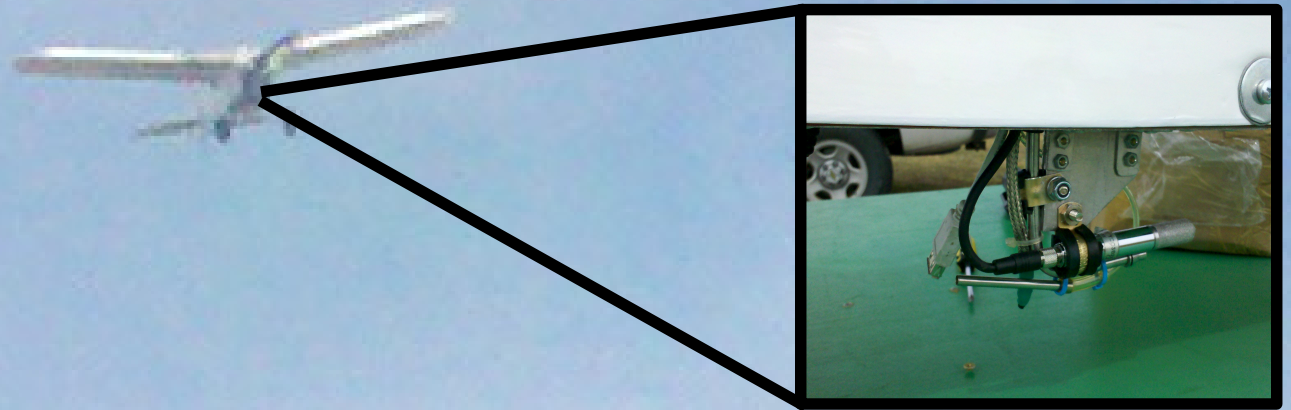# Scientific Data Processing and Visualization Software Company
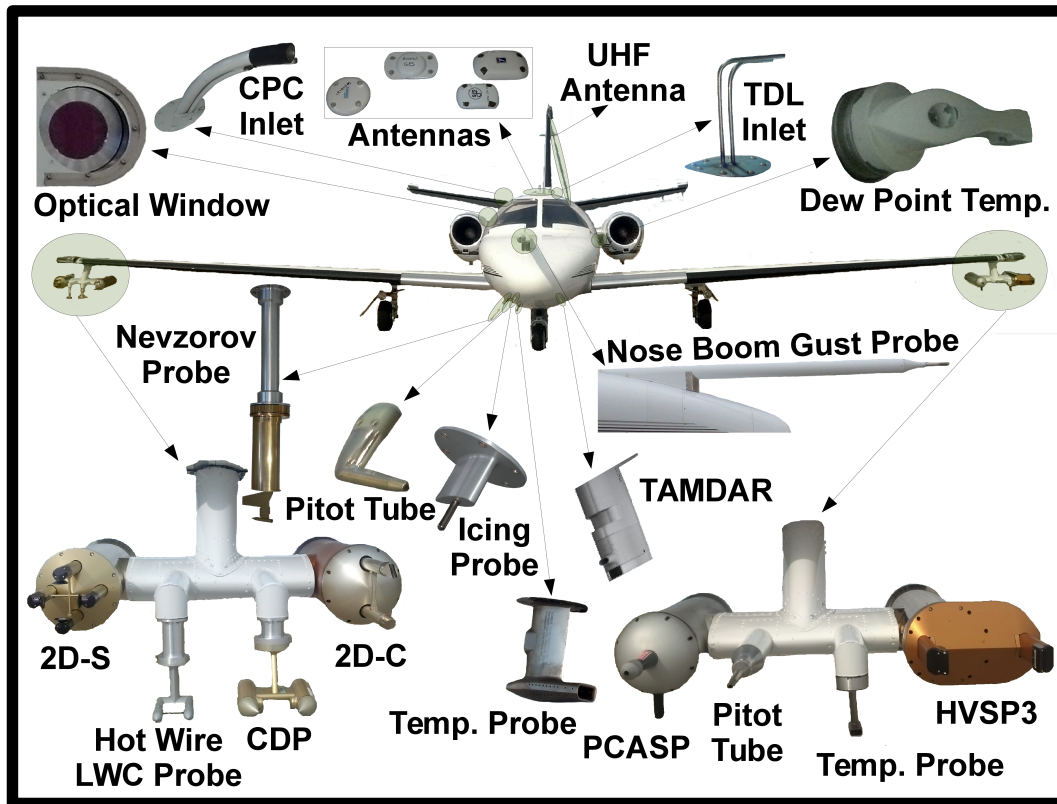
Dr. David J. Delene

Department of Atmospheric Sciences
University of North Dakota

The Problem – Too Much Data

Growing number of increasingly complex sensors making meteorological measurements that provide data but not information.

