Current Status of NOAA's Profiler Network and its Likely Future Evolution

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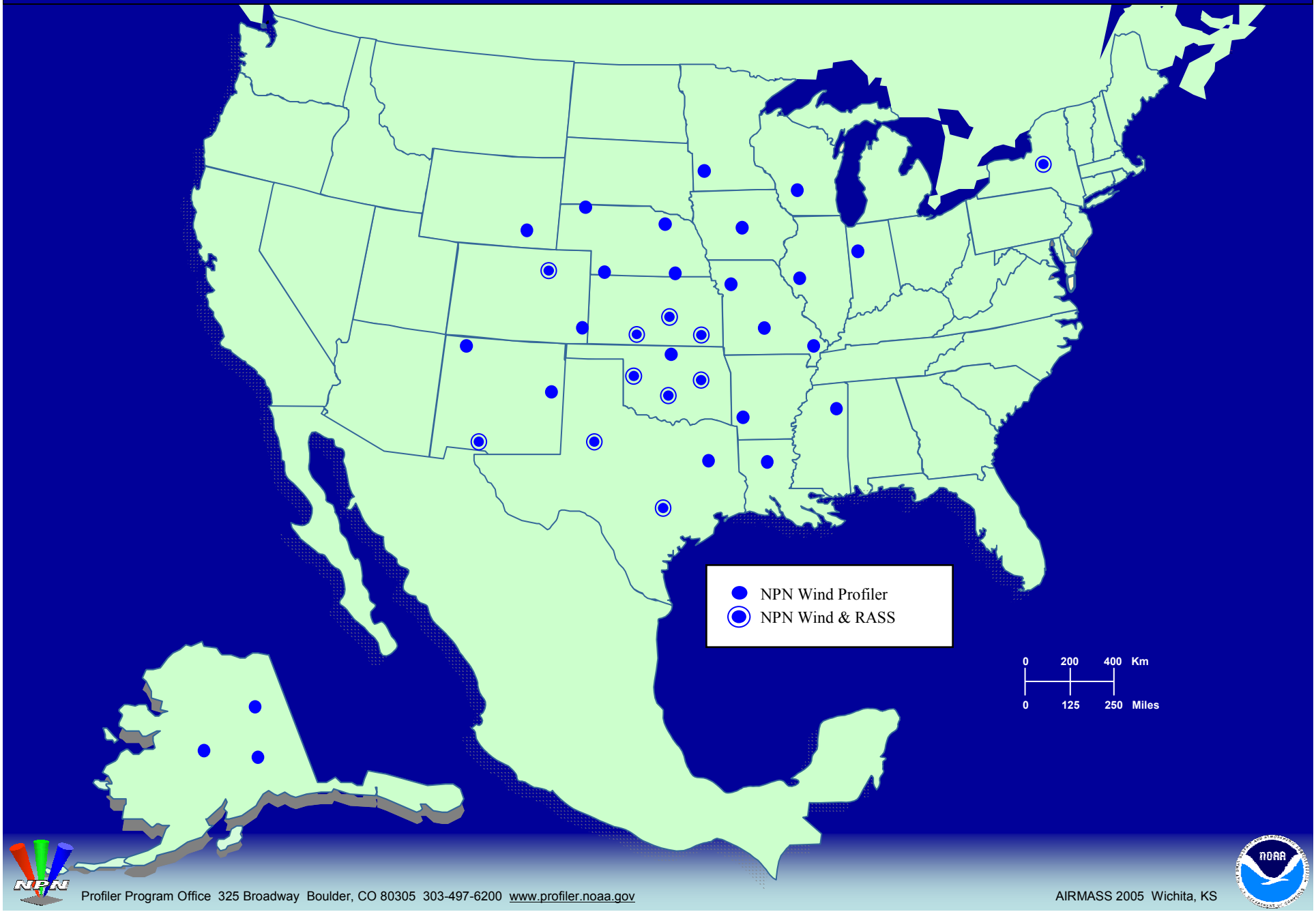
www.profiler.noaa.gov

