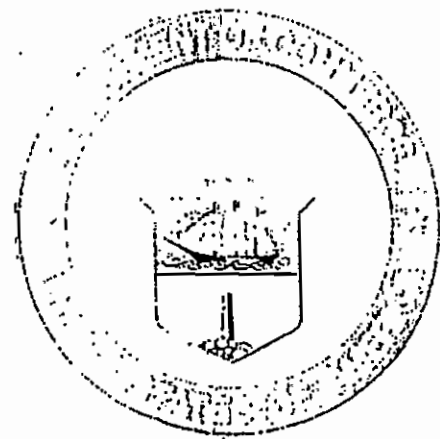
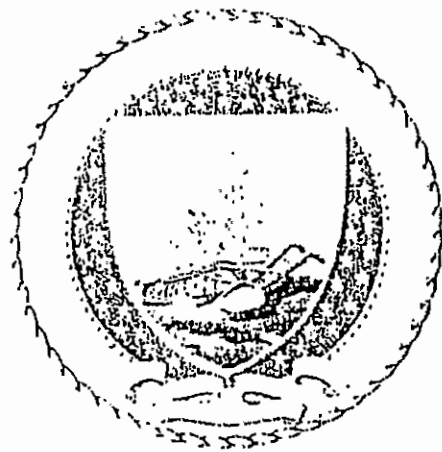




[ (b) (1) ] Satellite Support to  
National Fire Detection, Global  
Volcano Monitoring



## Background

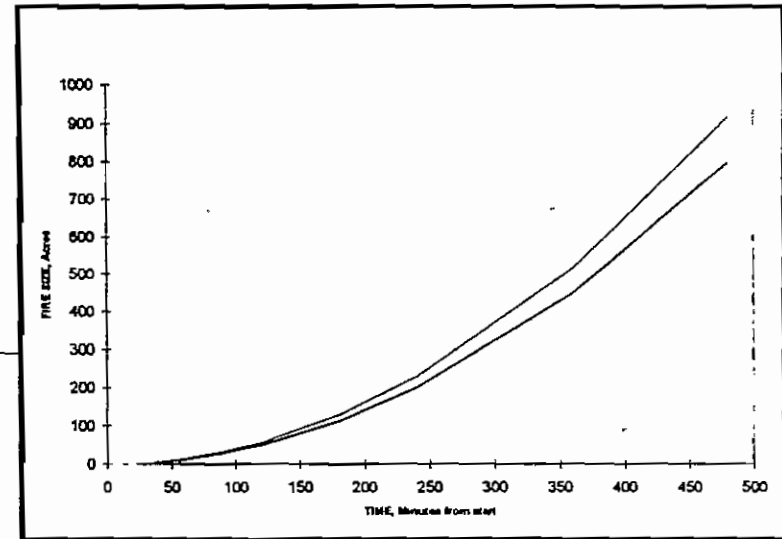
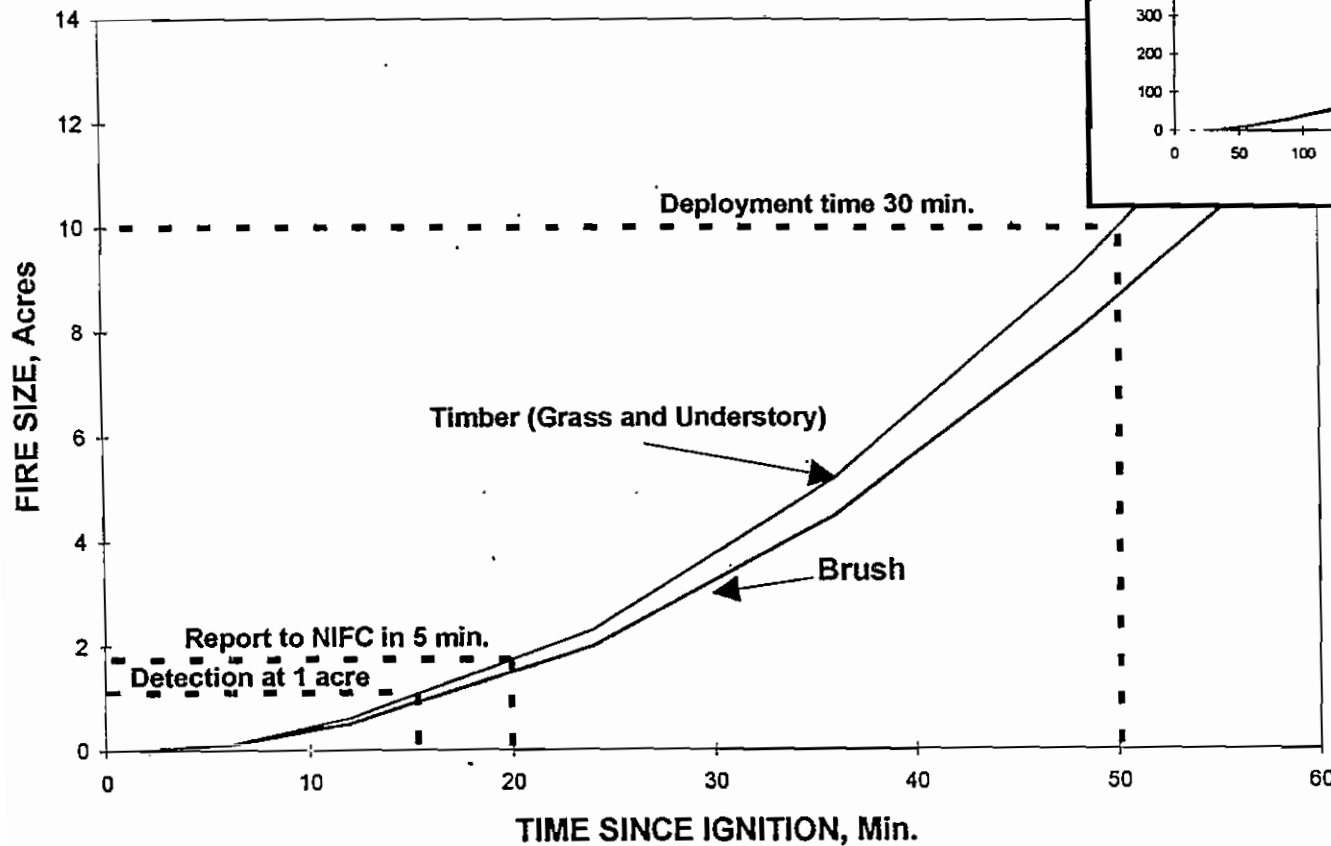
- America's wildland fire losses could be significantly reduced if the fires could be detected while they are still small enough to be quickly suppressed.
- The agencies of the fire community have estimated that if fires could be reliably detected and responded to while less than 10 acres in size then \$200M per year could be saved in fire suppression costs alone.

