GPS Challenge Team Overview

• Purpose of the GPS Challenge Team
  – Supporting Agencies Pos/Nav Requirements

• Concept of the Investigations
  - Real Time Positioning
  - Landscape Characterization
  - Ecosystem Based
  - Improving Operational Capability
  - GPS Challenge Team Data
USDA-DOI GPS Challenge Team

USDA – DOI Cooperative Research Project

USDA – Natural Resources Conservation Service
USDA – Agricultural Research Service
USDA – U.S. Forest Service
DOI – National Park Service
DOI – U.S. Geological Survey

Sponsors

Interagency GPS Executive Board
USAF GPS - Wing Civil Applications Office
Real Time Positioning & Navigation in Challenging Environments

Tongass National Forest – Douglas Island Alaska
Pacific Gulf Coastal Forest / Meadow Province – Northern Latitude
USDA-DOI GPS Challenge Team

Purpose

Designed to Observe and Analyze the Effects of Relief and Vegetation on GPS Performance

Redwoods National Park, Arcata, CA
California Coastal, Steppe, Mixed-Redwood Forest Province
USDA-DOI GPS Challenge Team

Result

Provide Information and Guidance to GPS Users to Improve Positioning and Navigation Capability Relative to Individual Environments

Hoosier National Forest, Bedford, IN
Eastern Broadleaf Forest (Continental) Province – Central Rolling Hills
USDA-DOI GPS Challenge Team

GPS Investigation Based on Ecosystems

U.S. Forest Service Test Site – Bakerville, CO
Southern Rocky Mountains Steppe – Coniferous Forest Province
Observations Versus Truth
Logging Static Data at Fixed Points

Acadia National Park, ME
Laurentian Mixed Forest Province – Northern Latitude
Unique – Site Characterization
Hemisphere Photography and
Leaf Area Index Determination at Each Point

Acadia National Park, ME
Laurentian Mixed Forest Province – Northern Latitude
USDA-DOI GPS Challenge Team

Concept
Improving Observation Capability

El Yunque National Park, PR    Puerto Rico Province – Rain Forest
Tandem Survey Control Points
Arcadia National Park – National Park Service Headquarters
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Degrees of Challenge

Open Sky Environment

Challenge – Horizontal and Vertical Accuracy
Agricultural Heartland
Challenging Environments are
Intermixed with Open Sky Areas
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Degrees of Challenge

Riverine Environments

Wetlands
Complex Terrain
Vertical and Directional Barriers
How Challenging Can an Environment Be?

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Degrees of Challenge
USDA-DOI GPS Challenge Team

Degrees of Challenge

Safety of Life Applications

Fire Management
Site Selection Criteria

- Landscape Features
  - High Relief / Directional Formations
  - Vegetation (Open to Closed Canopy)
- Federal Land
- Monumentation
- NDGPS Coverage
- Areas of National Importance
- Local Support
Chugach NF
Anchorage, AK

Tongass NF
Douglas Island, AK

Lubrecht Test Course
Lolo NF, MT

Powell Test Course
Clearwater NF, ID

Redwoods NP, CA
Crescent City, CA

Fort Collins, CO

Bakerville Test Course
Arapahoe NF, CO

Acadia National Park
Bar Harbor, ME

Bedford Test Course -
Hoosier NF, IN

Federal Center
Fort Worth TX

Caribbean Test Course
El Yunque NF, PR
Nationwide Differential GPS (NDGPS)
USDA-DOI GPS Challenge Team
DGPS
Wide Area Augmentation System (WAAS)
How Much Data Can You Collect?
GPS Challenge Team Data Asset

Represented by:

- 176 FTE days
  - Does not include travel, preparation, or analysis
- Data collection on 96 points on 11 sites
- 1021 Hours of observation
- 1885 Data files
- 22 Million lines of raw data
- 1.7 Million lines of processed data

4 Years of GPS Investigations
USDA-DOI GPS Challenge Team
Degree of Difficulty

Terrain
Rain
Weight
USDA-DOI GPS Challenge Team
Degree of Difficulty

“Things that Bite”
States and Localities Meeting
September 15, 2008 - 10:35am

Observation Methodology
Gary Hallbauer, USDA - NRCS

Point Characterization
Wayne Dulaney, USDA - ARS

U.S Forest Service Findings
Gary Boyack, USFS - FMFC
Dick Karsky, USFS - MTDC

National Park Service Findings
Karl Brown, NPS
Tim Smith, NPS