NOAA Profiler Network



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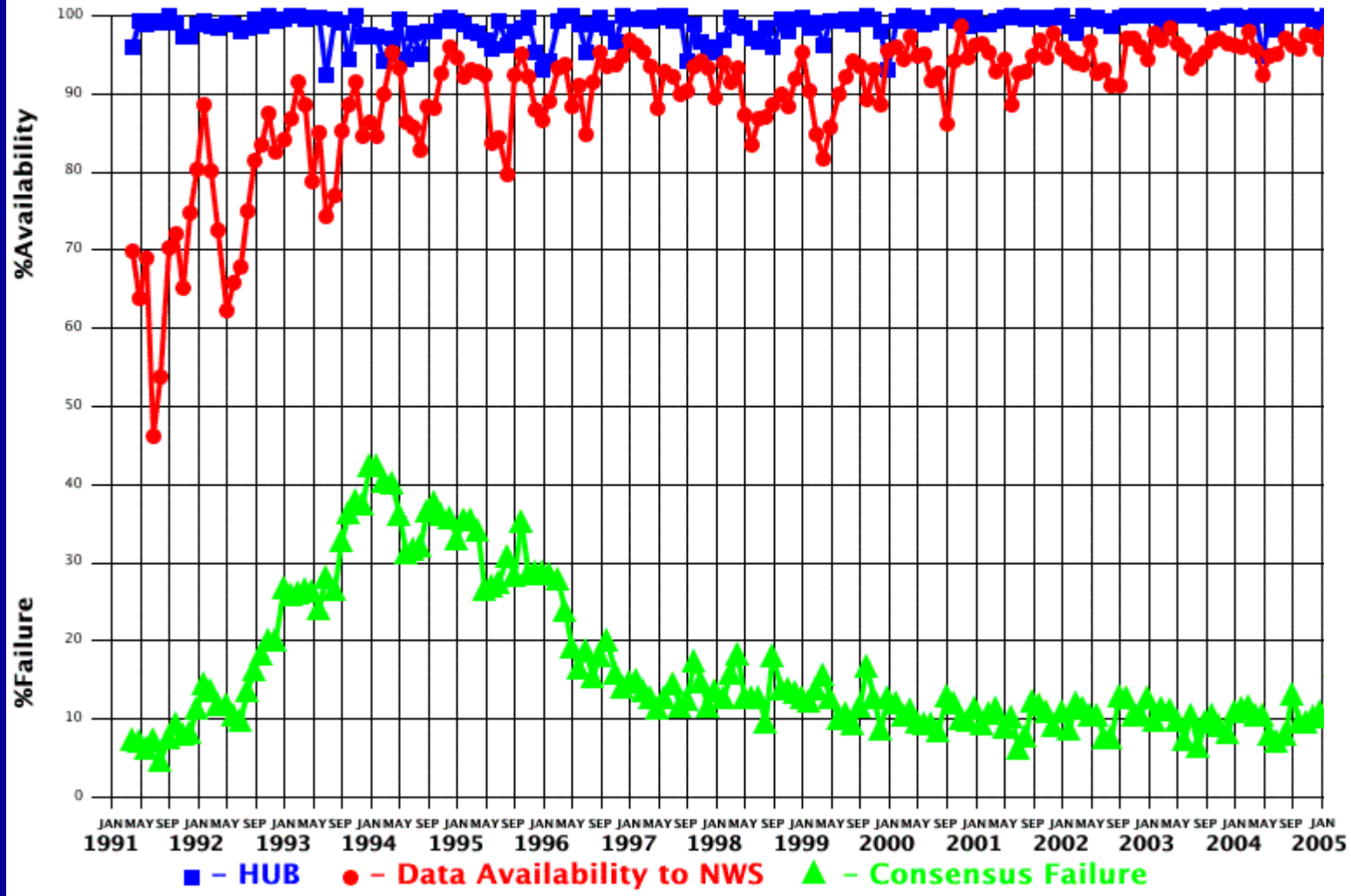
AIRMASS 2005 Wichita, KS

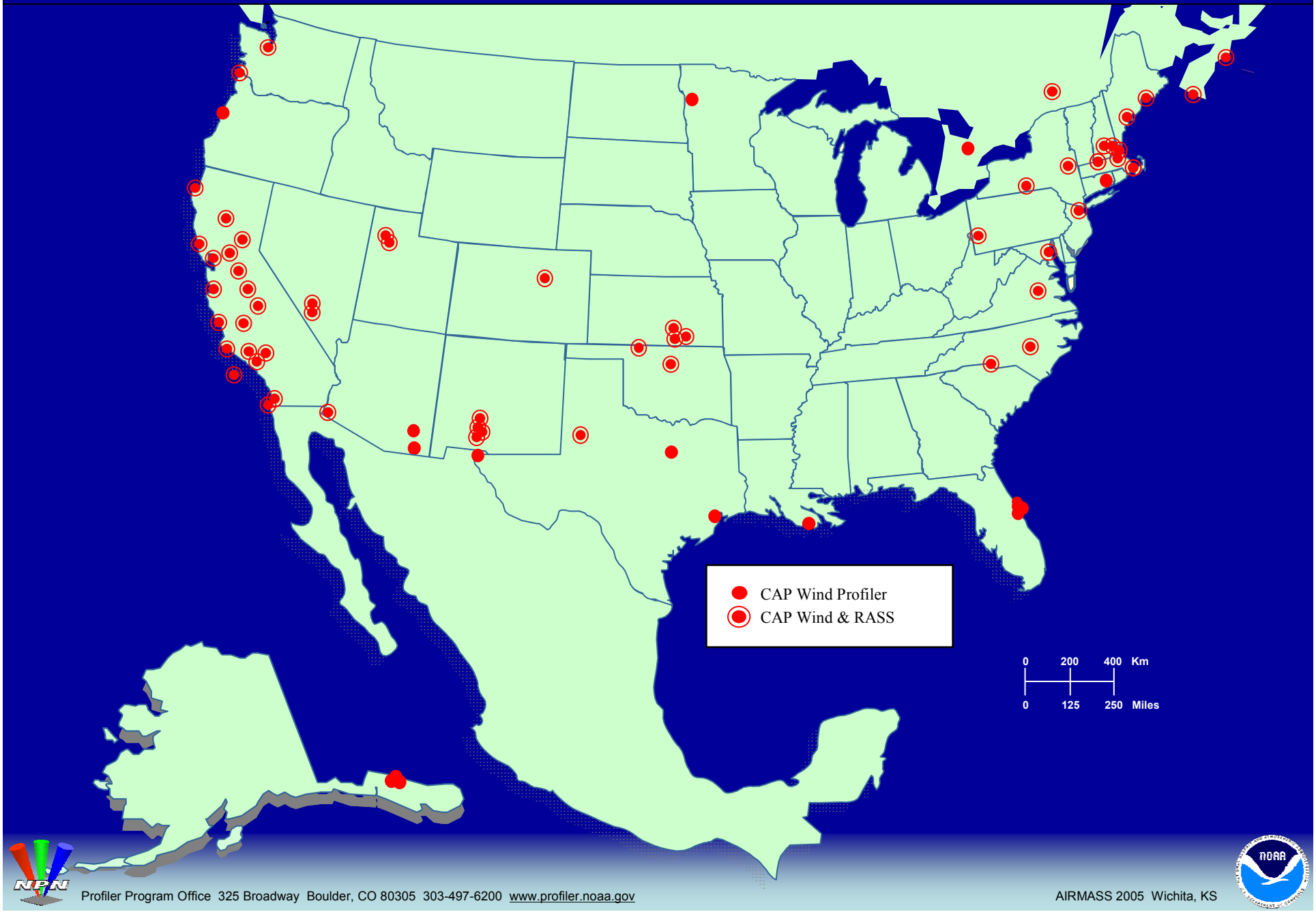
McPherson
Galva
Hillsboro
Marion
Cedar Point
Goessel
Inman
Moundridge
Peabody
Hesston
Burrton
Walton
Burns
North Newton
Elbing
Halstead
Whitewater
Potwin
Haven
Bentley
Mt Hope
El Dorado
Andale
Colwich
Maize
Park City
Benton
Towanda
Bel Aire
Andover
Augusta
Wichita
Hillsboro, KS - February 11, 1991