## Background (Cont.)

- Average USFS wildfire cost \$2.6M to suppress in 1994
  - not including value of lost timber
- The Departments of Interior and Agriculture spend more than \$600M annually to manage fires on Federal lands
- State and local wildland-fire suppression costs annually total in the tens of \$millions

# DETECTION AND REPORTING TIMELINE

## Nominal Wildfire Conditions

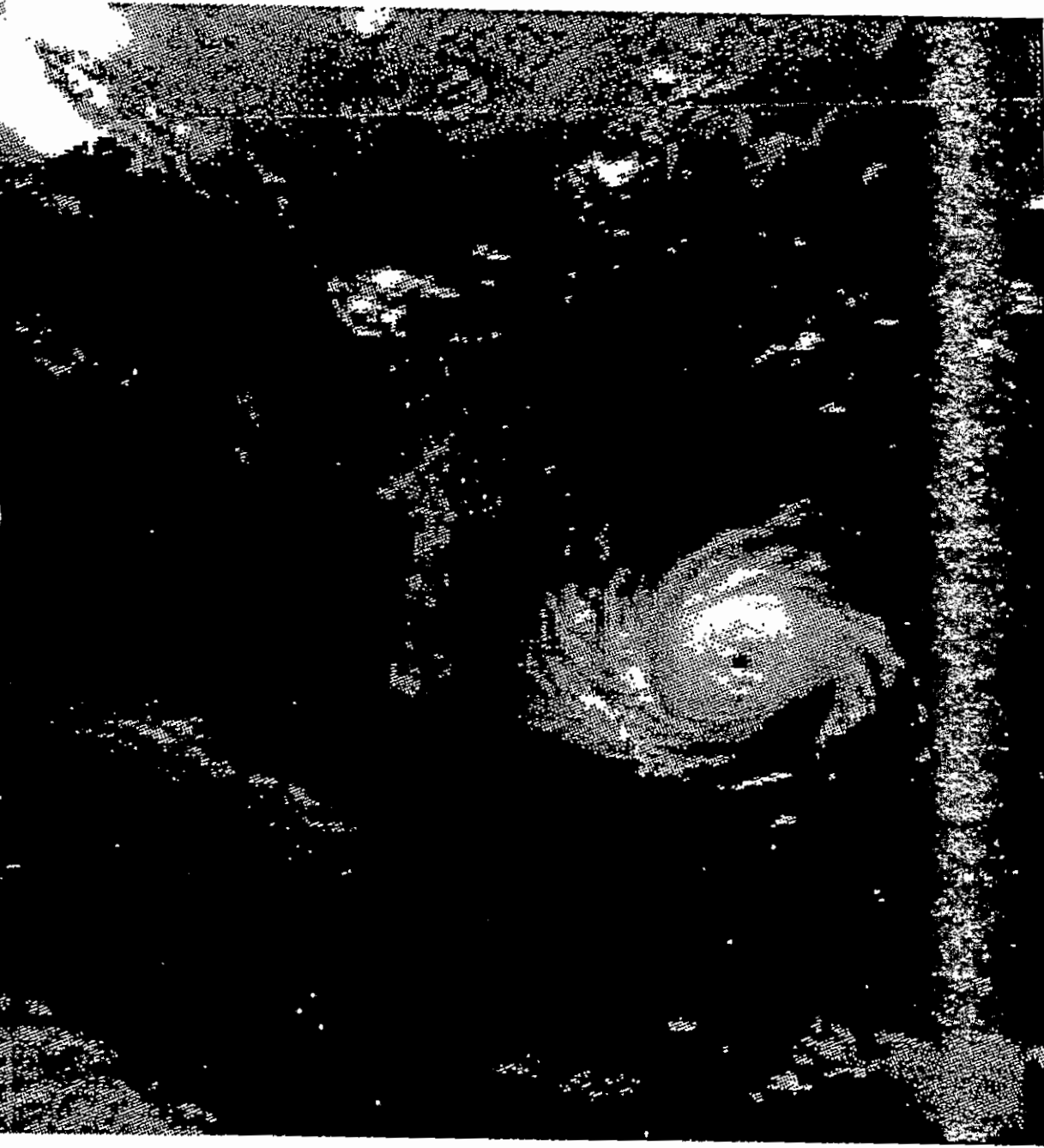


Wildfires detected and responded to while less than 10 acres can be suppressed quickly and at significantly lower cost.

