AWRP Program Review

Quality Assessment
Product Development Team

Quality Assessment (QA) PDT

Outline

- Organization
- Activities
- Accomplishments
- Plans

Quality Assessment (QA) PDT

If you can't verify it –

you can't forecast it!

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"It is hazardous, and in many ways irrelevant to become entangled with any form or variety of verification schemes. No matter where one stands, one is always in the middle of a lusty controversy. The verification expert and the meteorologist are always ravishing each other."

--Col. A.C. Holman; BAMS 1947

Why a Verification Program

- Establish an independent assessment group to evaluate the quality of AWRP forecast products.
- Develop new and advanced approaches for aviation forecasts that have never before been verified, and continue to develop improved approaches
- The development of verification approaches requires research and testing much like the development of aviation forecast products.

QA PDT: Members

Co-Leads

Jennifer Mahoney and Barbara Brown

Core Members

Tressa Fowler, Mike Kay, Matt Kelsch, Andy Loughe, Fred Mosher, Agnes Takacs

QA PDT: Organization

- AF and QA split
  - RTVS system development remains in AF PDT
  - Tasks pertaining to verification method development, analysis of results, and AWTT moved to QA PDT
- Tasks in other PDTs will remain in those PDTs for FY03, but will be moved to QA PDT in FY04.

QA PDT: Goals

- Help facilitate the transfer of technology through AWTT.
- Develop and apply appropriate, scientifically and statistically valid verification methods.
- Provide meaningful feedback to forecasters, developers, and managers.

QA PDT: Interactions

- Partnership between FSL and NCAR
- Work closely with other PDTs
  - Aviation Forecasts
  - Turbulence
  - Convective Weather
  - In-flight Icing
  - National Ceiling and Visibility
  - Oceanic Weather
  - Model Development and Enhancement