NOAA Profiler Network

404 Profiler Data Availability



Cooperative Agency Profiler Network



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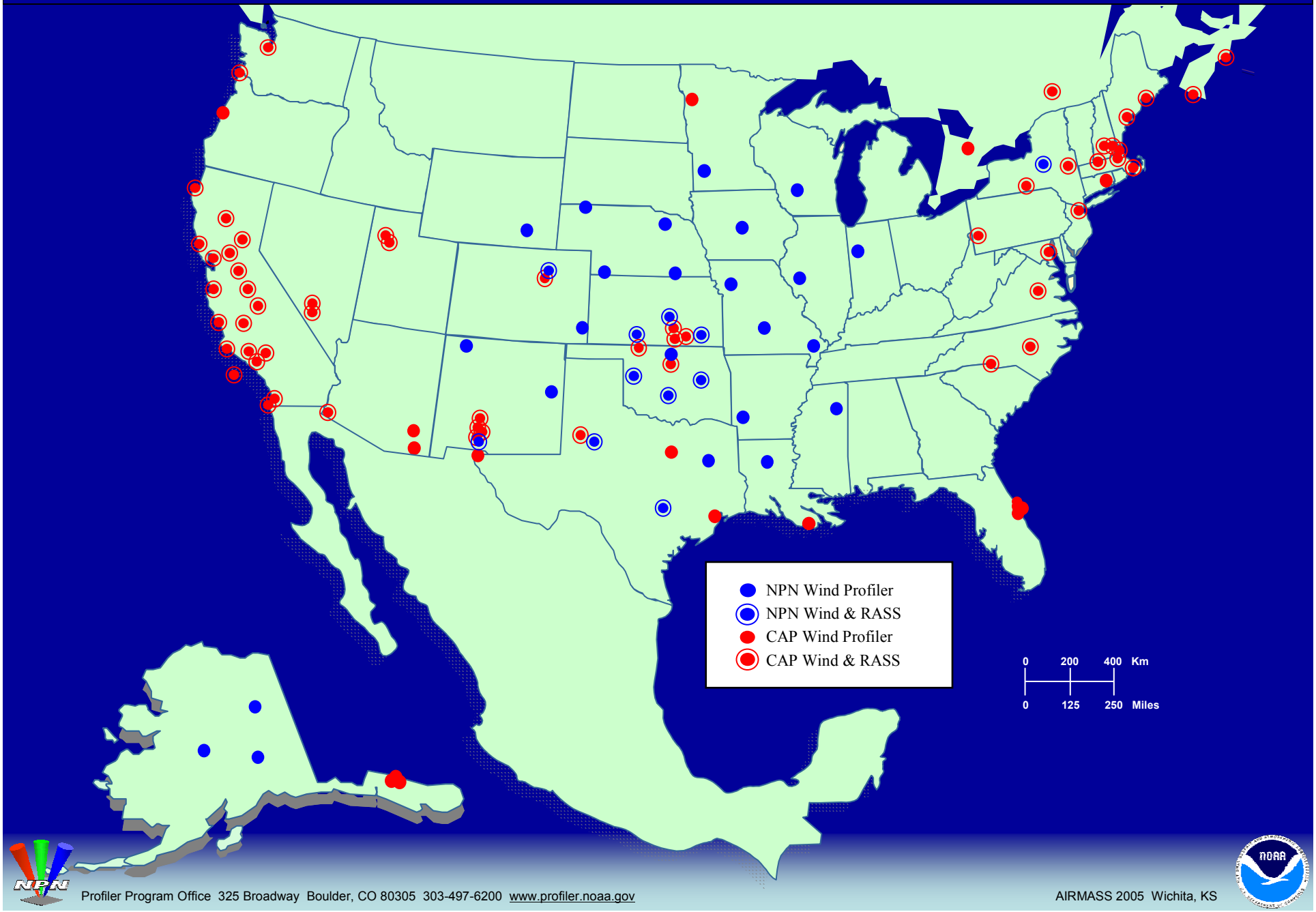
NPN and CAP Profiler Locations



