



GOES-R Proving Ground and Satellite User Readiness Workshop

AWIPS Migration Status and Plans

May 17, 2011



Topics



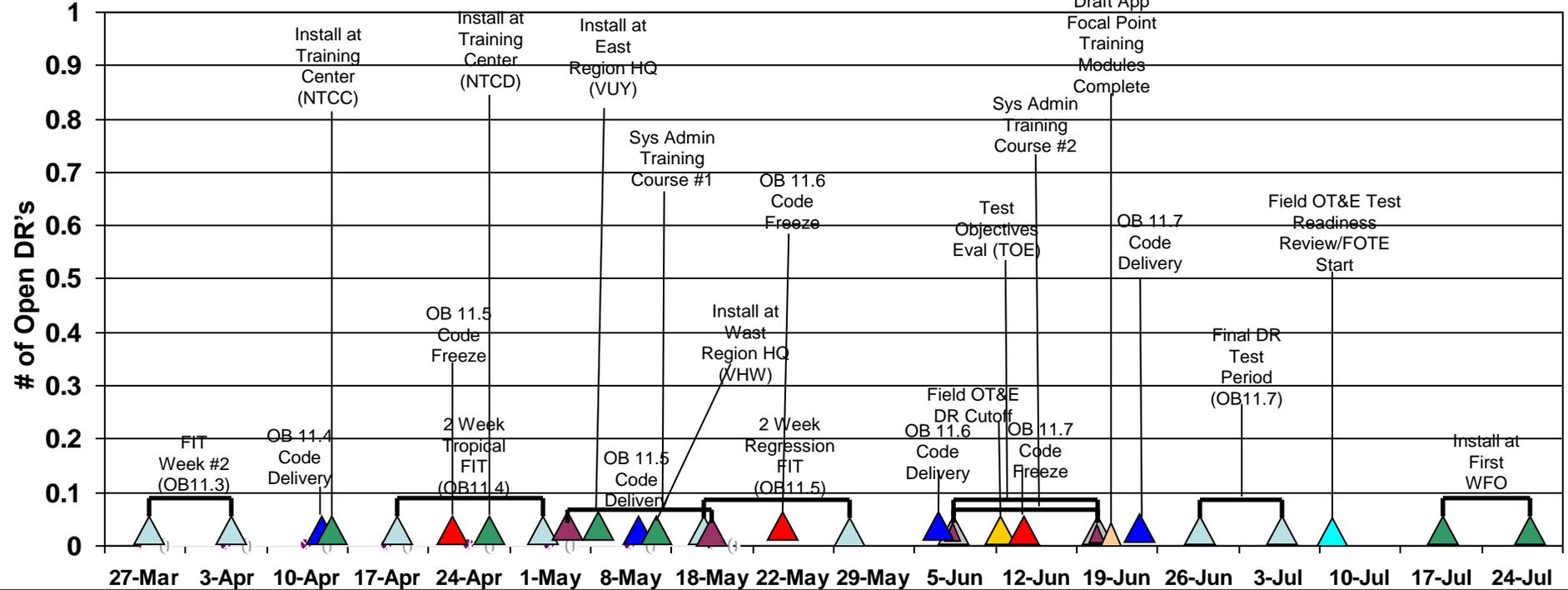
- AWIPS Migration Status
- Governance



AWIPS II Schedule & Milestones



Impact 1 --> 3 Open DR's



- ▲ FIT Week #2 (OB11.3): 3/28/11 – 4/1/11
- ▲ OB11.4 Code Delivery: 4/11/11
- ▲ Install at Training Center (NTCC): 4/11 – 4/14
- ▲ 2 Week Tropical FIT (OB11.4): 4/18/11 – 4/29/11
- ▲ OB11.5 Code Freeze: 4/22/11
- ▲ Install at Training Center (NTCD): 4/25 – 4/28
- ▲ Install at East Region HQ (VUY): 5/4 – 5/5
- ▲ Sys Admin Training Course #1: 5/2 – 5/13
- ▲ OB11.5 Code Delivery: 5/9/11
- ▲ Install at West Region HQ (VHW): 5/10 – 5/11
- ▲ OB11.6 Code Freeze – 5/20/11
- ▲ 2 Week Regression FIT (OB11.5): 5/16/11 – 5/27/11
- ▲ OB11.6 Code Delivery– 6/3/11
- ▲ Field OT&E DR Cutoff Date: 6/8/11
- ▲ Test Objectives Evaluation (TOE): 6/6 – 6/17
- ▲ Sys Admin Training Course #2: 6/6 – 6/17
- ▲ OB11.7 Code Freeze: 6/10/11
- ▲ Draft App Focal Point Training Modules Complete: 6/17/11
- ▲ OB11.7 Code Delivery: 6/22/11
- ▲ Final DR Test Period: 6/27/11 – 7/1/11
