLANDS	Y	G	G
3.6.5 PROTECTED SPECIES	G	Y	Y
3.7.1 LAND USE	G	G	G
3.7.2 CULTURAL AWARENESS CONCERNS	G	G	G
3.7.3 ENVIRONMENTAL JUSTICE	G	G	G
3.7.4 TRANSPORTATION	G	G	G
3.7.5 CULTURAL RESOURCES	G	G	G
3.7.6 BASE		Y	Y
3.7.7 FLIGHT OPERATIONS		G	G
3.7.8 HEALTH AND SAFETY	G	G	G

TAMU85

Scale 1:111,666,402 86.48 64.22

Operation:

Add Delete

Coordinates:

Latitude: Longitude: Width: mi

Add Update Delete

Date of Operation:

Start Date: March 02 2004

End Date: March 16 2004

Start Zulu Time: End Zulu Time: Min. Flight Ele

Parameters:

Select UTC: Quantity:

Add Delete Modify

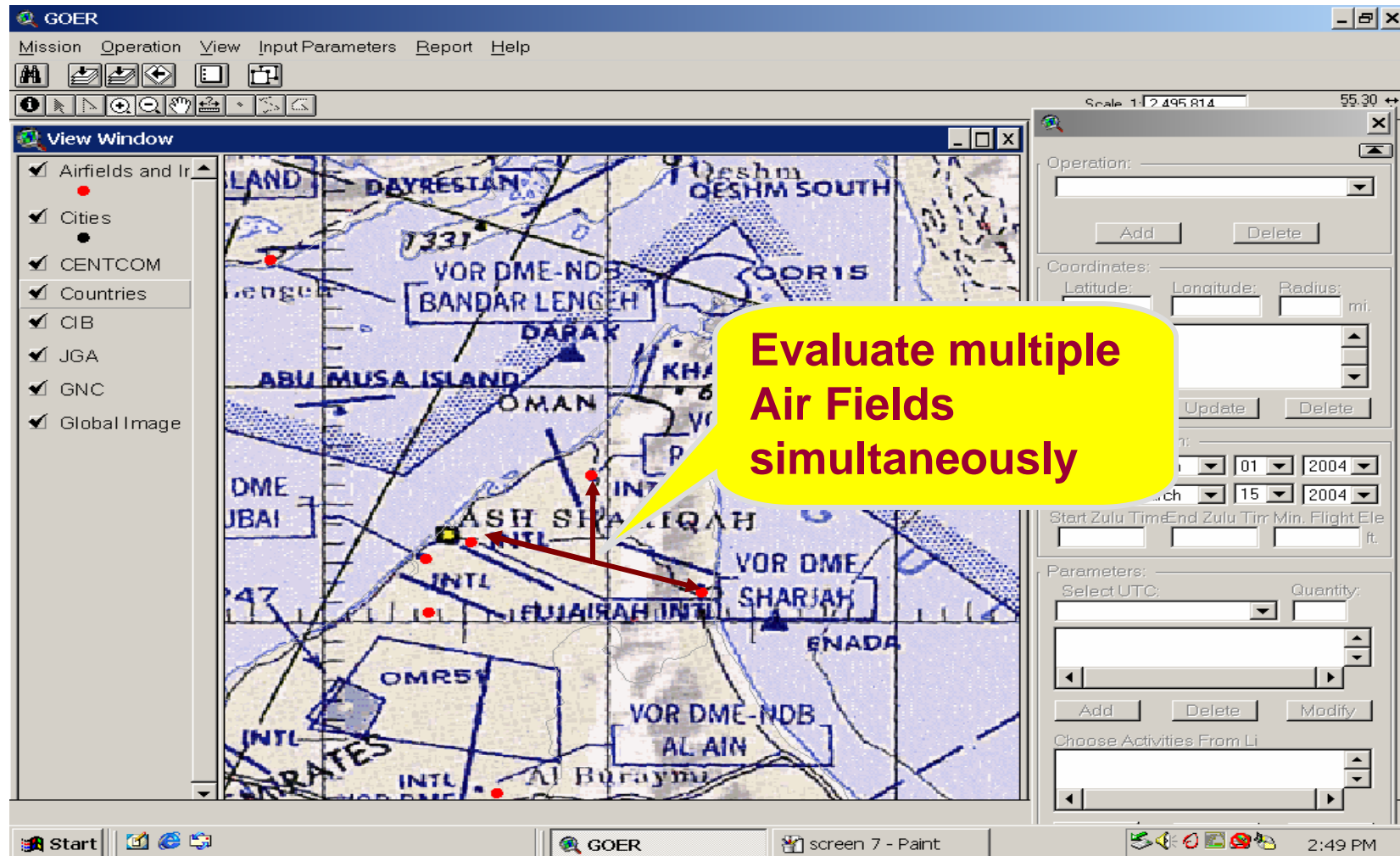
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# GSAT: Simultaneous Evaluations