North Dakota State Surface Ag Stations

University of North Dakota's Citation Research Aircraft

Telemaster with Sensors

The Solution – Proper Software

Open-source software environment designed to provide scientifically useful data sets which are easily visualized to provide desired information.
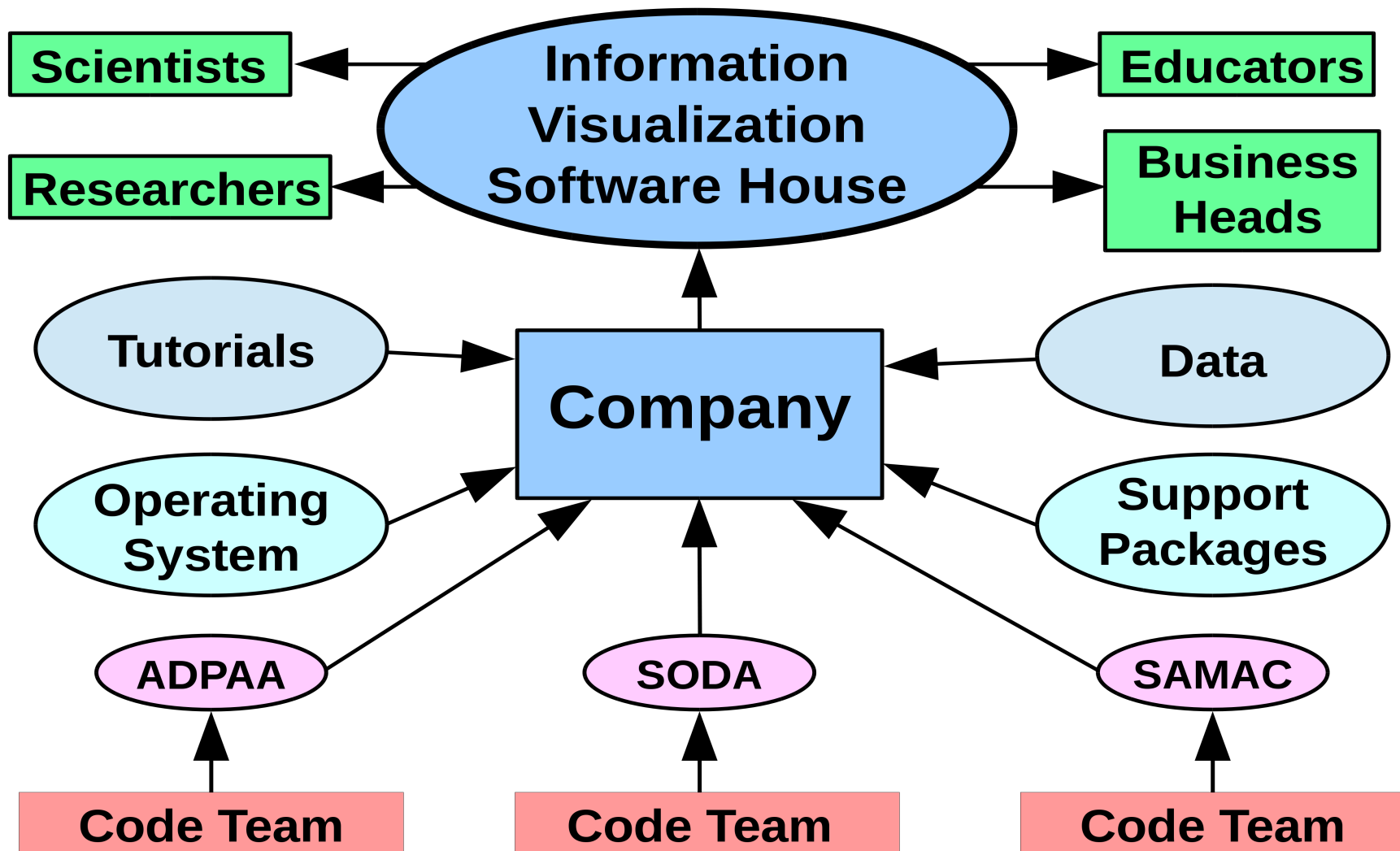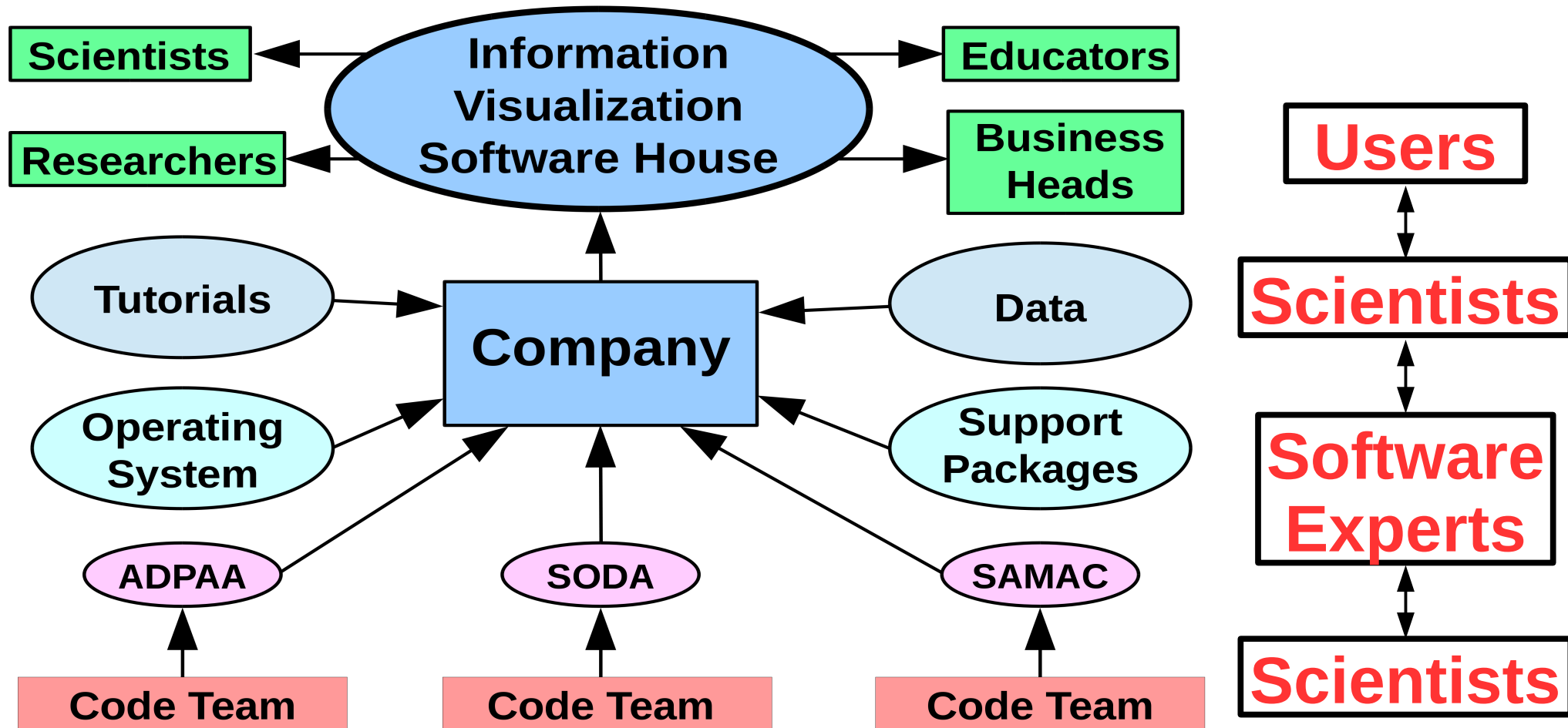
Project's Objectives