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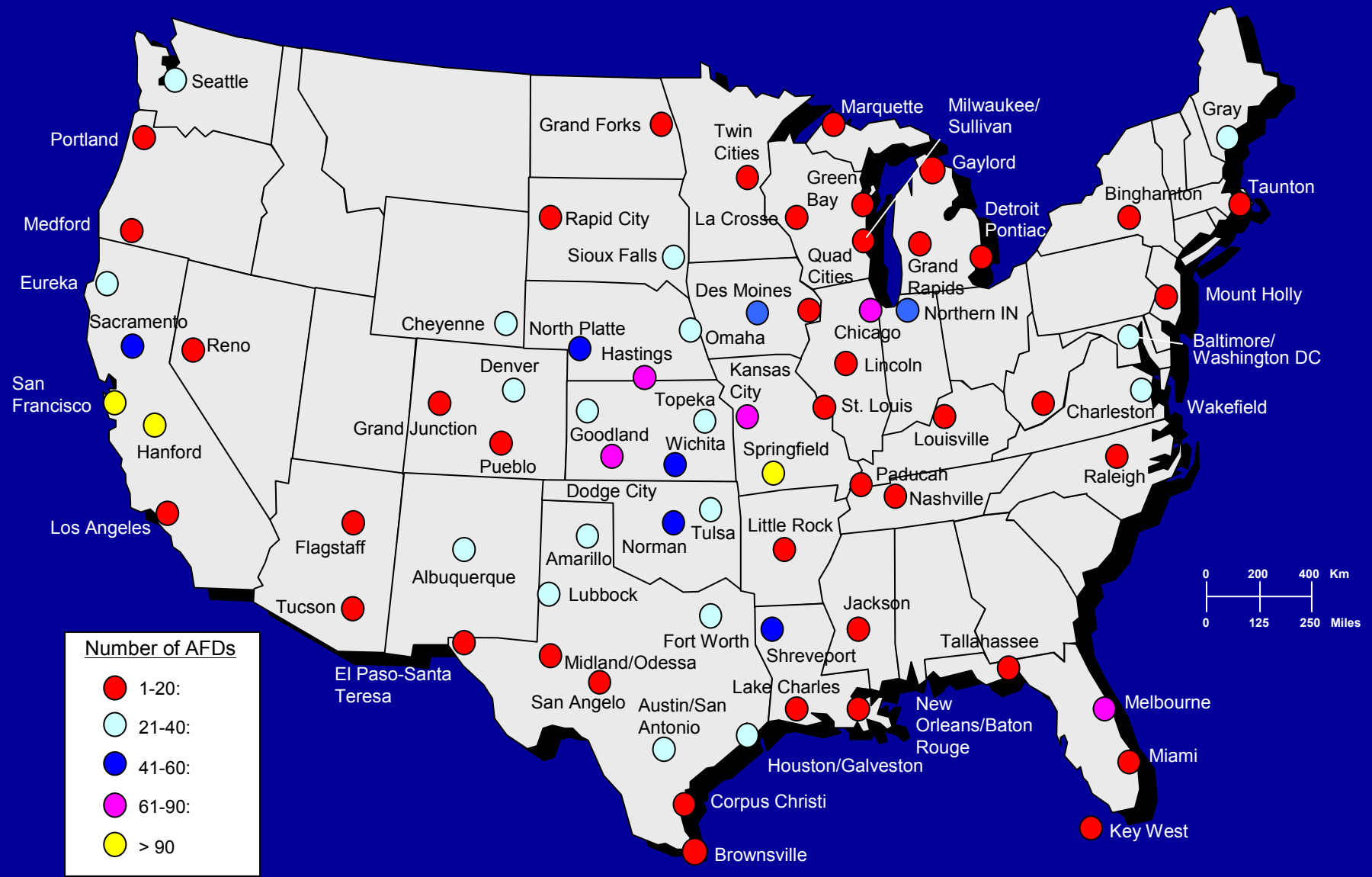
NWS Offices Identifying Use of Profiler Data in their Area Forecast Discussions
6 January 2003 – 5 January 2004



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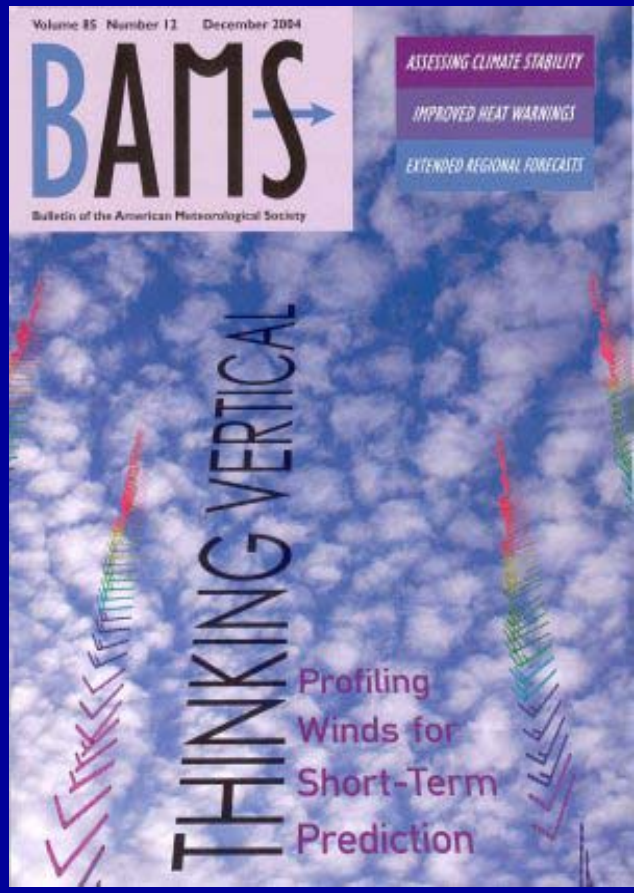
Recent Milestones



