General Aviation FIS Broadcast System

Honeywell International

AWIN System Project Overview

June 5, 2001

AWIN Phase I Overview

AWIN Phase II Plans

FIS Overview

June 5, 2001

AWIN Phase I Overview

- Developed Airborne Receivers and Displays
- Developed and built Ground Stations
- Deployed VDL Mode II Ground Stations
  - MN, WI, CO, KS, VA
  - VA stations used for CoWS Experiments
- Provided technical support for the Ground Station network.

Charlottesville VA

June 5, 2001

Petersburg VA

June 5, 2001

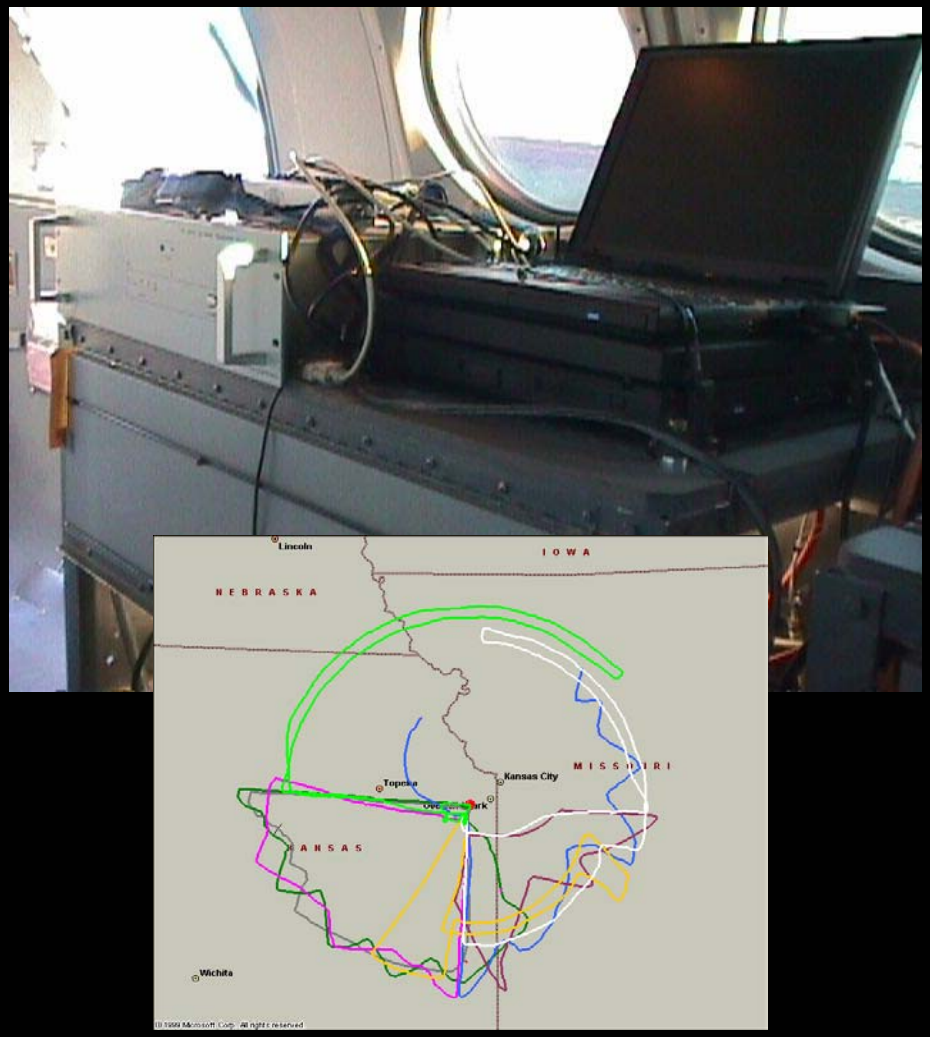
AWIN Phase II Overview

- Support Mid-Atlantic Test Range
- VDL Mode 2 RF Propagation Study
- Bi-directional FIS Study
- FIS Lightning Data Product Study
- Miniaturized VDL Mode 2 Radios

Test Range Support

- Continuation / Enhancement of AWIN VDL Mode 2 Network
  - Technical support for VA Ground Stations
  - Exploring transition to FIS network by implementing a Private Experimental Channel
    - Leverage FIS Subscription Control Encryption
    - Only NASA will be able to read the data
    - Allows the continuation of experiments and new data product evaluations
- License Display Software