- **Develop prototype of the Software House.**
  - Cloud-based environment.
  - Virtual Machines.
- **Assessment of business model assumptions.**
  - Determine customers requirements.
  - Quantify the size of potential markets.
  - Assess acceptance of pricing models.
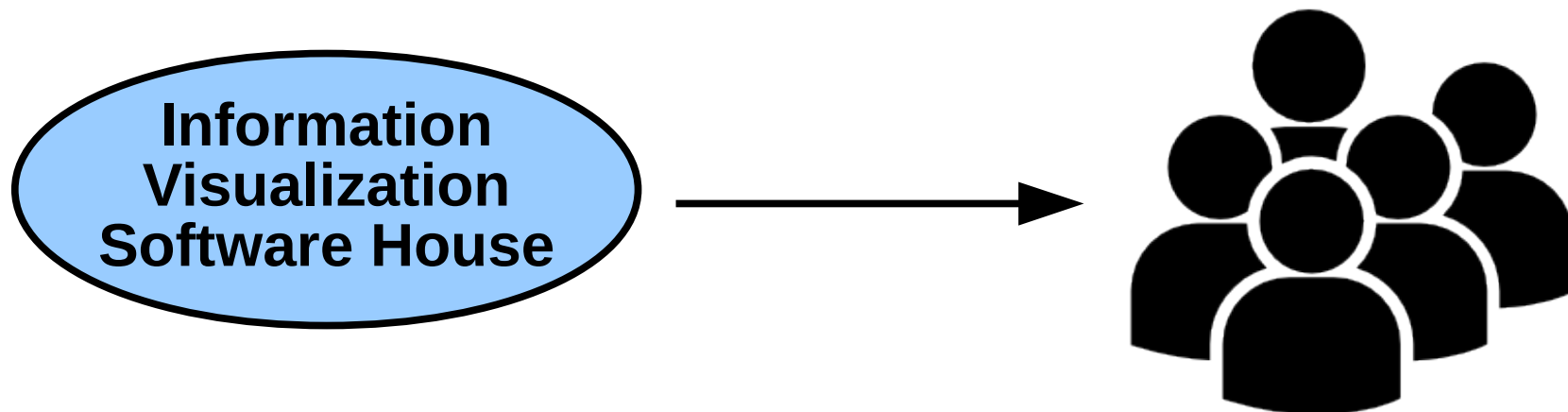
Technology Advancement

Different code teams have developed open source software packages (ADPAA - University of North Dakota, SODA – National Center for Atmospheric Research and SAMAC – Dalhousie University). The company would pull together software packages, support packages, computer operating system, example data and tutorials to create a "Software House" that would be used by the users to gain information from the meteorological measurements.

The Customers

- **Research Groups**
  - U.S. University Research Groups
  - International Research Groups (Canada, China, India, South Korea)
- **Organizations Conducting Field Measurements**
  - Government Orgainiations (NDAWN, NCAR, CIRPAS, University of Wyoming King Air Facility)
  - Private Sector Customers (WMI, SPEC)
- **Instrument Development Companies**
  - Companies developing instruments (DMT, SPEC, SEA, TSI, Aventech Research Inc.)