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# GSAT: Simultaneous Evaluations

**Evaluate multiple sites not on Air Fields**



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# Imagery and Charts

GOER

Mission Operation View Input Parameters Report Help

Scale 1: 111,666,402 86.48 64.22

TAMUB5 ()

- ☒ Airfields and Ir
- ☒ Cities
- ☒ CENTCOM
- ☒ Countries
- ☒ CIB
- ☒ JGA
- ☒ GNC
- ☒ Global Image

TAMUB5

Operation:

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Coordinates:

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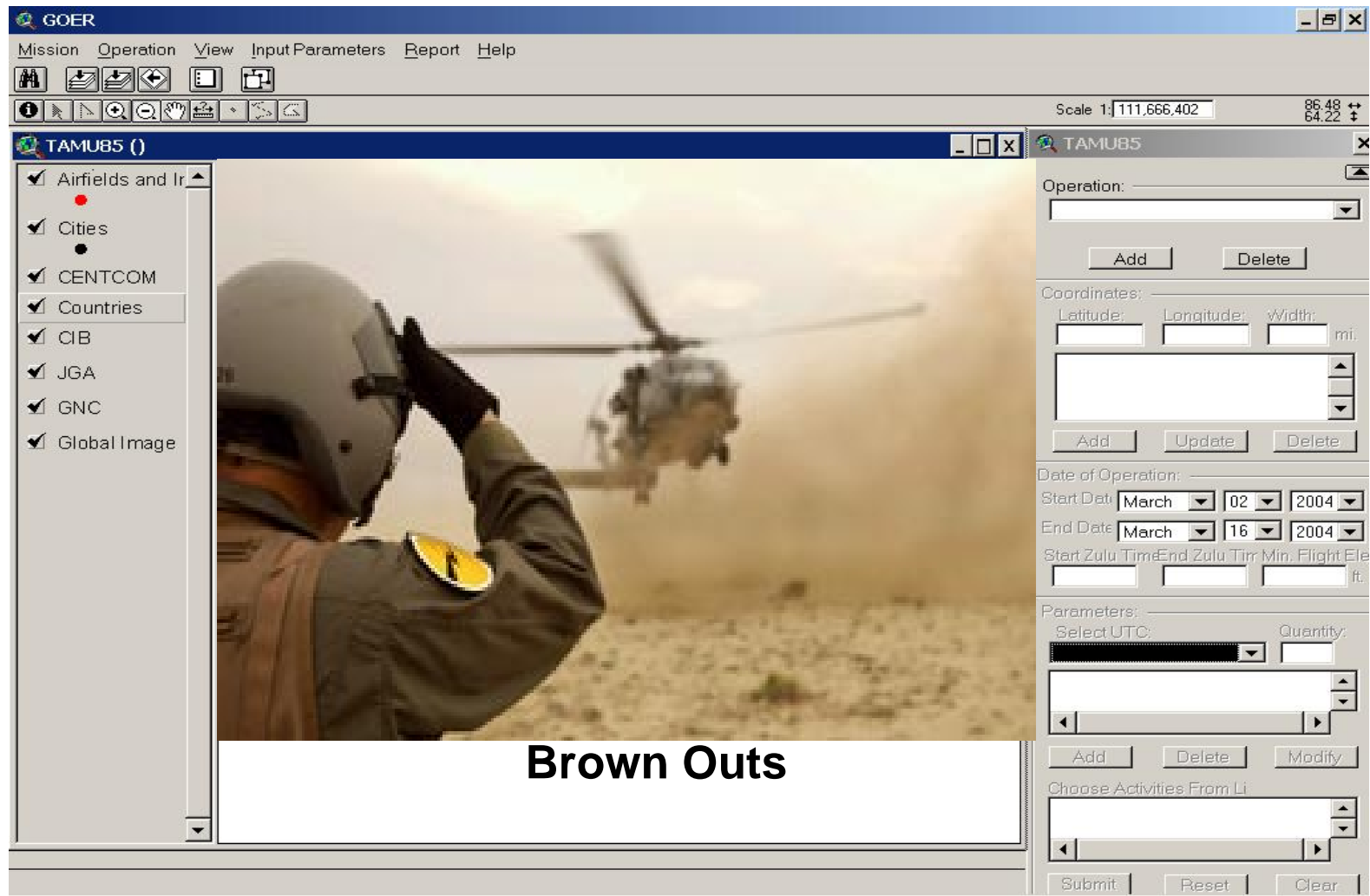
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# Operational Risk Management





