Integrated Weather Forecast Production and Monitoring System

Environment Canada / Environnement Canada

NinJo Aviation Needs Workshop, Montreal, June 8, 2009

Dashboard: Real-time situational awareness

GUI: Leverage meteorologist action

Meteorologist over the loop

Has **knowledge, wisdom**, perception, situational awareness

Can interact and intervene

Graphic | Artificial Intelligence | Text

Interpret and act
- Warn, advise
- Explain uncertainty
- Give confidence
- Add value

DG: Guidance

DF: TAF

0 time

Current Guidance Heads-up Alert

Current Obs (minutes old)

Guidance: Direct model output, statistical products (hours old)

Integrated Weather Objects: Scribe, Aurora, guidance combining models, observations, and climatology (visualize, control production)

Decision Support System: SIGMAR, FobCM, CIP, FRB, TAFWarn, TAFtime

Editor: **DF: Forecast** | Comments | Edit | Send

Dashboard

Engine

~ 5 seconds

Computer Model

DM: NWP → Post-process → **DP:** Weather Elements

Assimilate

DT: Land, sea

D1: Surface obs

D2: Satellite

D3: Radar

D4: Lightning

D5: Upper Air

D6: PIREP

D7: Webcam

D8: *Other?*

Current observations **data**

Integrate (AI)

Nowcast (obs, clim) (AI)

D1a - D8a: Archive

4D datacube

Forecast (AI)

Climate **data** (**D1a**)

DN: (0-6 h)

DG: Guidance

Merge: Nowcast, Forecast (0-72 h) (AI)

Significant Weather

Explanations Flags

DC: Current guidance (0-72 h)

Check DC – DF Consistency

Produce (one to many) (AI)

DW1: Static

DW2: Variable

DW3: Safety, economy

Data, information
- Objects, abstract features, derived fields
- Up-to-the-minute intelligent data fusion
- Intelligently composed interest fields

Clients

Aviation

DW1: limits, thresholds

DW2: daily variations, airport arrival and departure rates, timing sensitivities, runway configurations, traffic problems, preferred alternates

DW3: help GA pilot, cost-loss model for decision-making, NextGen, defence

DMa, DPa, DNa, DCa, DFa, DGa Archive

Hindcast: Verify

Conditional Verification

Feedback to integrate

Use observations, computer models, objective guidance, and mental models (with **AI**) to update forecasts and warnings, so that many diverse users can make optimal decisions. **Leverage human knowledge, perception, action**. Enable meteorologist to use valuable skills and limited time more effectively, for analysis, diagnosis, and prognosis (ADP), to attend to **high-impact weather, warnings,** to advise clients about current situations, and to sharpen skills to prepare to respond to future situations.