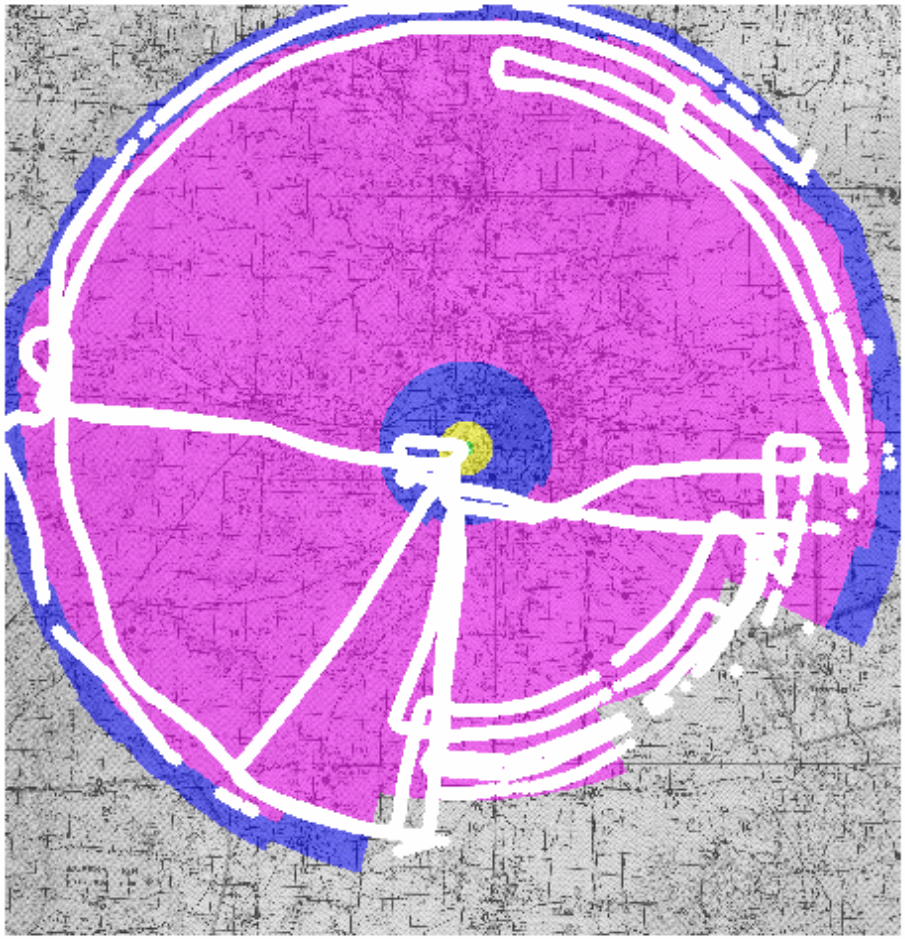
Flight Testing Program



June 5, 2001

- RF system performance tests
  - Single transmitter located in Olathe
  - Transmitted packets with known data
  - Aircraft flew at 5000 ft AGL
  - 19” rack Rx in Aircraft
  - Multi-flight test (>40 hours total)
- Data Collection
  - Time
  - GPS Position
  - Bit Error Rate (BER)
- Data Usage
  - “Calibrate” RF simulation tool
  - Refine Ground Station placement

VDL Mode 2 RF Propagation Analysis



White lines show the aircraft position where BER was less than 10^{-3}

Bi-Directional FIS Study

- Bearer System Evaluation
  - Focus on GA market parameters
- Return Path Usage Analysis
  - User requests tailored service
  - Response uplinked via FIS-B system
- VDL 2 Augmentation
  - Geographical footprint
  - Altitude

Lightning Data Product Analysis

- Examine the differences between lightning data collected by on-board systems and terrestrial network data
  - Cloud-to-cloud vs ground strike
  - Data latency
  - Position accuracy
- Leverage the study to determine education parameters for FIS users

Miniaturized VDL Mode 2 Radio

- Increment 1
  - Mini VDL2 Receiver
  - Increase integration of safety products
  - Generate platform for portable FIS receiver
- Increment 2
  - D8PSK “Radio on a Chip”
  - Transceiver
  - Enable further integration, create a next-generation portable platform core

FIS Overview

June 5, 2001

BASIC Products

- METARs
- PIREPs (pilot reports), urgent and routine
- SPECI surface observations
- TAF terminal forecasts
- AIRMETs
- SIGMET
- Convective SIGMETs
- Alert weather watches