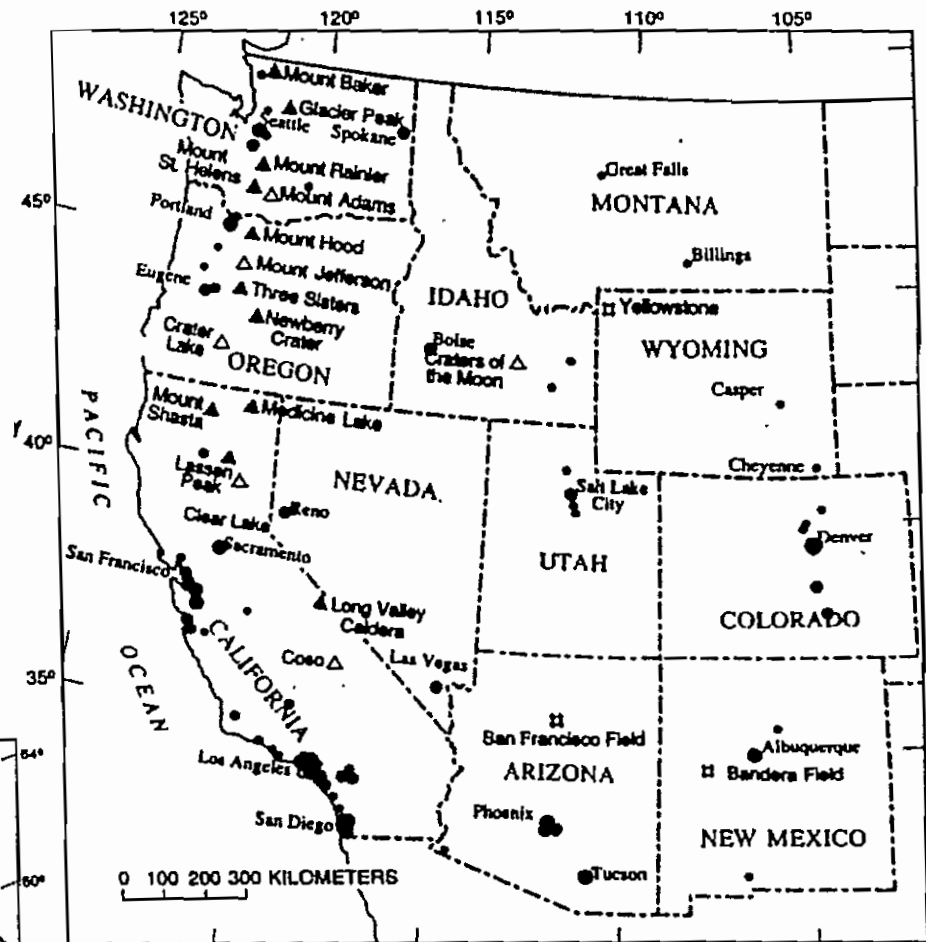
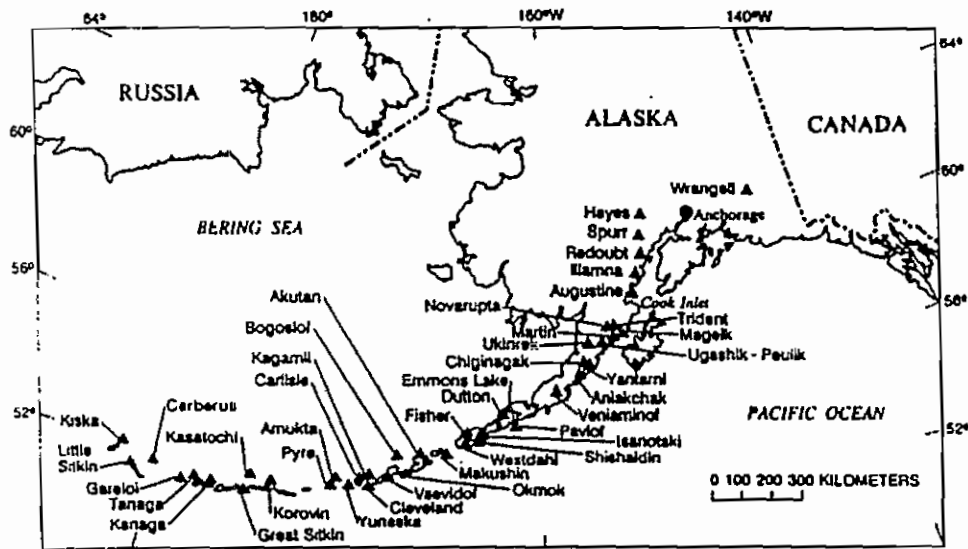
# Wildfire Detection Requirements

- **Coverage:**
  - Continuous coverage of CONUS, Alaska, and Hawaii
- **Minimum Threat:**
  - .25 acres in timber (40% obscuration)
  - 1 acre in grass
  - 2 acres in Alaska (all vegetations)
- **Reporting:**
  - Initial: not later than 5 minutes
  - Final: not later than 5 minutes after initial
- **Report parameters:**
  - location, absolute accuracy = 1 km.
  - time of detection
  - confidence of valid report
- **Probability of warning: 95%**
- **False Alarm Rate: <10% of reports**