- ▲ Field OT&E Test Readiness Review/FOTE Start: 7/6/11
- ▲ Install at First WFO: 7/18/11 – 7/22/11

AWIPS Migration Status

- Net DR closure falling behind projected following intensive FIT period
 - Full system testing is generating a higher percentage of high impact DRs than expected at this stage
- AWIPS II software functionality and performance continue to improve
 - Stubborn functional areas remain to be resolved
 - GFE-ISC/Service Backup, Decision Assistance Tools
- Local applications behind schedule
 - Developing a “just-in-time” site-by-site strategy
- AWIPS II training development on-track
- AWIPS II successfully installed & running at three NWS Regional Headquarter sites per OT&E Plan
- NAWIPS migration testing and deployment on-track



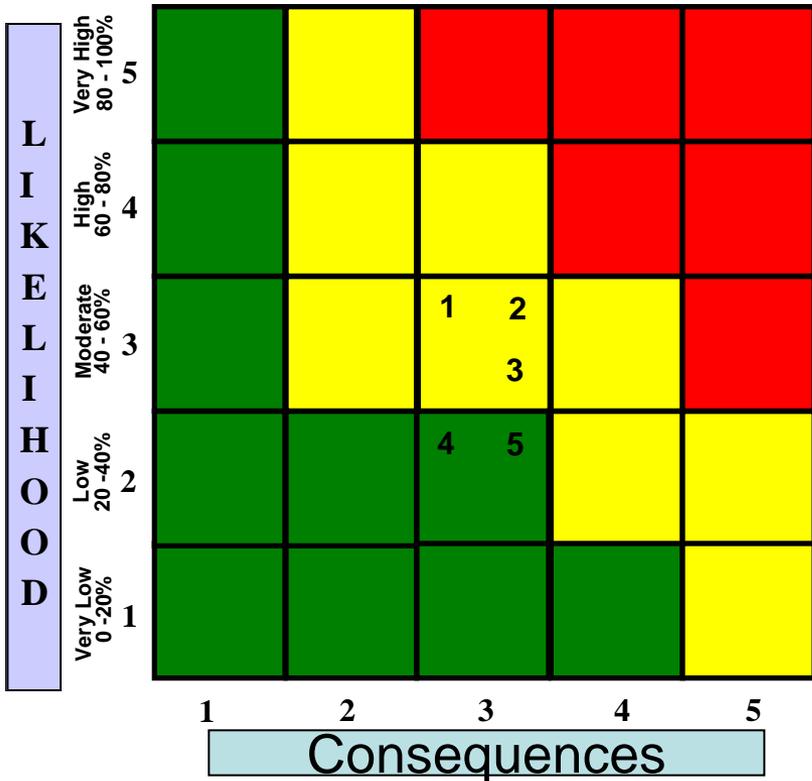
Fiscal Year	2006				2007				2008				2009				2010				2011				2012			
	FY6				FY7				FY8				FY9				FY10				FY11				FY12			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
AWIPS II Migration		Plan T01	Sys Anal T02	Infra Dev T03-6	Mig Plan T07																							
									Migrate Apps T08-10				Complete Mig T011								Operational Test & Evaluation				Deploy	Installs		