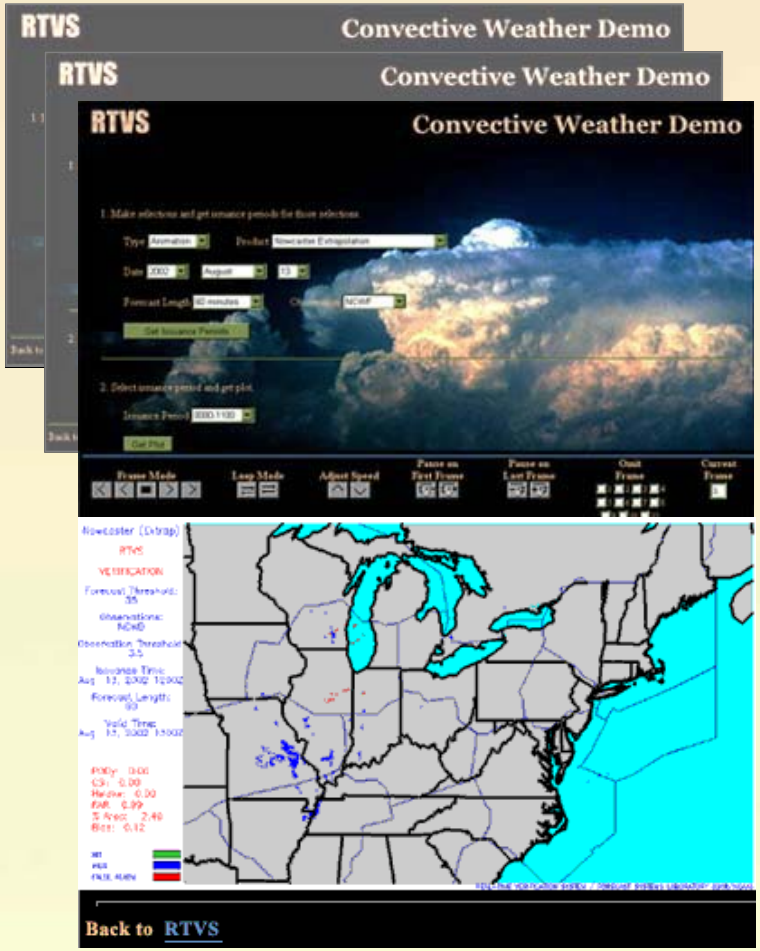
QA PDT: Interactions

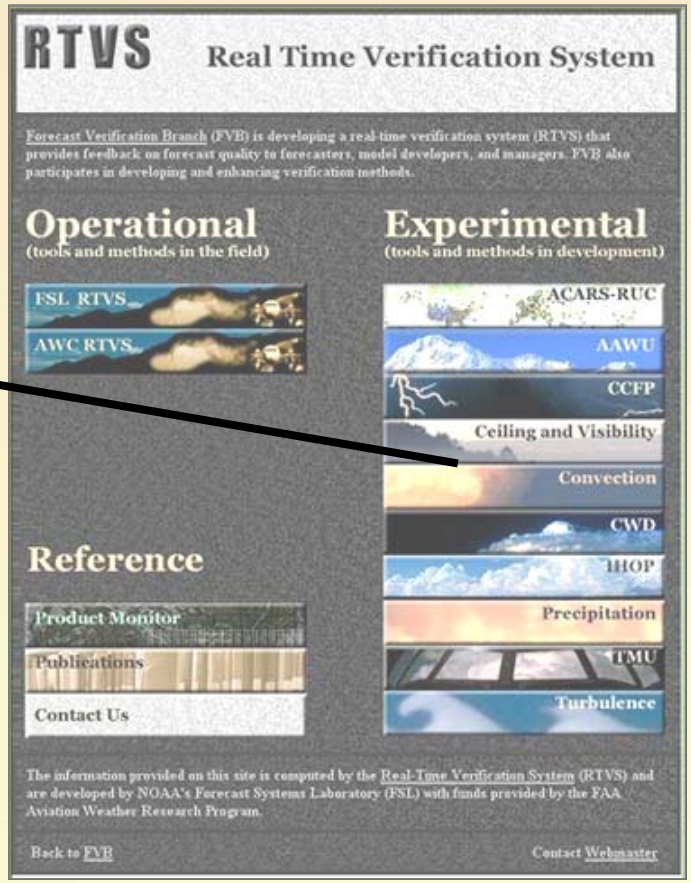
- Participation in activities of various statistical and verification committees
  - AMS Probability and Statistics Committee
  - WWRP Verification Sub-committee
  - MITRE Aviation Verification Committee
- Collaborate with AWC, NWS, other NCAR and FSL divisions, other laboratories, and universities.

QA PDT: Activities

- Develop verification methods for aviation forecasts
  - Workshop on “Making Verification More Meaningful”
  - Collaborations with other verification groups
  - Leverage with other projects (FSL precipitation project; USWRP)
- Support AWTT decisions
  - Intercomparison exercises
  - QA reports
- Provide verification information to users
  - Confidence level information