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# Engineering: Bed Down

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### Soil Types

Soil Type	Description	Soil Texture	Family	Water Regime	Iron Content
<b>Operation Name: base ops</b>					
Low humus stony desert soils	Stony desertic (hamadas; regosols)	Sand and loamy sand, gravel and rock debris	Low-humus, desertic, sometimes strongly calcareous, and gypsiferous	Extremely non-percolative water regime	very low
Stony desert soils	Stony desertic (hamadas; regosols)	No soil texture (primitive soils and nonsoil areas)	No soil family (primitive soils, nonsoil areas)	No soil water regime (primitive soils and nonsoil areas)	non soil
<b>Operation Name: ops area</b>					
Calcareous alluvial soils	Alluvial, calcareous and solonchic (salic-calcaric fluvisols)	No soil texture (primitive soils and nonsoil areas)	Fluvial	Fluvial water regime	very low
Grey-brown calcic gypsum soils	Gray-brown desertic calcareous (calcic gypsisols)	Rock debris and stone	Low-humus solonchic, gypsiferous	Extremely non-percolative water regime	very low
Low humus stony desert soils	Stony desertic (hamadas; regosols)	Sand and loamy sand	Low-humus, desertic, sometimes strongly calcareous, and gypsiferous	Extremely non-percolative water regime	very low
Low humus stony desert soils	Stony desertic (hamadas; regosols)	Sand and loamy sand, gravel and rock debris	Low-humus, desertic, sometimes strongly calcareous, and gypsiferous	Extremely non-percolative water regime	very low
Primitive arid soils	In arid and semiarid regions (leptosols)	Rock debris and stone	No soil family (primitive soils, nonsoil areas)	No soil water regime (primitive soils and nonsoil areas)	low
shifting dunes	Nonsoil	No soil texture (primitive soils and nonsoil areas)	No soil family (primitive soils, nonsoil areas)	No soil water regime (primitive soils and nonsoil areas)	very low
Stony desert soils	Stony desertic gypsiferous (gypsic regosols)	Heterogeneous, frequently varying	Low-humus, desertic, sometimes strongly calcareous, and gypsiferous	Extremely non-percolative water regime	non soil
Calcareous alluvial soils	Alluvial, calcareous and solonchic (salic-calcaric fluvisols)	No soil texture (primitive soils and nonsoil areas)	Fluvial	Fluvial water regime	very low
Grey-brown calcic gypsum soils	Gray-brown desertic calcareous (calcic gypsisols)	Loamy sand and light loam	Low-humus solonchic, gypsiferous	Extremely non-percolative water regime	very low