↑
May, 2011



AWIPS Risk Management

High Impact Risks



Trend	Rank	Approach	Risk
↔	1	M	ID #1 AWIPS II Performance in critical areas does not meet or exceed AWIPS I
↔	2	M	ID #2 Regions cannot port critical local applications to AWIPS II before deployment
↑	3	M	ID #3 AWIPS II Training not completed by deployment
↔	4	M	ID #4 Raytheon cannot resolve all critical AWIPS II Software Discrepancy Reports (DR's) before deployment
↔	5	M	ID #5 AWIPS II System Stability inadequate for deployment

	1	2	3	4	5
Cost	No Incr	No Incr	+10%	+20% incr	>20%
Schedule	No Slip	1 month	1 Qtr	2 Qtr	>2Qtr

Criticality	L x C Trend	Approach
Critical	↓ Decreasing (Improving)	M – Mitigate
Med	↑ Increasing (Worsening)	W – Watch
Low	↔ Unchanged	A – Accept
		R - Research



AWIPS Release Planning



- Release Planning - Responsibility of OST in partnership with Corporate Board
 - SREC is the team that prepares a recommendation of:
 - Release content and schedule – 5 year plan
 - DRS, Small Enhancements released **Monthly**
 - New/Modified Functionality released **Quarterly**
 - » Strategic
 - » Infrastructure
 - » Operational
 - » Operating systems, COTS and COTS versions, security patches
 - Hardware/Comms capacity planning
 - » e.g., SBN and local modeling
 - Assignment of Development Resources

Draft Release Schedule

2012 CY																										
1ST QTR CY12			2ND QTR CY12			3RD QTR CY12			4TH QTR CY12																	
JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC															
9	23	6	20	5	19	2	16	30	7	21	4	18	2	16	30	13	27	10	24	8	22	5	19	3	17	31
12.1		12.1.1		12.1.2		12.2			12.2.1		12.2.2		12.3			12.3.1		12.3.2		12.4		12.4.1		12.4.2		



AWIPS II Satellite Related Tasks



- **Current SREC Candidate List and Status**

- Strategic – must do

- 05-043 Meteorological Satellite Imagery and Products for the Forecast Field
 - NPP/GOES-R product list on page 8-11
- 06-065 Volcanic Ash Imagery

- Operational – prioritized by SREC team

- 06-080 High Temporal Satellite Precipitation Estimates (9.2)
- 06-034 Add Polar Orbiting Visible and IR Imagery to AWIPS (9.3)
- 07-034 Simulated Satellite Products from Operational NWP (20.4)
 - » High on the list of NCEP and Pacific region
- N/A Additional Blended TPW products
 - » High on the list for Western region

- 06-048 Polar Microwave Products for AWIPS (18)
- 10-013 Satellite-based Convective Initiation (26)
- N/A GOES SFOV DPI Products (42)



- Infrastructure

- Upgrade to 64 bit architecture
- 10-016 AWIPS Capability for 24-bit Visualization of Satellite Imagery and Products
- Others?
 - 32-bit visualization
 - Expands the ingest (special data sets in kml, csv, ascii, other formats)



AWIPS II Satellite Related Tasks

NPP/GOES-R Product List (1 of 3)