QA PDT: Accomplishments





QA PDT: Accomplishments

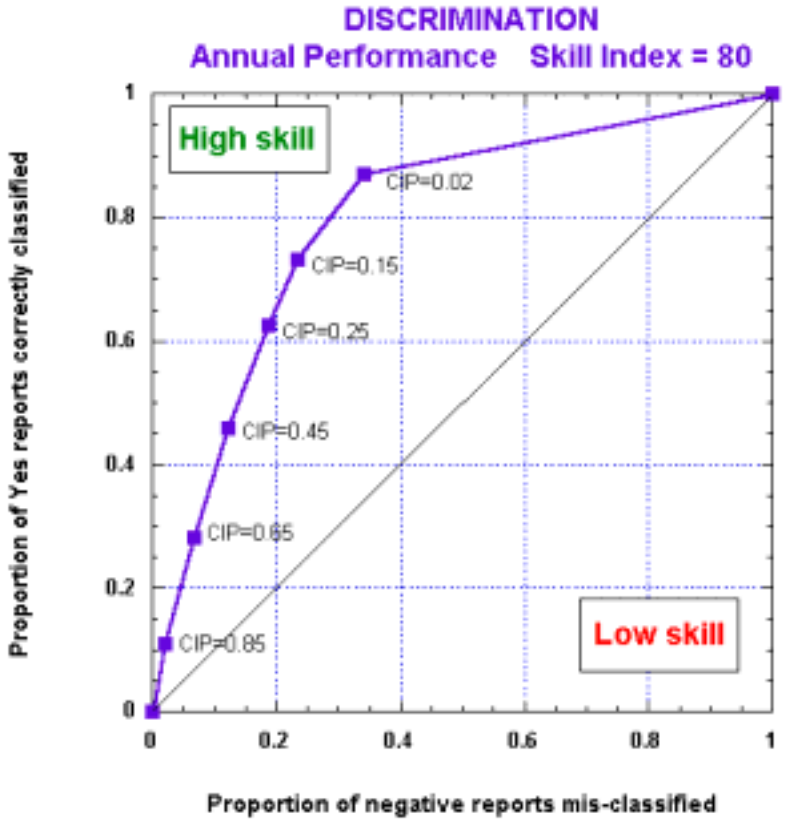
Confidence Level Information

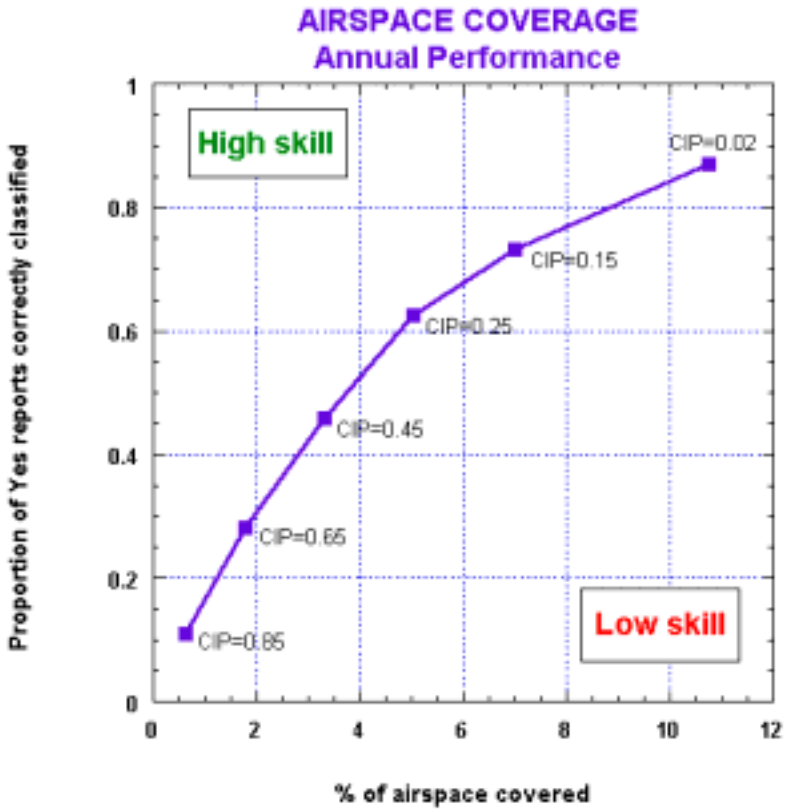
Current Icing Potential (CIP) Performance Statistics:

- http://adds.aviationweather.gov.projects/adds/icing/cip_performance.php
- Annual, seasonal, and regional
- Similar information for other products (e.g. ITFA) will be included on ADDS.

QA PDT: Accomplishments

Confidence Level Information





QA PDT: Accomplishments

- Submitted technical reports to AWTT Technical Review Panel
  - IIDA/CIP
  - IIFA/FIP
  - ITFA

QA PDT: Accomplishments

International Workshop:

"Making Verification More Meaningful"

- Goals
  - Bring together verification experts
  - Consider major issues in verification of aviation weather and related forecasts
  - Establish and extend collaborations
- Focus
  - Operational issues (how to make verification relevant)
  - Observations (uncertainty, scaling)
  - Advanced methods (especially for spatial forecasts)
  - Ensemble forecast verification

QA PDT: Accomplishments

"Making Verification More Meaningful"

Participants:

- From 6 countries and all parts of U.S.
- Atmospheric scientists, operational meteorologists hydrologists, statisticians, mathematicians
- Government laboratories, universities, operations, private consultants

QA PDT: Accomplishments

"Making Verification More Meaningful"

Outcomes:

- A variety of issues identified:
  - Users and operationally-relevant verification
  - Scaling
  - Improved spatial forecast verification approaches
  - Incorporation of observational uncertainty)
  - Need for improved education
- New collaborations
- Desire for similar events in the future

Web address: http://www.rap.ucar.edu/research/verification/ver_wkshp1.html

QA PDT: Plans

- Develop and test approaches that address "operationally-relevant" questions.
  - Practically-perfect approach (Brooks et al.1998)
  - Ebert/McBride (2000) diagnostic approach
  - Object-oriented approach (NCAR, NSSL)