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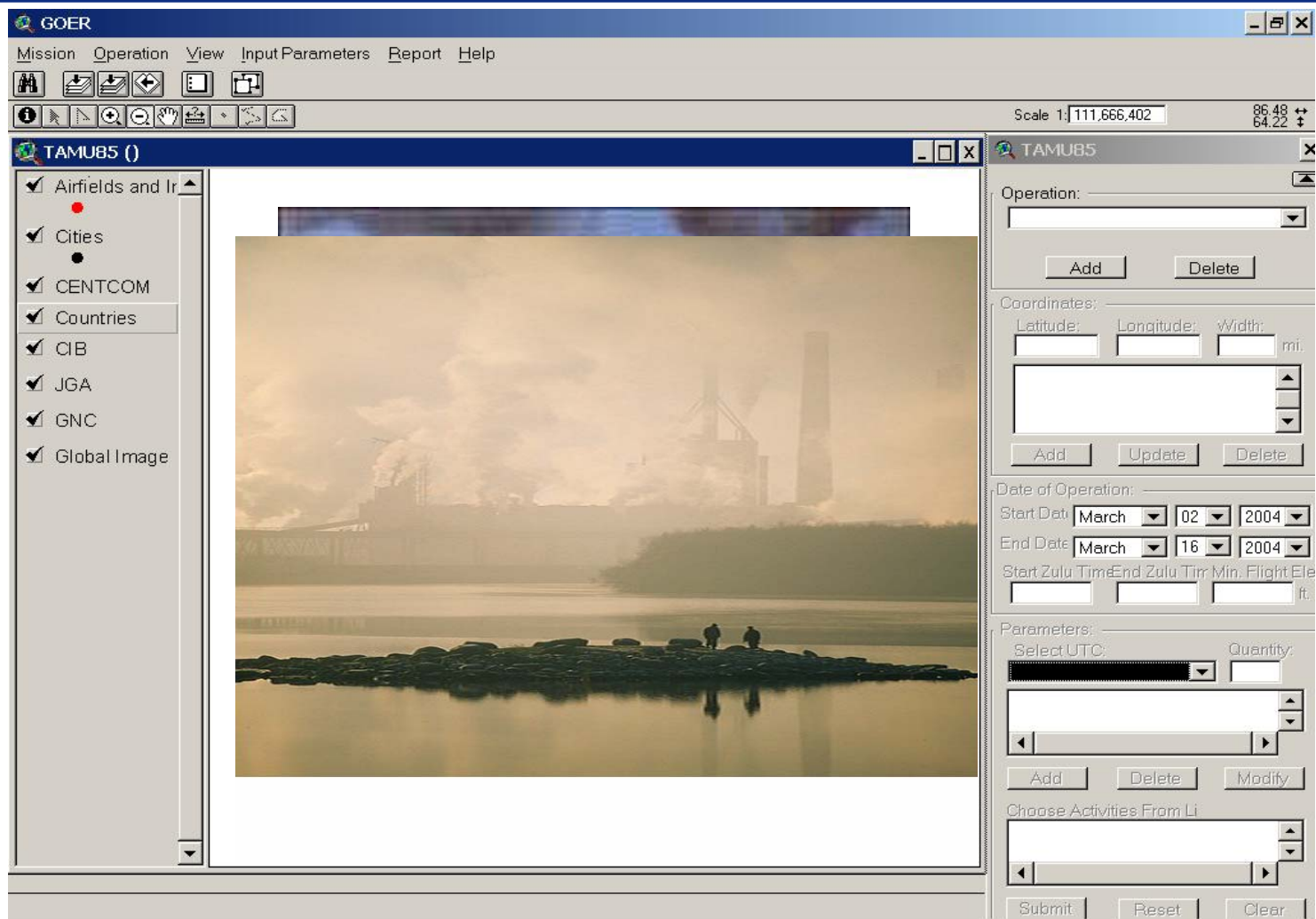
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**Extremely non-percolative water regime**