Product (by product type and sub-type)	Testing Plan Date (CY)	NDE Operational Readiness Date (CY)	Release Priority	Number of Products
GOES-R Baseline End-Product Sets				
Atmosphere / Aerosols				
Aerosol Detection (including Smoke and Dust)	2013 Q3		1	6
Aerosol Optical Depth	2013 Q3		1	4
Volcanic Ash: Detection and Height	2014 Q3		2	2
Atmosphere / Clouds				
Cloud S. Moisture Imagery	2013 Q3		1	54
Cloud Optical Depth	2013 Q3		1	4
Cloud Particle Size Distribution	2013 Q3		1	6
Cloud Top Phase	2013 Q3		1	6
Cloud Top Height	2013 Q3		1	6
Cloud Top Pressure	2013 Q3		1	4
Cloud Top Temperature	2013 Q3		1	4
Hurricane Intensity	2014 Q3		2	2
Lightning Detection: 1) Events 2) Flashes 3) Groups	2014 Q1		1	6
Atmosphere / Precipitation				
Rainfall Radar/QPE	2014 Q3		2	2
Atmosphere / Profiles				
Legacy Vertical Moisture Profile	2013 Q4		1	6
Legacy Vertical Temperature Profile	2013 Q4		1	6
Derived Stability Indices (5 indices: CAPE, Lifted Index, Kindex, Showalter Index, Total Totals)	2015 Q1		2	30
Total Precipitable Water				
	2013 Q4		1	6
Atmosphere / Radiances				
Downward Shortwave Radiation: Surface	2014 Q3		2	6
Reflected Shortwave Radiation: TOA	2014 Q3		2	4
Atmosphere / Winds				
Derived Motion Winds	2015 Q1		2	36
Land / Land				
Fire / Hot Spot Characterization	2014 Q3		2	6
Land Surface (Skin) Temperature	2014 Q3		2	6
Snow Cover	2014 Q3		2	6
Ocean / Ocean				
Sea Surface Temperature (skin)	2014 Q4		2	2
Space & Solar / Energetic Particles				
Energetic Heavy Ions	2014 Q1		1	1
Magnetospheric Electrons and Protons: Low Energy	2014 Q1		1	1
Magnetospheric Electrons and Protons: Medium & High Energy	2014 Q1		1	1
Solar and Galactic Protons	2014 Q1		1	1
Space & Solar / Magnetic Field				
Geomagnetic Field	2014 Q2		1	1
Space & Solar / Solar				
Solar Flux: EUV	2014 Q2		1	1
Solar Flux: X-Ray	2014 Q2		1	1
Solar Imagery: X-Ray	2014 Q2		1	2
Total Baseline End-Products (GOES-R)				231
GOES-R Option 2 End-Product Sets				



AWIPS II Satellite Related Tasks

NPP/GOES-R Product List (2 of 3)



Product (By product type and sub-type)	Testing Plan Date (CY)	NDE Operational Readiness Date (CY)	Release Priority	Number of Products
Atmosphere / Aerosols				
Aerosol Particle Size	2015 Q2		3	2
Atmosphere / Clouds				
Aircraft Icing Threat	2016 Q2		4	2
Cloud Ice Water Path	2015 Q1		3	6
Cloud Layers / Heights	2015 Q1		3	6
Cloud Liquid Water	2015 Q1		3	6
Cloud Type	2015 Q1		3	4
Convective Intensity	2015 Q1		3	4
Enhanced W / Overshooting Top Detection	2016 Q2		4	4
Low Cloud and Fog	2015 Q1		3	2
Tropopause Folding Turbulence Prediction	2015 Q1		3	4
Visibility	2016 Q2		4	2
Atmosphere / Precipitation				
Probability of Rainfall	2016 Q2		4	2
Rainfall Potential	2016 Q2		4	2
Atmosphere / Radiances				
Absorbed Shortwave Radiation: Surface	2015 Q1		3	2
Downward Longwave Radiation: Surface	2015 Q1		3	4
Upward Longwave Radiation: Surface	2015 Q1		3	4
Upward Longwave Radiation: TOA	2015 Q1		3	4
Atmosphere / Trace Gases				
Ozone Total	2015 Q1		3	4
SO ₂ Detection	2015 Q1		3	2
Land / Land				
Flood/Standing Water	2016 Q3		4	4
Ice Cover	2016 Q3		4	2
Snow Depth (over Plains)	2016 Q3		4	6
Surface Albedo	2015 Q1		3	2
Surface Emissivity	2015 Q1		3	2
Vegetation Fraction: Green	2016 Q3		4	2
Vegetation Index	2016 Q3		4	2
Ocean / Ocean				
Currents	2016 Q4		4	4
Currents: Offshore	2016 Q4		4	4
Sea & Lake Ice: Age	2016 Q4		4	2
Sea & Lake Ice: Concentration	2016 Q4		4	4
Sea & Lake Ice: Motion	2016 Q4		4	4
Total Option 2 End-Products (GOES-R)				166
NPP Products				
Blended Total Precipitable Water*		Jul-2012	1	1
Blended Total Precipitable Water Anomaly*		Jul-2012	1	1
Blended Rain Rate*		Jul-2012	1	1
VIIRS Imagery Channel 1 (0.64 µm)	Oct-11	Oct-2012	1	1
VIIRS Imagery Channel 4 (3.74 µm)	Oct-11	Oct-2012	1	1
VIIRS Imagery Channel 5 (11.455 µm)	Oct-11	Oct-2012	1	1
Atmospheric Temperature Profile (CrIS/ATMS)	Oct-11	Jan-2013	1	1
Atmospheric Moisture Profile (CrIS/ATMS)	Oct-11	Jan-2013	1	1
Atmospheric Temperature Profile	Oct-11	Apr-2013	1	1
Atmospheric Moisture Profile	Oct-11	Apr-2013	1	1
VIIRS Imagery Channel 2 (0.865 µm)		Oct-2012	2	1
VIIRS Imagery Channel 3 (1.610 µm)		Oct-2012	2	1
VIIRS Imagery Moderate Channel 6 (0.746µm)		Oct-2012	2	1