- *Commenced planning for transition to the NWS*
  - *NPN as an commissioned, operational system(?)*
- *Completed Cost and Operational Effectiveness Analysis (COEA) at the request of Congress*
  - *"NPN superior to other wind detection systems in meeting NWS mission goals for short-range forecasting, watches, and warnings."*
- *Initial Stages of Defining a National Profiler Network*
  - *A Component of NOAA's Integrated Upper-Air Observing System*
  - *Profiler horizontal spacing, vertical height coverage and vertical resolution*

The Frequency Issue

- *Limitation of the current NPN becoming operational is its transmitter frequency (404.37 MHz)*

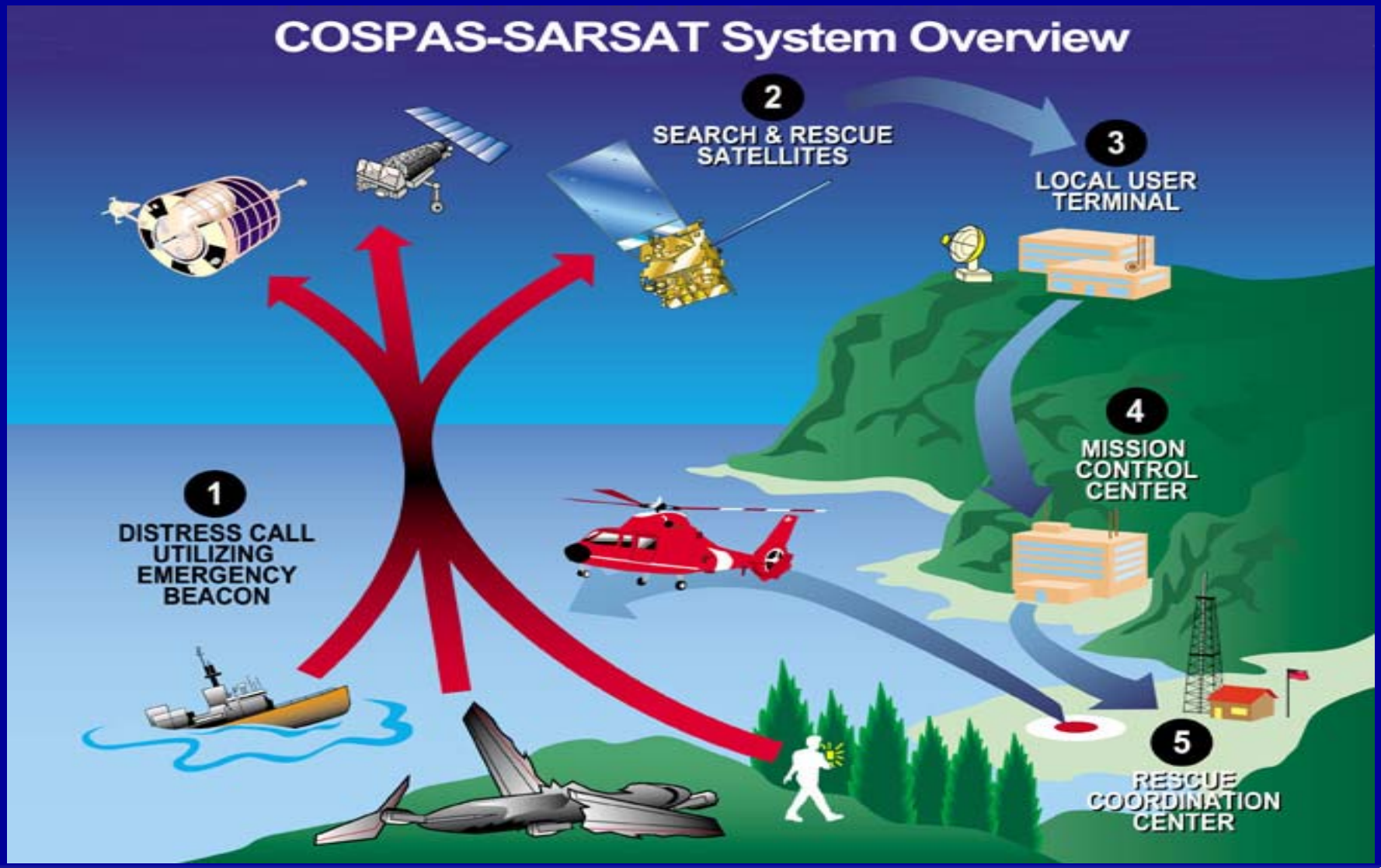
  - Profilers interfere with Search And Rescue Satellite-Aided Tracking (SARSAT) system (operates at 406.05 MHz).

  - SARSAT, and its Russian counterpart, COSPAS, are an operational, international search and rescue program.

  - Peaceful co-existence for the past 10+ years (no interference problems to the 6 satellites), with minimal impact to NPN data.

  - Possible serious problem ~2008 as next generation GPS satellite constellations become operational, with ~60 satellites carrying SARSAT receivers.

  (New European 'Galileo' constellation of ~30 satellites plus U.S. replacement 'GPS III' constellation of ~30 satellites.)


COSPAS-SARSAT System Overview
2
SEARCH & RESCUE SATELLITES
3
LOCAL USER TERMINAL
4
MISSION CONTROL CENTER
1
DISTRESS CALL UTILIZING EMERGENCY BEACON
5
RESCUE COORDINATION CENTER

- *The Solution; change the profiler's transmitter frequency from 404.37 to 449.0 MHz. (NTIA designated 449 MHz as the protected profiler operational frequency.)*

Two possible approaches for the NPN:

1. *Change only frequency dependent hardware (antenna, transmitter and receiver).*

    - Maintains availability at minimum cost.