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# Industrial and Radiological Sites







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# Health and Safety: Dangerous Species



## Death Stalker

Operation Name: base ops  
Leiurus quinquestriatus

Death Stalker

This species grows up to 10 cm in length and is usually straw yellow to orangish yellow. It is very unique in that it has five keels on mesosomal tergites I-II. The remaining tergites III-VII have the typical Metasomal segment V i

Dry habitats desert areas on various substrate types (but not in sand dunes). Hides in small natural burrows, under stones

This one of the dangerous scorpions, with a very potent venom.

One of the world's most dangerous scorpions, with a very potent venom. Potentially deadly; only localized reactions occur in 97% of victims, but can be lethal in children

Naja haje arabicus

Arabian Cobra

Average length 4.9 to 5.8.2. Males have longer hoods are heavier than. Relatively large, 3 to 4 slender, glossy black co. Head small, flat

Operation Name: Low level  
Androctonus amoreuxi

Fat tailed scorpion

The terminal metasoma coloration and the metas



Plate 1. (A) Patient as first seen by me 4 days following severe envenomation by *Crotalus horridus*. (B) Six weeks after conservative care: sterile whirlpool treatment, Burrow's solution soaks, oxygen to the hand, painting of the wounds with triple dye (p. 317), and physical therapy. Patient regained full use of hand with only slight limitation of motion of thumb. (C) Finger as first seen 6 days following severe envenomation by *Crotalus viridis helleri*. (D) Finger 8 weeks later, showing bite area. (E) Ecchymosis and swelling 16 hours following bite by *Crotalus ruber ruber*. Cruciate incisions made by patient. (F) Serosanguinous and blood-filled blebs on arm at 4 days following bite by unknown rattlesnake. Note debrided areas painted with triple dye.

ially deadly.

f the world most rous species. It is known quite aggressive. ially deadly.

arly as venomous as A. lis or L. quinquestriatus tentially deadly.

rate Risk). Frequency of omation moderate; venom

cause death under certain ions. ially deadly.

dangerous North African species; subspecies in m France is much less





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# Health and Safety: Dangerous Species

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Hookworm infection

Infection with the human hookworm, an intestinal parasite of humans and the second most common human helminthic infection (after ascariasis).

Leprosy

Leprosy is a chronic infectious disease caused by Mycobacterium leprae, a rod-shaped bacillus. It mainly affects the skin, peripheral nerves, and mucous membranes.

Leptospirosis


Caused by the spirochete bacterium Leptospira interrogans. Transmitted by contact with contaminated freshwater, moist soil, or mud.

Myiasis

Infestation by fly larvae (maggots). Maggots invade body cavities, alimentary canal, mucous membranes, or open wounds. The maggots feed on the tissue.

O Fever

O fever is a zoonotic disease caused by Coxiella burnetii, a gram-negative bacterium. It occurs globally. Cattle, sheep, and goats are the primary reservoirs. The disease is characterized by a biphasic fever, with the first phase lasting 2-14 days and the second phase lasting 1-2 weeks. Symptoms include fever, headache, muscle pain, and sometimes pneumonia.



**Avoidance Strategies**

Vaccination against hepatitis B is not routinely recommended. Travelers can reduce risk by a vaccine. No vaccine is available for HCV. Risk can be reduced by avoiding risky sexual behavior, medical procedures, and blood transfusions.

Avoid bat and bird droppings. Use respiratory protection. Antimicrobial medications are used.