AWIPS II Satellite Related Tasks

NPP/GOES-R Product List (3 of 3)



Product (by product type and sub-type)	Testing Plan Date (CY)	NDE Operational Readiness Date (CY)	Release Priority	Number of Products
VIIRS Imagery Moderate Channel 9 (1.375 µm)		Oct-2012	2	1
VIIRS Imagery Moderate Channel 13 (4.05 µm)		Oct-2012	2	1
VIIRS Imagery Moderate Channel 15 (10.763 µm)		Oct-2012	2	1
VIIRS Imagery Moderate Channel 16 (12.013 µm)		Oct-2012	2	1
VIIRS Imagery Day Night Band (0.7 µm)		Oct-2012	2	1
Sea Surface Temperature (SST)		Jan-2013	2	1
Land Surface Emissivity (ATMS)		Jul-2012	3	1
Cloud Liquid Water (ATMS)		Jul-2012	3	1
Snow Water Equivalent (ATMS)		Jul-2012	3	1
Ice Water Path (ATMS)		Jul-2012	3	1
Land Surface Temperature (ATMS)		Jul-2012	3	1
Blended Snow Cover		Dec-2013	3	1
Blended Total Precipitable Water (GCOM)		Sep-2014	2 (1?)	1
Blended Total Precipitable Water Anomaly (GCOM)		Sep-2014	2 (1?)	1
Blended Rain Rate (GCOM)		Sep-2014	2 (1?)	1
Nadir Profile Ozone		Apr-2013	3	1
Coastal Total Column		Apr-2013	3	1
Snow Cover		Apr-2013	3	1
Cloud Cover/Layers		Apr-2013	3	1
Vegetation Index		Apr-2013	3	1
Aerosol Optical Thickness		Apr-2013	3	1
Surface Albedo		Apr-2013	3	1
Aerosol Particle Size		Apr-2013	3	1
Cloud Top Temperature		Apr-2013	3	1
Cloud Top Pressure		Apr-2013	3	1
Cloud Optical Thickness		Apr-2013	3	1
Cloud Base Height (New)		Apr-2013	3	1
Land Surface Temperature (VIIRS) (New)		Apr-2013	3	1
Suspended Matter (New)		Apr-2013	3	1
Ice Surface Temperature (New)		Apr-2013	3	1
Atmospheric Pressure Profile (New)		Apr-2013	3	1
Precipitation (TypeRate) (GCOM)		Sep-2013	3	1
Soil Moisture (GCOM)		Sep-2013	3	1
Total NPP Products				46
Total Products:	383		Totals per FY:	383