The Markets

- **Research Aircraft**
  - Government and Private Aircraft
- **Surface Monitoring Stations**
  - Ag, Highway, and Fire Monitoring Stations
- **Unmanned Airborne Systems**
  - Newly Developed Sensor Systems
- **Scientific Analysis and Training**
  - Conduct Scientific Analysis
    - Combined Customer's Data Sets
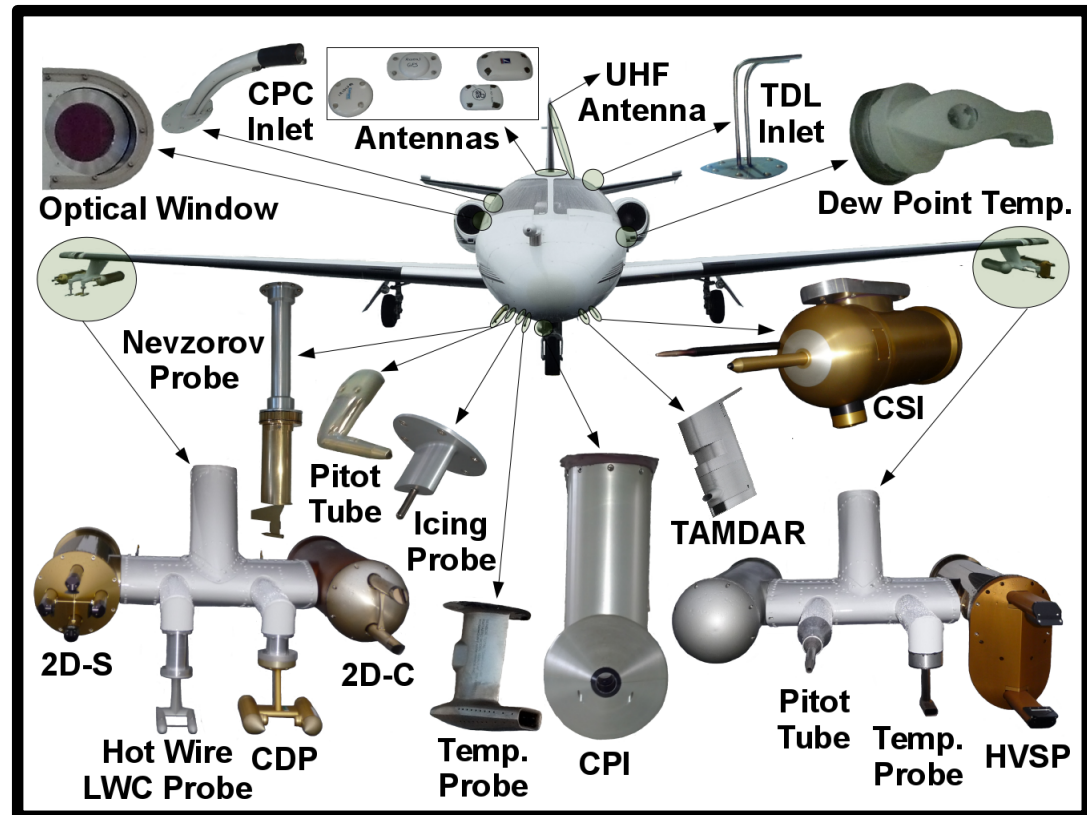 - Workshops and Short Courses

Known

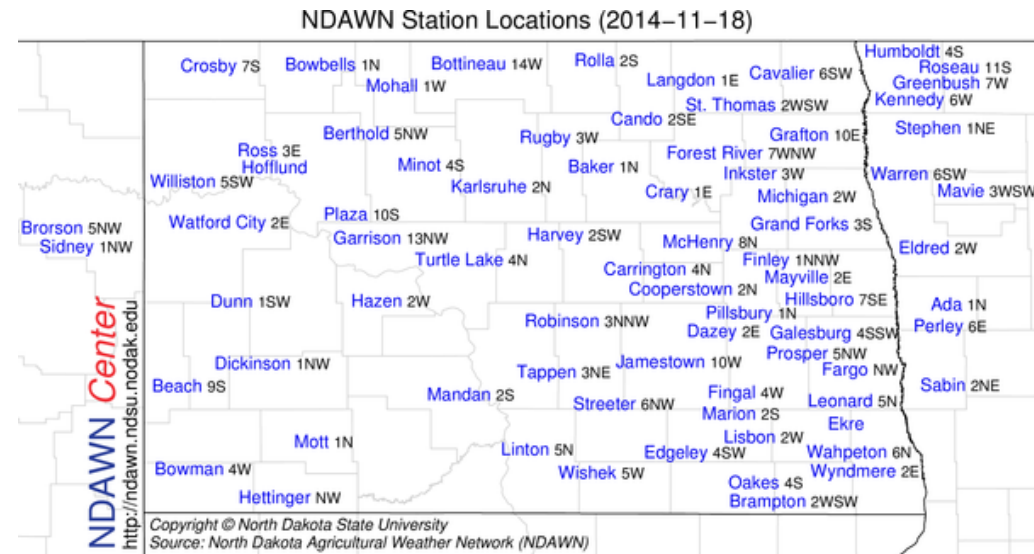**Potential**

Research Aircraft

Base to Start Company

- Single aircraft field project costing approximately one million dollars.
- Company support would be in the range of twenty-five thousand dollars per year.
- 20 projects per year.
- 50% Market Share
- $250,000 per year