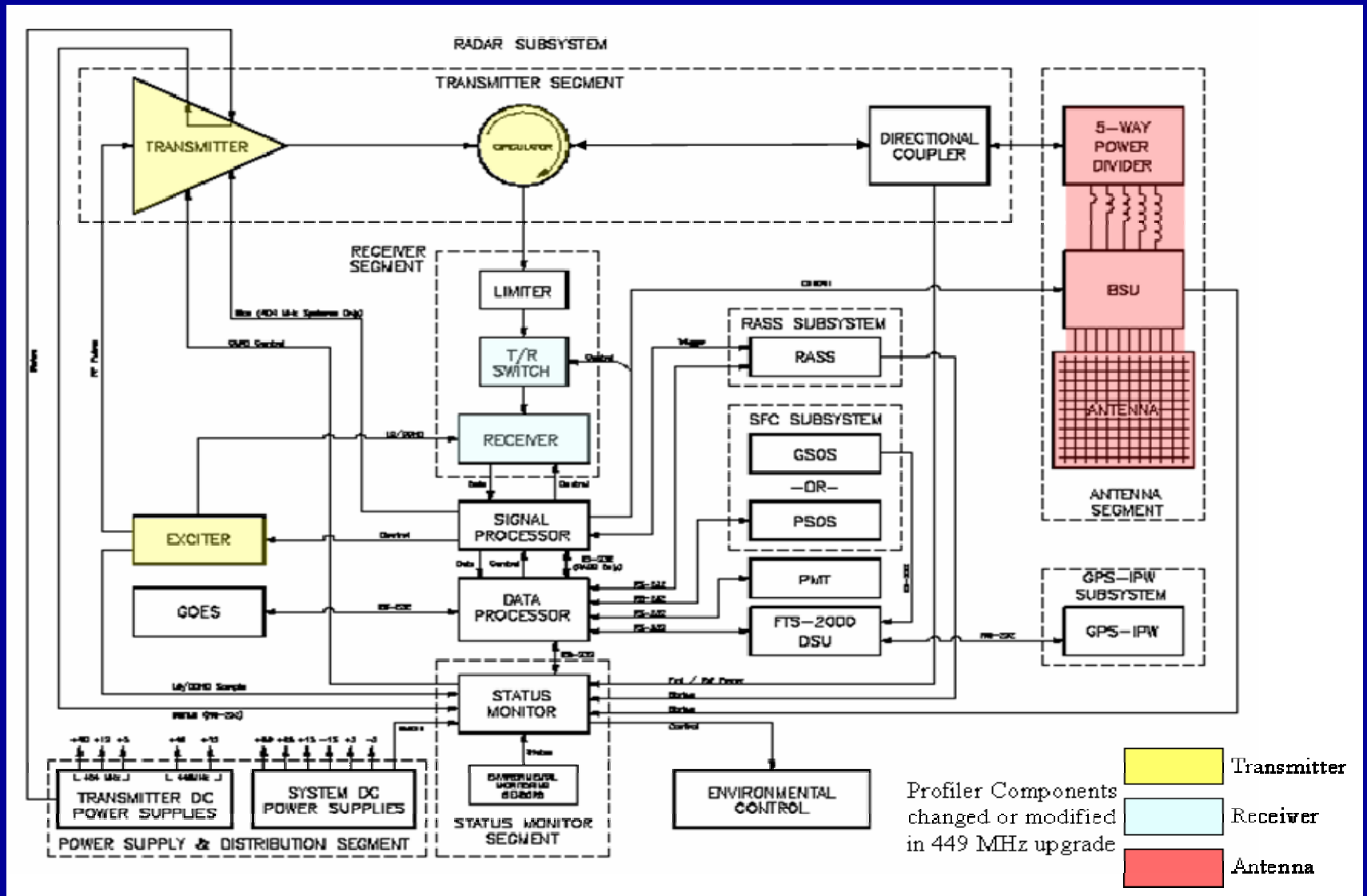
    - Maintains existing data processing system.

2. *Replacement of all existing hardware, and populate the entire country with the "Next Generation Profiler".*

    - Takes advantage of modernized hardware and signal processing.