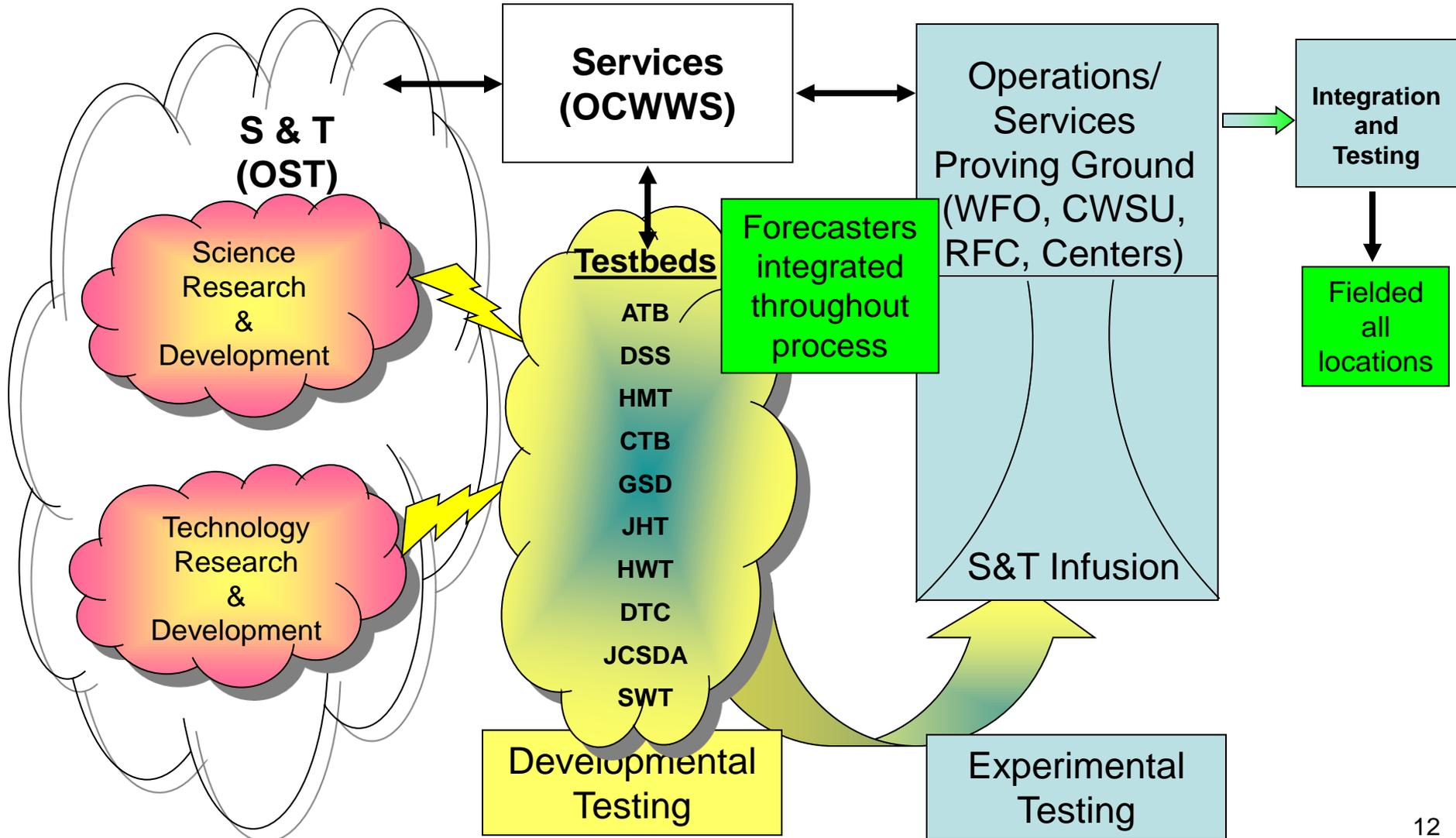
NPP Assumptions:

For products with Operational Plan Date, begin testing 6 months earlier.
 GOES-R Master Schedule (tentative)
 Release 1 Products Site Testing: CY15Q3—CY14Q3
 Release 2 & 3 Products Site Testing: CY14Q3—CY15Q1
 Release 4 Products Site Testing: CY15Q2—CY17Q3



Moving Research into Operations

Synchronizing Services and S&T





Governance Vision



- Enable Collaborative AWIPS II Environment to effectively incorporate new science and technology into AWIPS II operational baseline from NOAA development organizations, proving grounds and test beds, and academic and research communities
 - Enable an agile software development environment with sufficient disciplined methods in place to allow high quality software to be incorporated into the operational baseline in a timely fashion by a number of development groups
 - Enable effective user and developer collaborations
- The result will be that AWIPS will become the premium “Open Source” software development Platform for the hydrometeorological community