Surface Monitoring Stations

Some Experience

- **Agricultural Stations**
- **Road Weather Stations**
- **Air Pollution Stations**
- **Research Stations**

NDAWN Station Locations (2014-11-18)

Copyright © North Dakota State University
Source: North Dakota Agricultural Weather Network (NDAWN)

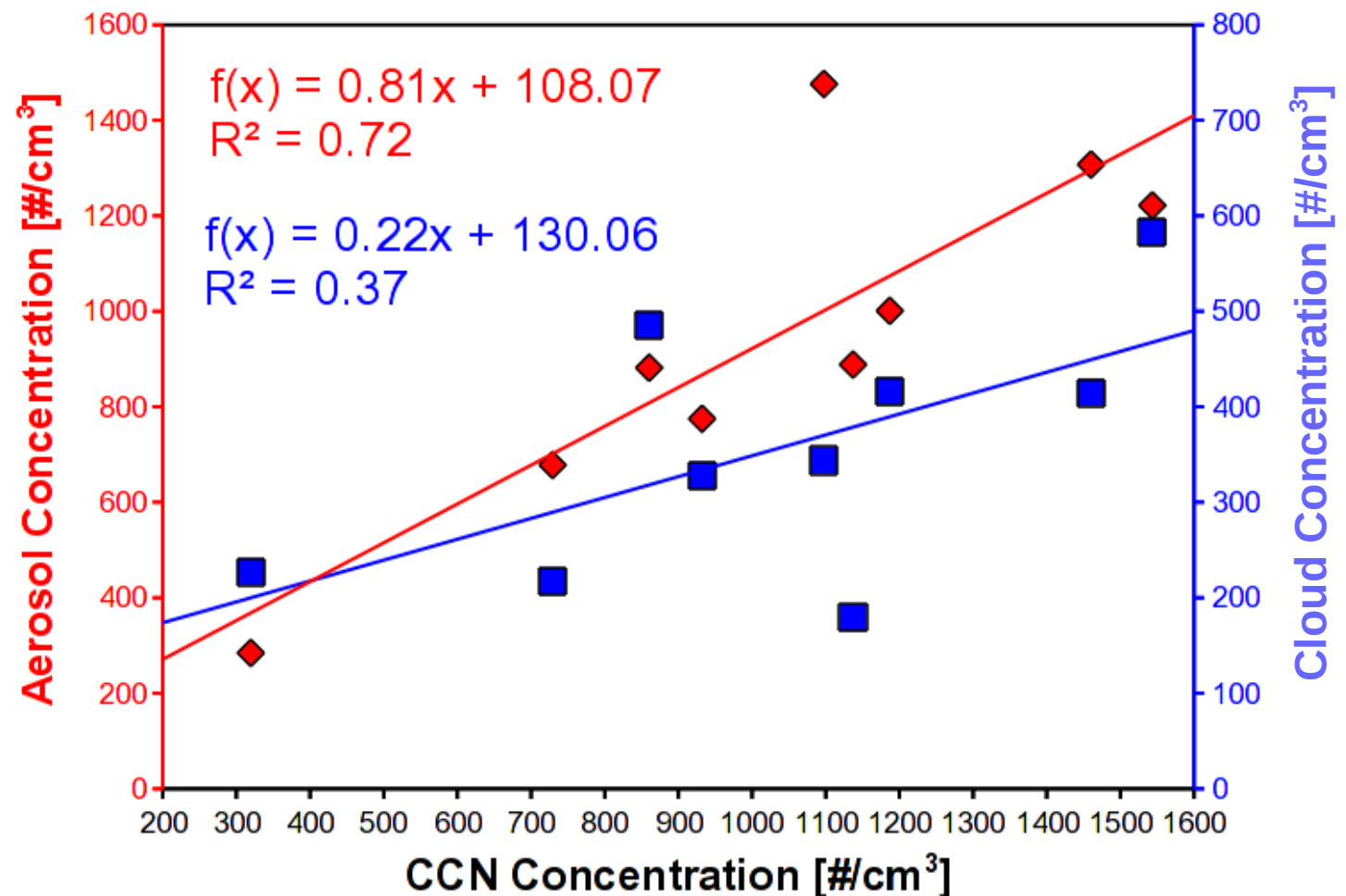# Unmanned Airborne Systems

New Market

- **No Well Established Companies**

- **New Meteorological Sensors**

- **New Applications**

- **Lots of Unknowns**