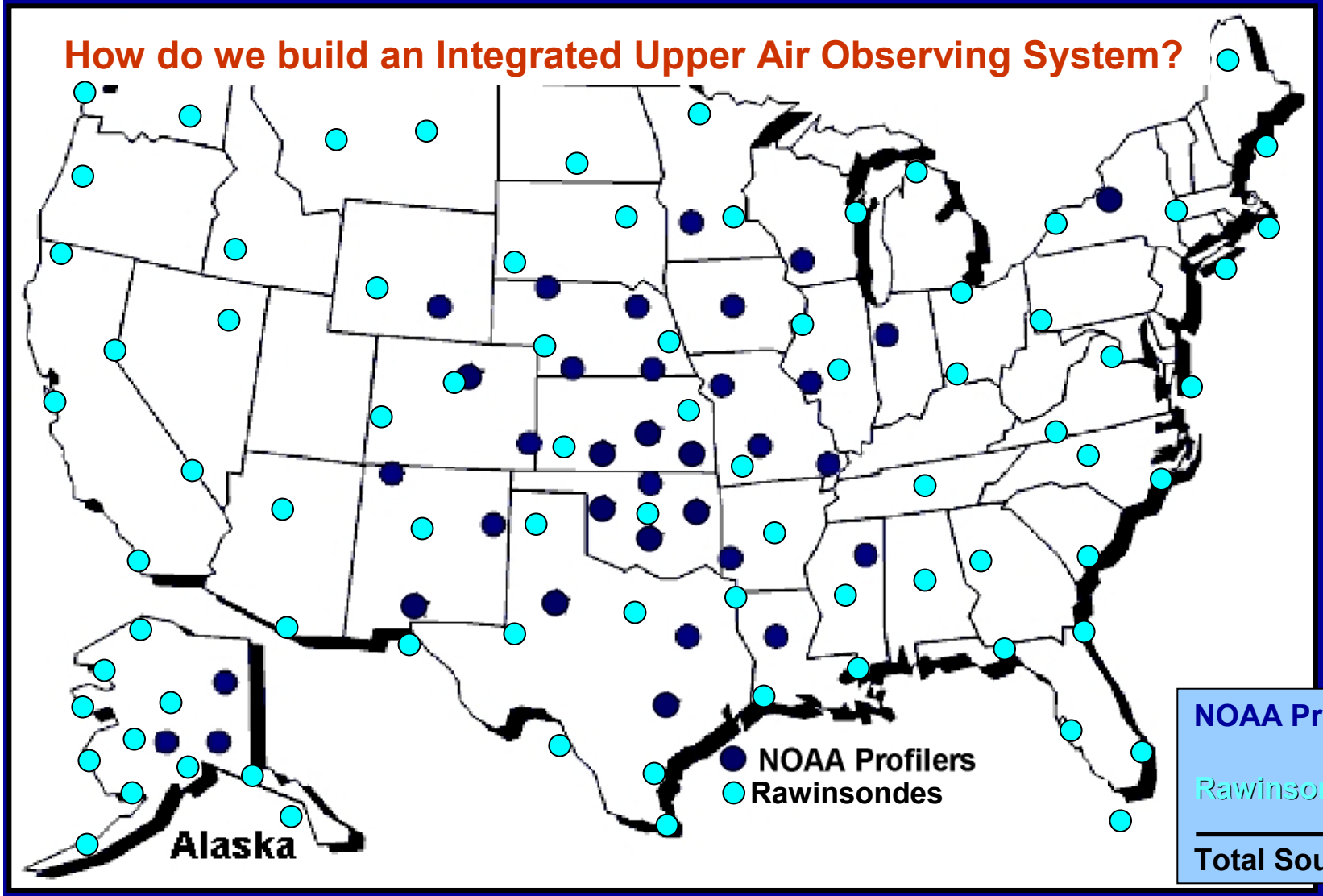
    - Items needed: Requirements Definition, Request for Information, SOW and Specifications, Procurement Plan, Contract Award, Testing and Acceptance, Production Approval, and Installation.