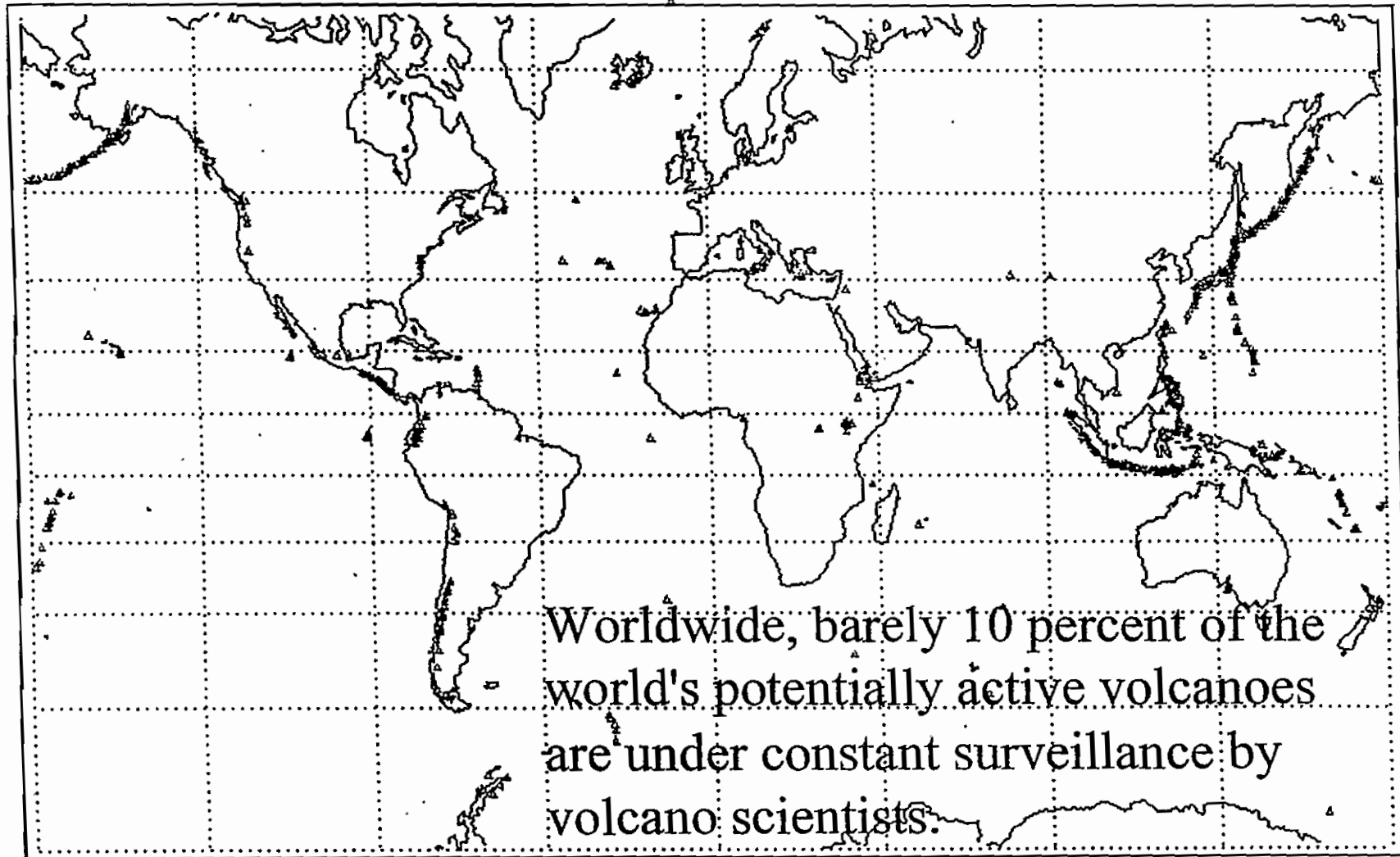
The remote detection of fires and volcanic activity could revolutionize understanding of wildfires and volcanoes as weather satellites did hurricane forecasting.



Currently, less than half of America's 65 potentially active volcanoes are monitored for signs of activity, most only for premonitory microearthquake activity.