Stakeholders



- Raytheon O&M Team, Raytheon AWIPS II Development Team
- OST/PPB (OSIP)
- OST SEC Software Development Team
- MDL (RITT)
- OHD development team
- Sites and Regions (local applications)
- OOS (O&M)
- OCWWS (Policy, Requirements and Training)
- Regional and Site Developers (local applications)
- National Centers (AWC, CPC, HPC, NHC, OPC, SPC)
- NESDIS
- NSSL
- OAR/ESRL/GSD
- GOES R Proving Ground
- UCAR, NCAR
- FAA
- NASA
- UNIDATA/Universities



How to Accomplish the Vision?



- Development Process
 - Develop streamlined well documented governance processes balancing software agility needs with necessary software engineering discipline to ensure high quality software infusion into AWIPS baseline
 - Establish software architecture documentation and Gov't expertise in that architecture to facilitate design-oriented discussions
- Development and Testing Environment
 - Provide well-documented AWIPS Development Environment (ADE)
 - Provide AWIPS test environment (Proving Ground, ADAM, and methods including regression and automated test tools)
- Technical Support
 - Provide a well defined set of best practices, common libraries and toolkits to support development
- Collaboration
 - Provide methods to collaborate among developers
- Infrastructure
 - Evolve the infrastructure facilitate new data (self describing data format plugins), new models and applications
 - Integrate cyber security

“Always maintain connect to the OS&T Roadmap Focus Areas”



Software Development Process



- Software Development Process
 - Exploration and Definition
 - Define CONOPS/Requirements
 - Planning
 - Release assignment and resource allocation
 - Development Project Plan
 - Development (agile methods)
 - Iteration of requirements, design, code and unit/development testing
 - Testing
 - Site (ADAM), Test beds, Proving Grounds, Integration and Baselining
 - For each areas
 - Roles and Responsibilities
 - Communication Plan
 - Standards, Guidelines and Templates



Software Development Process



- **Policy Directives**
 - <http://www.weather.gov/directives>
- **Development Environment (ASDT Wiki)**
 - <https://collaborate.nws.noaa.gov/trac/asdt/wiki/AiiHb>
- **Development Process (ASDT Wiki)**
 - <https://collaborate.nws.noaa.gov/trac/asdt/wiki/GovernanceSoftwareDevelopmentProcess>
- **Standards & Guidelines (ASDT Wiki)**
 - <https://collaborate.nws.noaa.gov/trac/asdt/wiki/GovernanceSoftwareDevelopmentCodingStandards>



Technical Support



- Architecture team
 - Owners of the system
 - Identify commonalities (eliminate stove pipes of excellence)
 - Establish guidelines
 - Review software designs
 - Prepare a Product Improvement Plan
 - Include hardware, communications
 - Provide IT security expertise
 - Respond to developer questions
 - Training
 - Development handbook and Workshop



Development Collaboration



- Development Collaboration
 - Effective use of creative potential of employees and partners, leverage expertise, learn from mistakes, share best practices and share technology solutions
 - Design reviews (participate as Arch team member)
 - Exchange ideas
 - Discuss common problems
 - Identify commonalities, overlap and opportunities
 - Innovation web portal
 - Developer's Forum (listserver, wiki)
 - Innovation center (SEC)
 - Looking at cloud computing
 - Challenges
 - Engaging folks and commitment
 - Organizational boundaries
 - Distributed teams



Future Efforts



- Finalize Release Plan (June 2011)
- Finalize Governance (June 2011)
- Train Development Process (July/August 2011)
- Begin Development Reporting (August 2011)
- Establish Architecture Team (June 2011)
- Begin Development Collaboration (June 2011)
 - Developer Workshop
 - Exchange ideas, discuss common problems and Identify commonalities, overlaps, and opportunities
 - Innovation web portal
 - to provide a common virtual interactive environment for innovators to collaborate on ideas and concepts and share information
- Documentation - SSDD, Development Handbook (June/August 2011)