# *FAA Weather Product Verification Procedures*

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*AWRP Quality Assessment*
*Product Development Team*

# The


# Process

# Outline

- AWTT Process
- Verification process
- FAA verification goals and challenges
- Value of satellite observations for future FAA evaluations

# The AWTT Process

- AWTT = Aviation Weather Technology Transfer
- What is AWTT?

  *An FAA/NWS process for transferring new aviation weather products and systems into operations*
- Who is on the AWTT Board?

  *Representatives of NWS and FAA*

# AWTT Process Goals
## *(from Debi Bacon, AvMet)*

- Provide user input to define users needs, requirements, and product design
  - *Users Needs Analysis*
  - *Concept of Use (ConUse)*
- Recommend research priorities
- Approve ***product graduations*** from experimental to operational based on:
  - *Technical/scientific readiness*
  - *Operational readiness*
- Plan and monitor conversion to operations
  (Rule/guidance changes, Training, Software Platforms, Communications)

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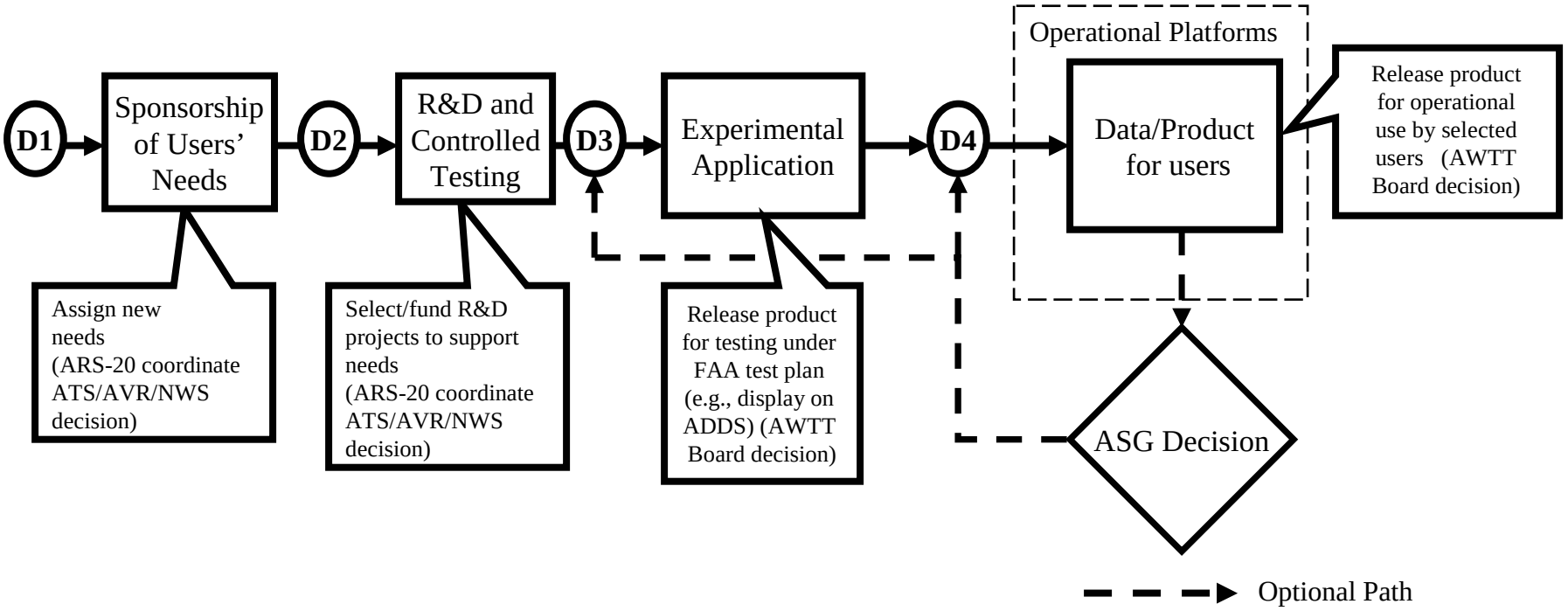
# AWTT Process

| D1 | D2 | D3 | D4 |
|---|---|---|---|
| •User needs<br>•Initial concept of use (ConUse) | •User needs<br>•ConUse (refined) | •Initial ConUse approval<br>•AVR approvals or approval plans in place<br>•Initial approval of requirements<br>•Enter AMS Process, if needed | •Final ConUse approval<br>•Final AVR approvals in place<br>•Final approval of requirements<br>•AMS Process, if needed, completed |