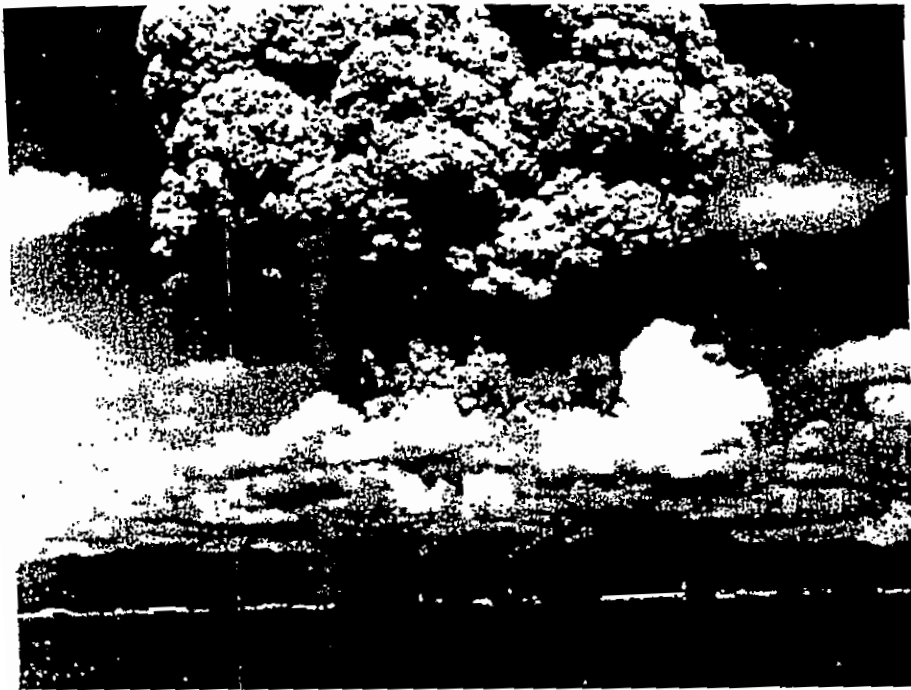


# The World's Most Active Volcanoes



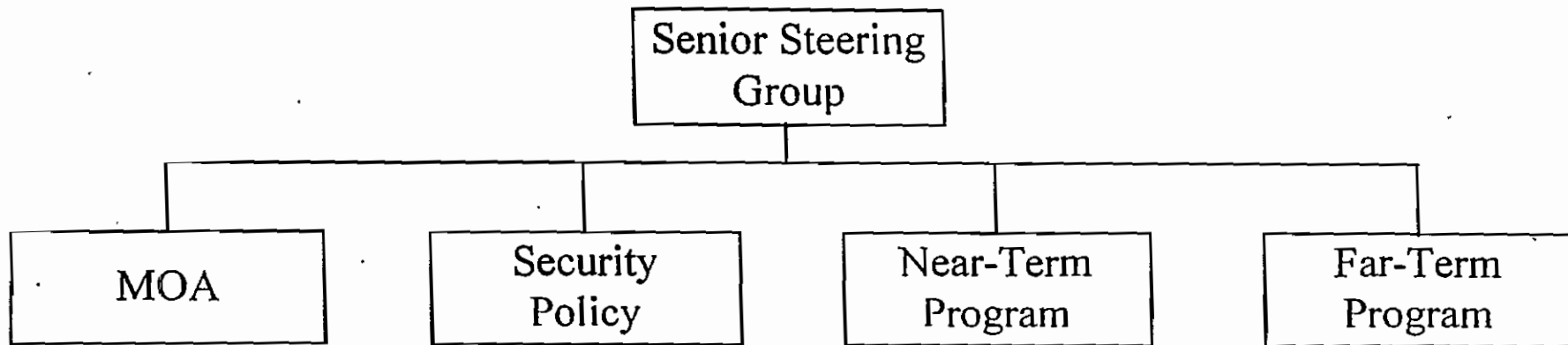


About 10 volcanic eruptions a year penetrate the altitude range of air traffic.



- Over 15 years, more than 80 jets have been damaged by ash clouds.
- 7 passenger airliners experienced loss of engine power, endangering more than 1,500 passengers.
- Repair and replacement costs as of May 1994 have exceeded \$200 million.