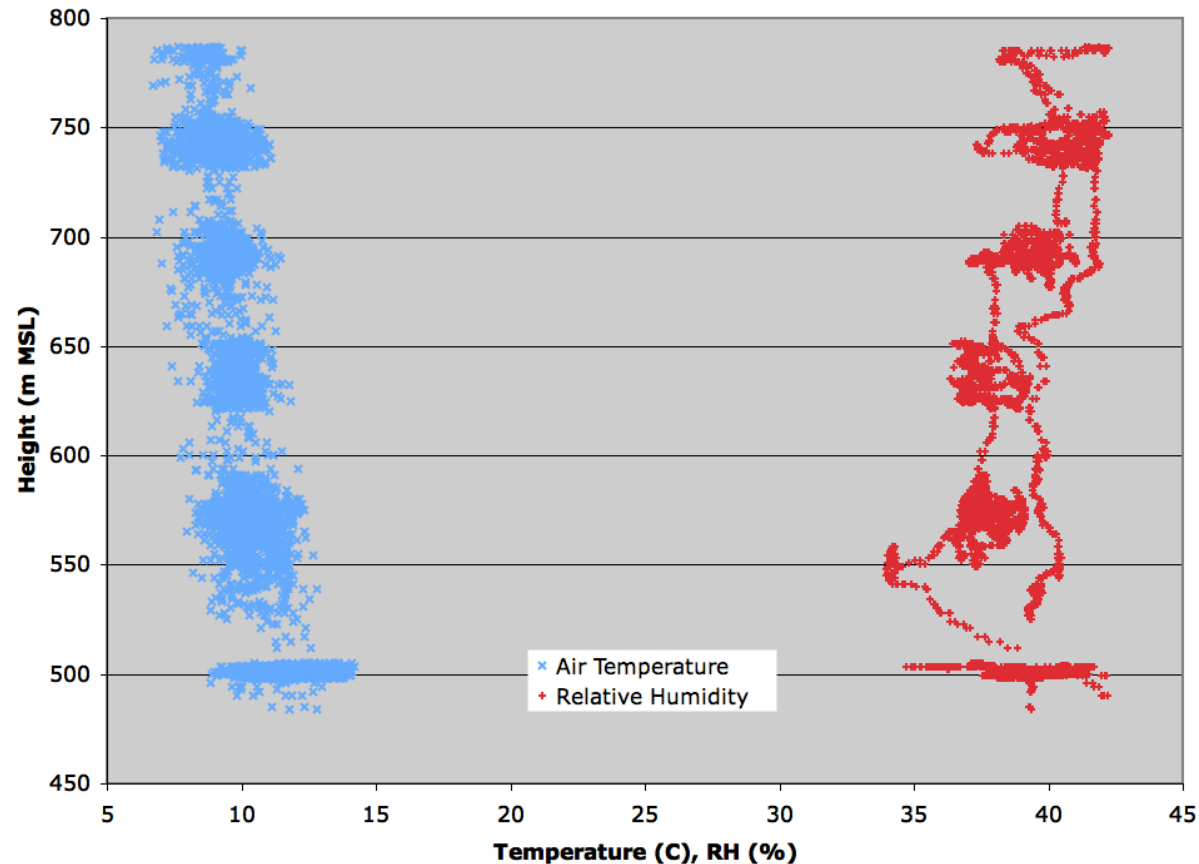
Scientific Analysis

Time to Develop

- **Potentially a Large Market (Combine Data and Models)**
- **Established Companies (SAIC, Raytheon)**
- **Training**

$f(x) = 0.81x + 108.07$
$R^2 = 0.72$

$f(x) = 0.22x + 130.06$
$R^2 = 0.37$

Conclusion

Develop prototype software environment.

Test our market assumptions.

- Don't know the answers now but lots of potential.

Reviewer's Concerns

- **Market Size and Readiness**
- **Management Plan and Team**

Questions