# What are the AWTT stages?

- D1
  - *Initial product concept*
  - *Can be the idea of developer or "pushed" by user requirements*
- D2: "Test"
  - *Moved from a concept to a "product"*
- D3: "Experimental"
  - *Product ready for testing*
  - *Requires*
    - Product technical description
    - Quality Assessment (QA) Report
    - ConUse plan
- D4: "Operational"
  - *Product ready for operational use (either as "supplemental" or stand-alone)*
  - *Requires same documentation as D3, only more complete/in-depth*
  - *Evaluation of operational product following implementation*

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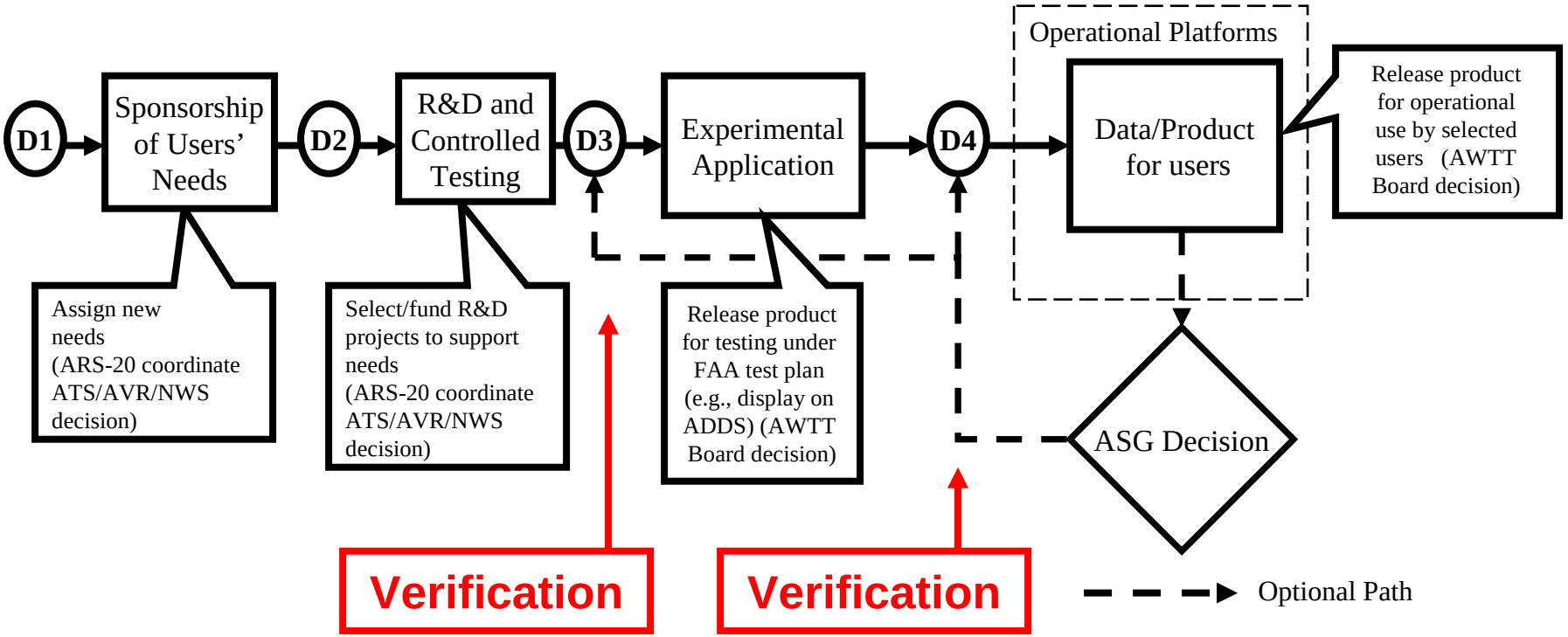


# AWRP philosophy

- Transfer products as quickly as possible
- Do not demand perfection
- “Do No Harm” while offering a capability the users do not already have

# D3/D4 process

- PDTs
  - *Product development*
  - *Technology transfer support for AWC*
  - *(CONUSE)*
- Quality Assessment PDT
  - *Independent evaluation of product*
  - *Quality Assessment report*
  - *Supplemental report on operational implementation of product*
- Evaluation by Technical Review Panel (TRP)
- Final decision by AWTT Board
- Implement on ADDS (experimental/operational)

