

NASA /NWS Spaceflight Meteorology Group Training – A Foundation for the NWS Decision Support Program

Kurt Van Speybroeck
NWS Spaceflight Meteorology Group

**Memphis All Hazards Decision Support
Workshop**
February 10, 2010

*The views presented are the authors and do not
necessarily represent those of NOAA/NWS*





Acknowledgments

**Rusty Billingsley and Jud Ladd
NWS Southern Region Headquarters**

**Frank Brody
NWS Spaceflight Meteorology Group**

**Alan Gerard
NWS Jackson, MS**

**Jon Zeitler
NWS Austin/San
Antonio, TX**

**Bill Bunting and Mark Fox
NWS Fort Worth, TX**

**Tom Bradshaw and
Tracy Howieson
NWS Southern Region
Headquarters**



Overview

- **NWS Training Philosophy**
 - Incident Meteorologists (IMETs)
 - Spaceflight Meteorology Group (SMG)
 - EOC Ops/Training

- **NASA Training Culture**
 - SMG Experience
 - Simulation from 30K feet
 - True Collaboration Plans

- **Emerging Decision Support Services**
 - Present status and Future Plans
 - Focused shift in training methods



Incident Meteorologists (IMETs)



History of NWS Operational Support



Spaceflight Meteorology Group (SMG)



History of NWS Operational Support



Spaceflight Meteorology Group (SMG)

- **Created 1962 - SMG provides weather guidance to NASA Human Spaceflight Operations (orig. PMWSG)**
- **Weather support (details) change as program changes and decision thresholds are modified.**
- **Supported Mercury, Gemini, Appollo, Skylab, Shuttle Ops, and ISS.**
- **Member of Flight Control Team – (Ops/Training)**
(NASA sometimes forgets we are NWS...NWS sometimes thinks we are NASA)
- **Future – Constellation (Orion and Ares)**





Decision Support & SMG

- An incident is not the place for introductions
- Decisions are based on trust and information
- Joint/collaborative training
- Common experiences/events help solidify trust



Launch is **Optional**;
Landing is **Mandatory!**



Decision Support & SMG

- An incident is not the place for introductions
- Decisions are based on trust and information
- Joint/collaborative training
- Common experiences/events help solidify trust



Launch is **Optional**;
Landing is **Mandatory!**



Emergency Operations Support

NWS has increased decision support services for core partners with a similar mission (public safety).



History of NWS Operational Support

History of SMG Decision Support



Primary Missions - NASA



Shuttle

- Plan, Train, Fly, Next Mission
- Pre Flight/Post Landing
- Lessons learned
- Mission Focus during flight



International Space Station



- Plan, Train, Fly with continuous ops
- ISS is a 24/7/365 operation
- Training integrated with operations



NASA Training, Philosophy & Culture



“clear and concise communication is critical to our mission”



- Flight Control Team members –enter SIM with baseline in discipline knowledge.
- SIM world provides chance to work with team, and apply lessons learned (experience)
- Facilitate communications (styles, prefs, and SA)

Knowledge, Communication, and Application

Motto - Plan, Train, Fly

Training and Certification

SMG conducts both an NWS training program and a certification program to meet NASA requirements for mission support.

NOAA / NWS

**Training &
Development**

Core Competencies:

- **Meteorology**
- **Forecasting**
- **NWS systems**
- **Communicating with public**



NASA

**Certification for
Flight Support**

Core Competencies:

- **Decision support**
- **Teamwork**
- **Technical communications**
- **Unique systems and data**



Training Nuts and Bolts

Certification Process





Simulation and Mentoring Process

Simulation Plan: Determine objectives, internal or external participation, and identify participants



**Pre-simulation mentor meeting
Establish mentoring level and personal objectives**



Conduct simulation



**Team debrief: (Post-Mortem)
Team performance: Flight Director feedback**



**Post-simulation mentor meeting / Individual debrief
Review performance and establish next training steps**



Debriefings / Feedback

Feedback cycle is critical to the success of any simulation or live operation.

Replay:

What happened? What went well?

Reconstruct:

What could we have done differently?

Reflect:

***Assess performance and decision making
Lessons learned***

Redirect:

***How does this relate to past events?
How do we apply this to future events?
Action Items***



Decision Support Services



NWS focusing on supporting public safety/first responder mission

Philosophy before DSS

- Scientific experts
- Data to users w/o interpretation
- “Datacentric”
- Gatekeepers of information
- Accuracy/verification
- 9-10-01 thinking
- Training focus
 - Technical/Scientific skill





Decision Support Services



NWS focusing on supporting public safety/first responder mission

Post DSS Culture

- Scientific experts
- Interpretive service with Data
- “Teamcentric”
- Integrated with EOP/EOC
- Timeliness and accurate
- Training focus
 - Technical/Scientific skill
 - **Communication**
 - **SA, reverse role, integrate**



Landing Weather Statistics as of Dec 09 (STS-1 to STS-129)

- **SMG has supported 128 missions (127 landings)**
- **72 KSC landings, 54 EDW, 1 NOR (15 night landings)**
- **63% of all missions impacted by obs/forecasted weather at landing**
 - 56 (44%) landing weather changed duration of flight
 - 25 missions had wx related landing site changes
- **Prime landing site is KSC since 1991**
 - 66 of 89 missions landed at KSC since 1991
- **Low cloud cigs and proximity of precip**
 - most frequent wx flight rule violations, on-time landings
 - Low cig also most difficult to forecast



THANK YOU!

Questions? Comments?

Kurt Vanspeybroeck

NOAA/NWS

SMG Houston, TX

kurt.m.vanspeybroeck@nasa.gov

Jon W. Zeitler

NOAA/NWS

WFO Austin/San Antonio, TX

jon.zeitler@noaa.gov





Proposed Simulation Levels

- **Level 0: Training, Professional Development, EOC Visits, NIMS/ICS**
- **Level 1: Developmental Simulation**
 - **Verification of plans, procedures, equipment – possibly segmented**
 - **Can serve as a pre-training opportunity for Level 2**
- **Level 2: Internal Simulation (local participation)**
 - **1 - 2 Forecasters training, 1 - 4 hours duration**
 - **Local Simulation Supervisor**
 - **Not focused on “training/learning” but working out the kinks before real time ops**
- **Level 3: Train with your local decision makers**
 - **Use available (local) partners, (1 - 2 forecasters training)**
 - **Local Simulation Supervisor or one from another forecast office**
 - **4 - 8 hour duration**
 - **Opportunity to interact with the decision maker**



Proposed Simulation Levels

- **Level 4: Full WFO Team/Partners**
 - **WFO shift team, with partners**
 - **Play the scenario through to completion**
 - **Use “real” team members in their roles**

- **Level 5: FEMA Table Top style (WFO Team/multiple agencies/ROC-SRH)**
 - **Full Team (customers, WFO team, SRH ROC, EOC, kitchen sink)**
 - **Could be a multi-day (most likely would be a FEMA Tabletop with WFO spinning their training into the FEMA big picture)**
 - **Use all available bodies and any additional that can be loaned**
 - **Long fuse planning required**
 - **Major time/resource requirements**



Decision Support Model