Value-Added Products

- NEXRAD
- Graphical METARs
- NOTAMs
- Graphical SIGMET and AIRMET display
- NLDN lightning data
- Special use airspace status
- Winds aloft information
- Convective nowcast
- Icing nowcast
- Turbulence nowcast

ID-76048

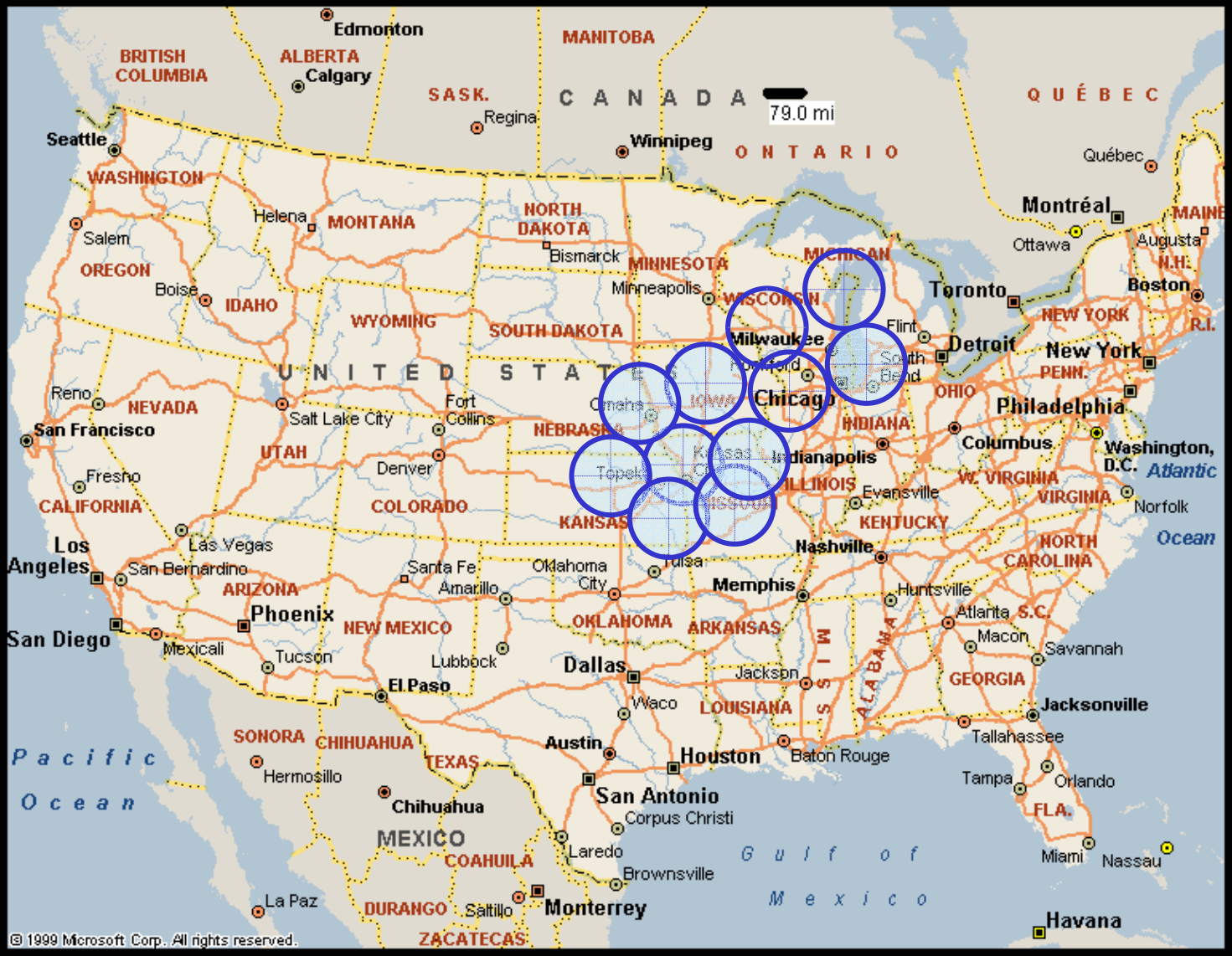
KMD 550 Multi function Display

KDR 510 FIS Receiver

KGS 511 Ground Station

Honeywell

FIS Installations



Installation Complete

Installation In Process