# Technical Review Panel (TRP)

- Members
  - *NWS representative*
  - *FAA representative (usually from AWRP)*
  - *Outside expert in subject area*
- Examines Technical Description and Quality Assessment Report
- Makes recommendation to AWTT Board

# QA PDT Verification Goals

- Independent assessment of products going through the AWTT process
  - *Reflect the way the products will be used (i.e., may not be the same as a* scientific *evaluation)*
- Evaluate strengths and weaknesses of aviation weather forecasts and diagnoses
- Provide meaningful feedback to developers and TRP

# QA/Verification Assessment Process for FAA Products

- Develop ***understanding*** of product
- Identify appropriate verification ***observations***
- Develop appropriate verification ***methods***
- Create a Quality Assessment ***Plan***
- Collect independent ***dataset(s)***
- ***Apply*** verification approaches, ***analyze*** results, and prepare Quality Assessment ***Report***
- Provide report to TRP

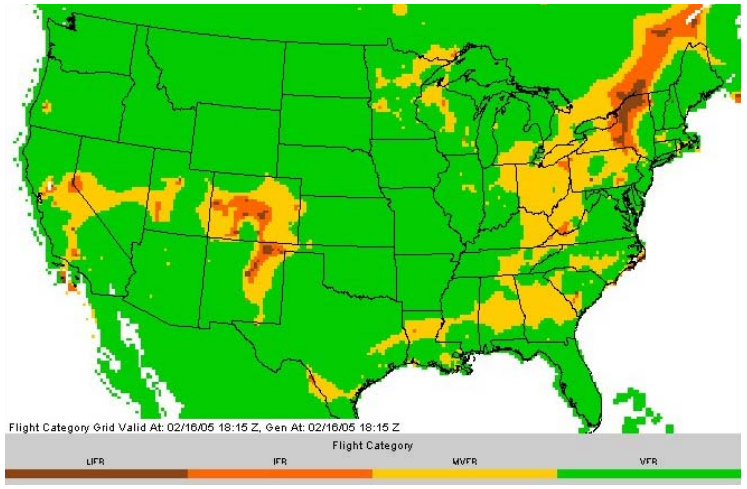
# QA PDT (FAA) Verification Challenges

- Identification of appropriate datasets that are both *independent* and *meaningful* for an evaluation
  - *PIREPs, METARs, in situ observations*
  - *Research aircraft*
  - *Satellite*
- Development of methods that reflect the observation limitations and provide meaningful measures of forecast quality
  - *Ex: Limitations in statistics based on PIREPs*
- Challenges are especially large in oceanic regions and other regions with limited in situ or ground-based observations

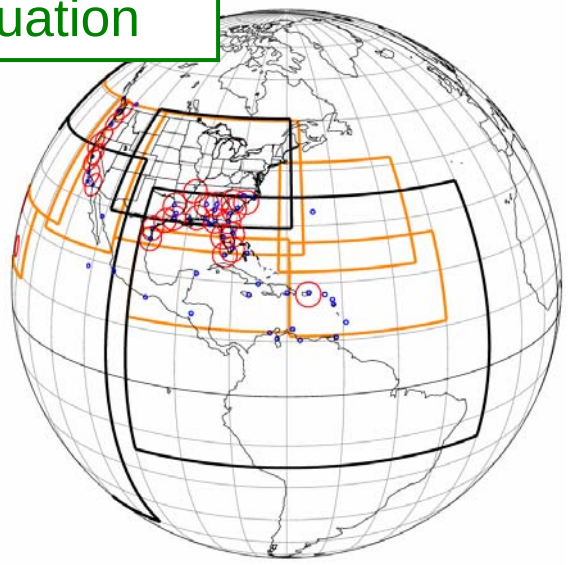
# Meeting QA PDT (FAA) Verification Challenges

- No independent observations
  - *Use statistical approaches to estimate quality (e.g., cross-validation)*
- Sometimes “true” observations of phenomena are not available
  - *Use inferred measures*
  - *Establish that product is consistent with other inferred values*

NCV Analysis




CTOP evaluation



# Use of satellite-based observations for verification

- Provide an opportunity to meet some of the verification challenges
  - *Oceanic/Alaska – Icing, Convection, Cloud Top. Turbulence, Volcanic Ash, C&V*
  - *Diagnoses and forecasts*
- Provide challenges of their own! (e.g., Mahoney; Madine/Kay; Holland/Takacs)
- New observation platforms and instruments (e.g., CloudSat, MODIS) provide many opportunities for the future