Profiler Block Diagram



National Network

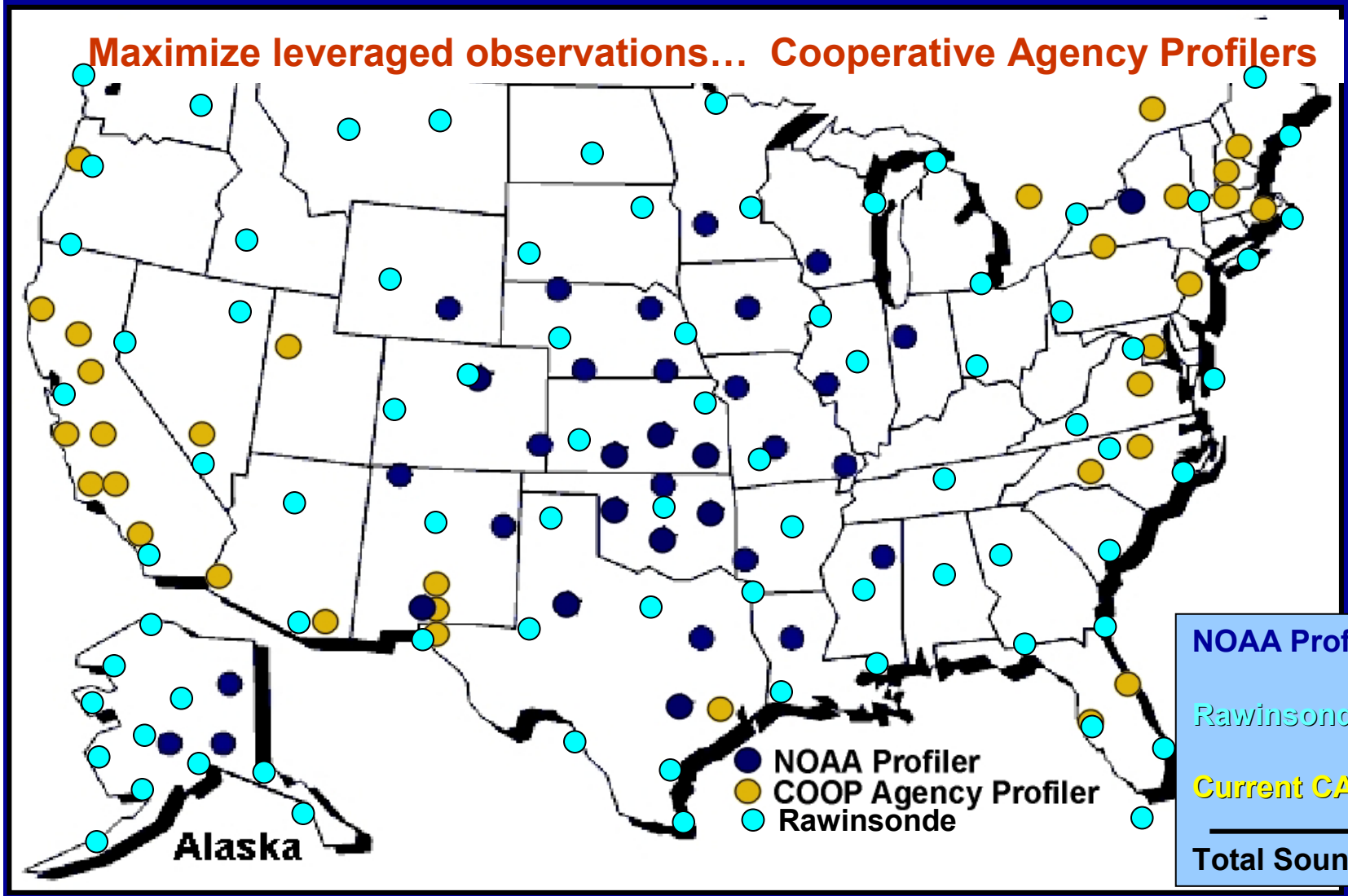
Current NOAA Profilers



Slide prepared by David Helms, NWS; presented at NPN Technical Review, June 22, 2004

National Network

Current NOAA Profilers and CAPs



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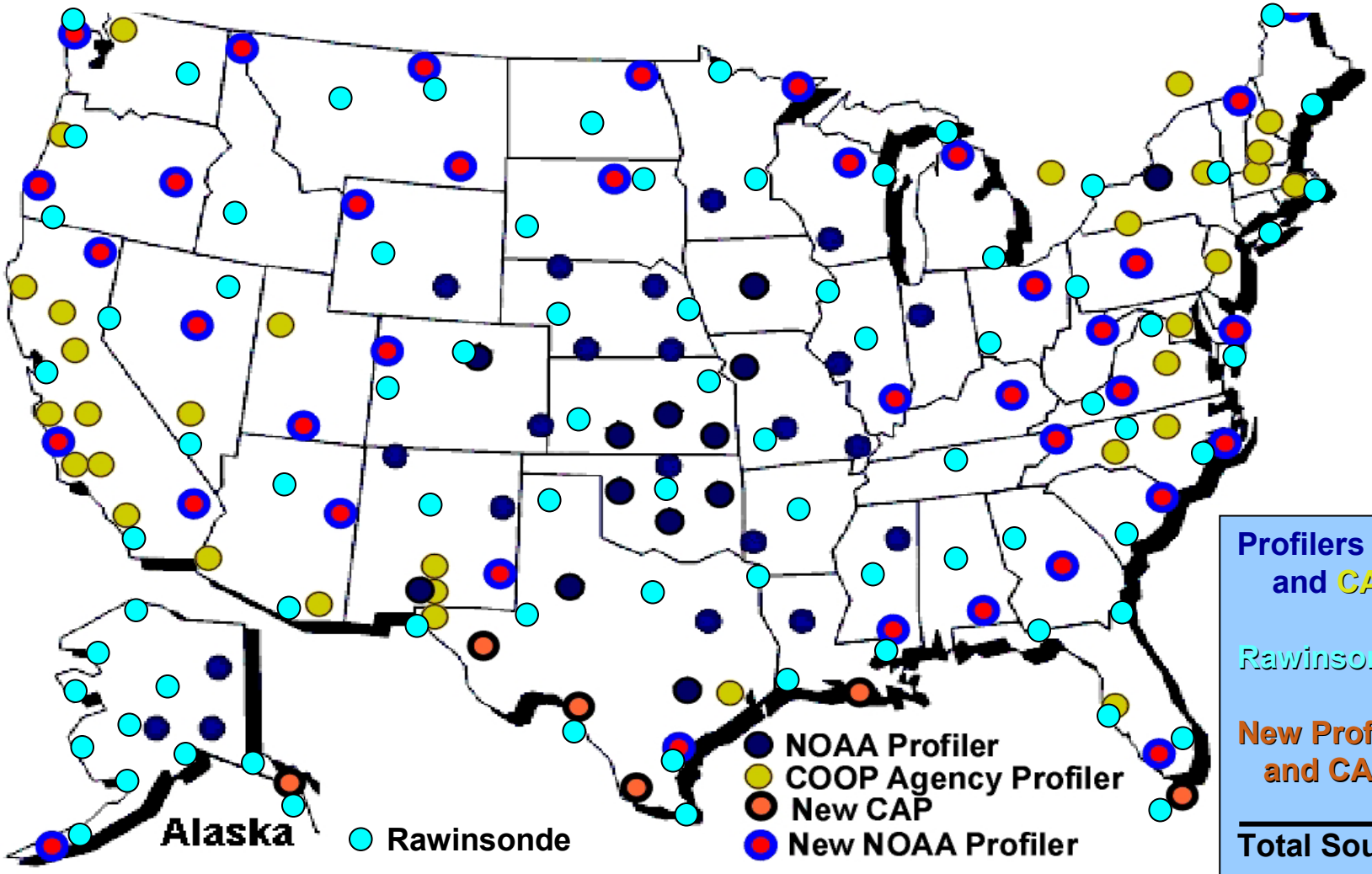
National Network

An Integrated Upper Air Observing System

… then build a national backbone



Profilers and CAPs	115
Rawinsondes	102
New Profilers and CAPs	60
Total Soundings	277

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National Profiler Network
Possible System Composition

16 Km System

8 Km System

4 Km System

System Cost is Proportional to Height Coverage (16,8,4 Km)