Wear shoes to prevent contact with larvae in contaminated soil. Avoid accidental swallowing.

Avoid infected persons.

Seek prompt medical attention if suggestive symptoms develop within the incubation period (in the case of leishmaniasis). Medical removal of larvae (improper removal can result in additional damage), proper cleaning.

Avoid consumption of local dairy products and contact with domestic animals, hides, and carca.

Avoid stray animals, especially dogs, and seek emergency treatment of any animal bite. Post-exposure prophylaxis.

Take precautions against louse bites. Tetracycline, erythromycin, and ampicillin are effective.

Take precautions against nighttime insect bites (sandflies bite at night). Use repellents on exposed skin.

Wear shoes to prevent infection; avoid contact with potentially fecally contaminated soil. Tetracycline, erythromycin, and ampicillin are effective.

**Sand Flies are a vector that transport Leishmaniasis disease**

Person to person

Contaminated media:

**Sand Fly Fever caused by Phlebovirus. Typically produces an acute fever lasting 2-3 days, typically accompanied by headache and muscle pain**

Contaminated media:

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# ***Cultural Awareness***

- **Ethnic population**
- **Language**
  - **Languages spoken**
  - **Predominant dialect**
- **Areas of cultural significance**
  - **Religious structures**
  - **Historical structures**
  - **Cemeteries**
- **Significant events**
  - **Religious event**
  - **National or tribal event**