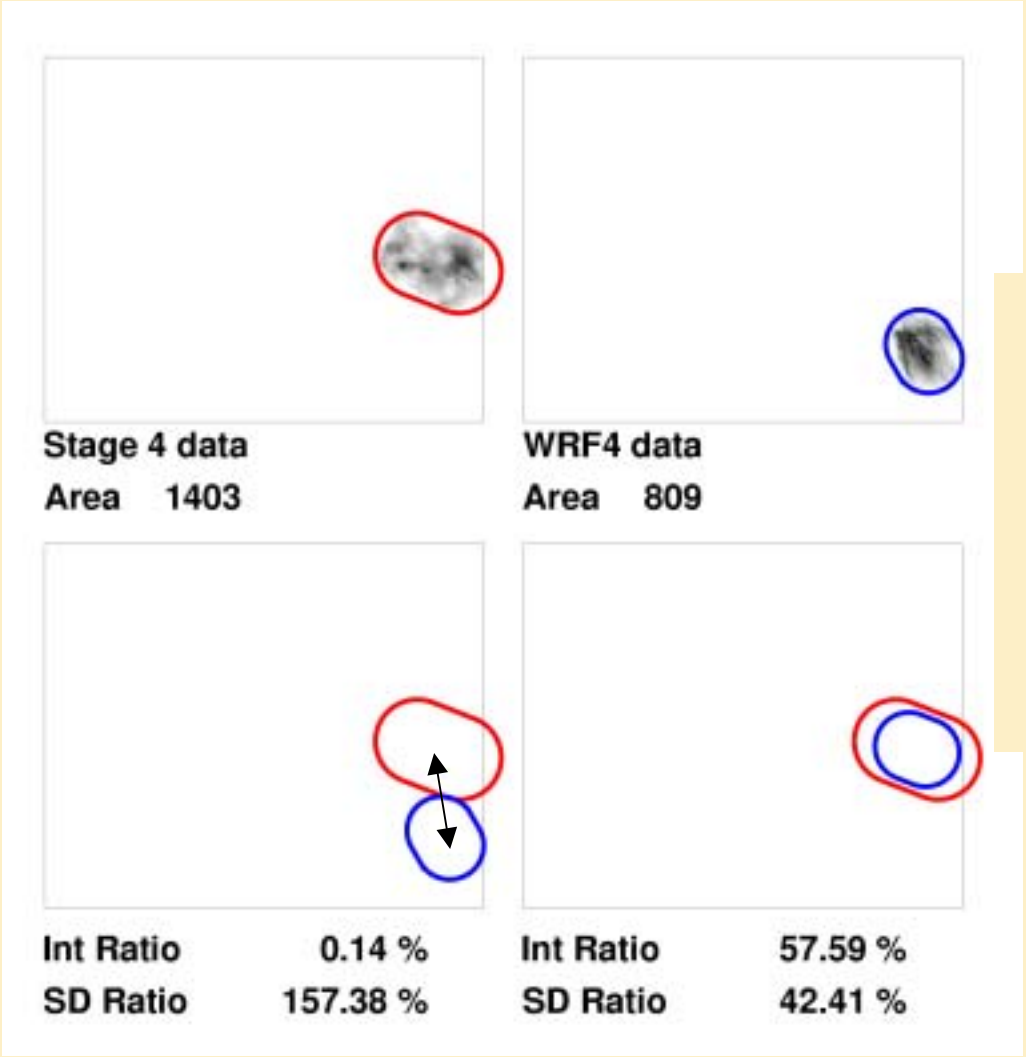
QA PDT: Plans

An "Object-Oriented" Approach

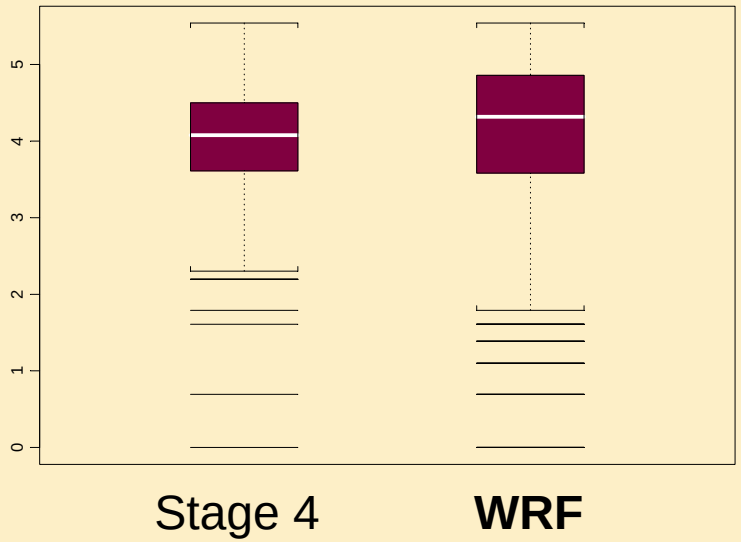
- Identify verification questions that are *meteorologically and operationally relevant*
- Define precipitation/convective objects and shapes
- Diagnose errors in location, shape, size, timing, etc.
  - Include operationally-relevant attributes, such as location of "gaps" in convection
- Characterize and compare convection within shapes

QA PDT Plans: Example of Object-Oriented approach

Shapes/objects and matching:



Precipitation intensities:



QA PDT: Plans

- Continue technology-transfer activities
  - CIP icing severity for D3 decision
  - FIP for D4 decision
- Begin development of C&V and Oceanic Weather intercomparison activities for D3 decisions in FY04
  - National C&V algorithm
  - Cloud top height
  - Global convective diagnosis
  - Global turbulence forecast
- Continue Convective Weather evaluation activities
  - NCWF 2-h forecast for D3 decision in FY04

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Questions ?