# Interagency Process



Participants: National Security  
Deputy Under Secretary of Defense (Space)  
Department of the Air Force  
National Reconnaissance Office  
Central MASINT Office

Civil Agencies  
U.S. Geological Survey  
National Oceanic & Atmospheric Agency  
Bureau of Land Management  
U.S. Forest Service

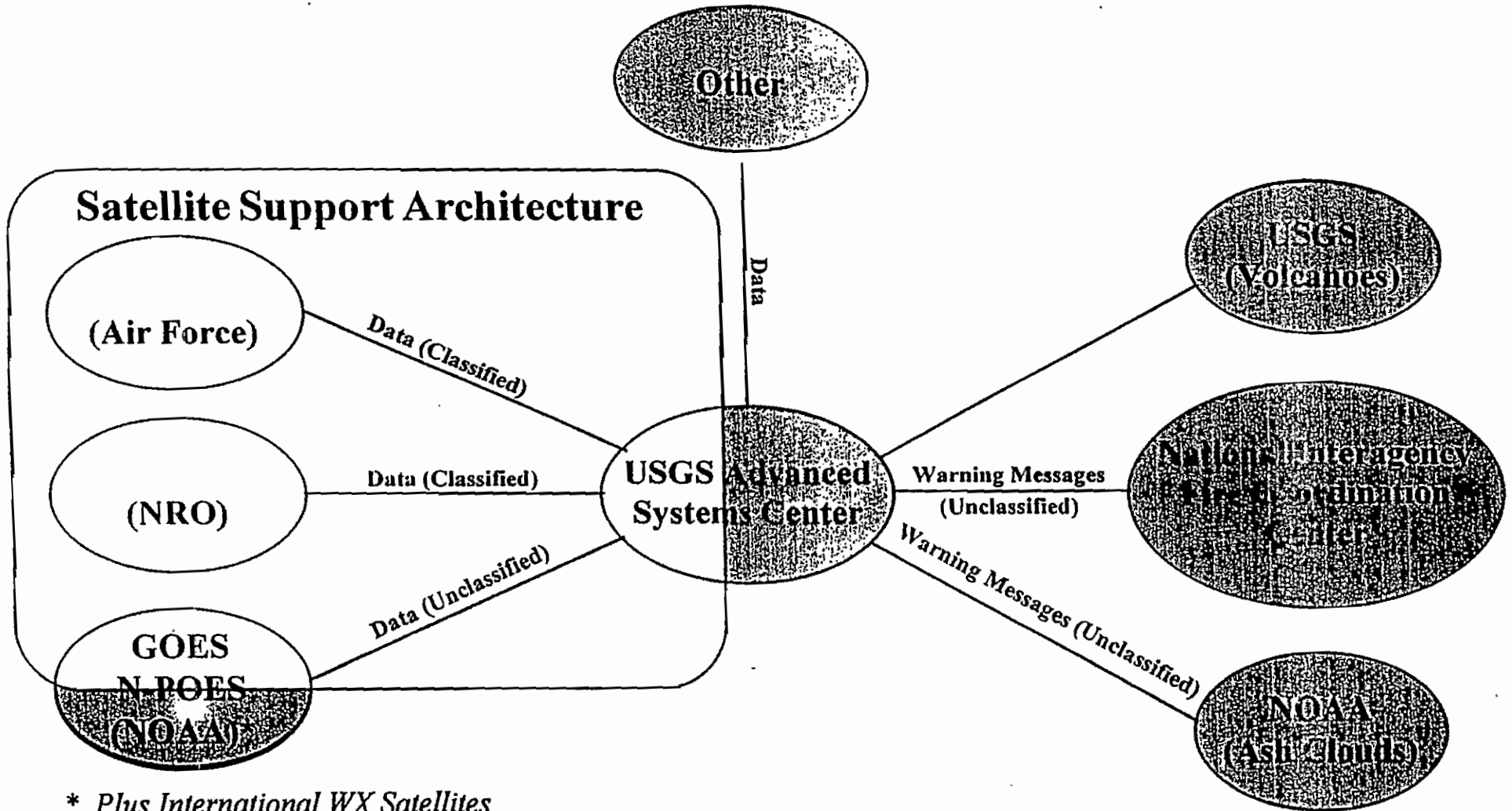
National Aeronautics & Space  
Administration

# Program Evolution

Prototype Operations FY 99   FY 00	Demonstration/Validation FY 97   FY 98	Concept Development FY 95   FY 96
	• Needs Document • Architecture Design • Costing • Implementation Schedule • CONOPS • Security Plan	SERDP (\$135K) MEDA (\$760K) NRO (\$350K)
Civil - Funded	DoD - Funded	Multi-Agency Funding

- The Demonstration/Validation Phase will deploy an operationally-configured prototype architecture to demonstrate utility to users

# Architecture



\* Plus International WX Satellites