# GSAT

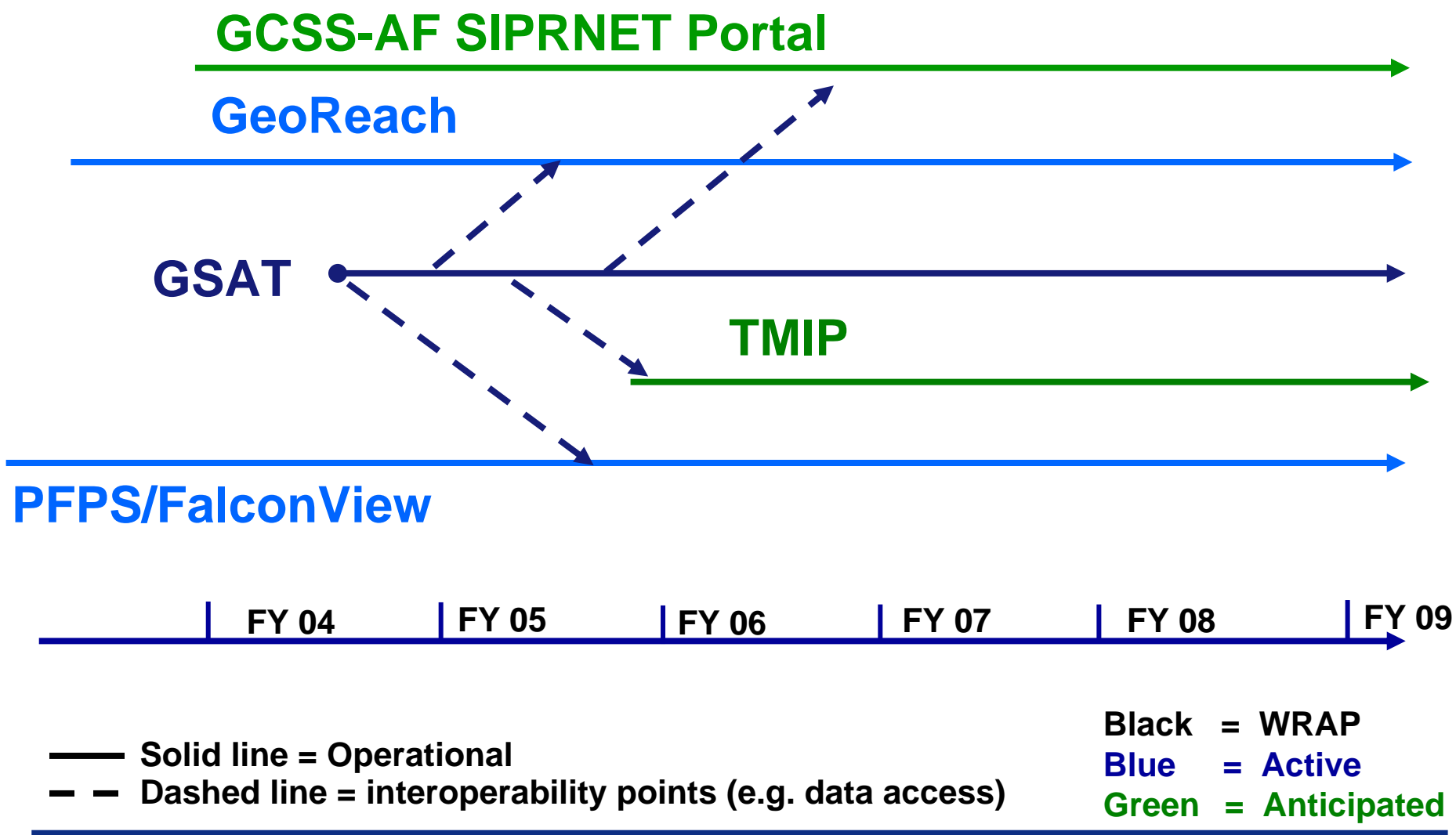
## *Concept of Operations*

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- **Plan operations, actions, or other activity that consider ESOH threats (mission impacts).** Operational planners may also use the force protection aspects to weigh operational risks at a site; develop mitigating alternatives to improve successful outcomes.
  - **Environmental Threat Planning-** assist in considering threats to the mission success from environment. Provides knowledge and facts to weigh risks and benefits of Ops.; make adjustments, or consult functional expert. Weather, flooding, soils, dangerous pests, landslides.
  - **Operational Medical Threat Planning-** identifies potential for endemic diseases, vectors, dangerous pests, health threats; suggests vaccinations, pest anti-venoms to pack for AO, advises pest control of specific pests.
  - **HAF/MAJCOM Program Managers-** evaluate merits of different proposals; conduct strategic analysis of program decisions; provide assurance of analysis.
  - **Deployed Personnel-** will ground truth data and feedback, evaluate/plan FOLs for risks, escape and evasion; LZ selection.
- **Warfighter shall access on both SIPRNET and NIPRNET plus stand alone PC.**



# GSAT Integration / Interoperability Roadmap







# ***GSAT Model***

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- **Included in GCCS CDD- Expeditionary Site Planning Process**
  - **Provides Global C2 System Roadmap**
  
- **Capabilities beyond what GeoReach provides today**
  - **Provides operations analysis capability of unit type code (UTC) equipment/unit employment, or mission employment, of location planning in general**
    - **244 COA arguments**
  - **Adds medical information layer**
  - **Adds environmental information layer**



# ***Why Integrate GSAT and GeoReach?***

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## **It's a Good Match!**

- **Future of Mission Planning**
  - Consolidate Resources
  - Broad & Deep Site Picture
- **Mission Planning Starting Point**
  - Situational Awareness
  - Mission Prep. and Planning
  - Trip-wire Eagle Look for Commanders
- **Share Infrastructure**
  - Complementary Not Duplicative Systems
  - AF Functionals Read From Same Sheet of Music
  - Increased User Base
- **Automated Operational and ESOH Risk Management**
  - Operational Deployment Planning merged with Surgeon and Preventive Medicine
  - Reduce Injuries, Illness, Hospitalization & Long-term Care
  - Reduce Patient Loading
- **Capitalize on Multitude of Existing Databases**
  - Mine Integrated databases
  - Web-based w/auto updates
  - Tailor to the Mission Needs, not Base Specific



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# ***Contact Information***

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