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Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Progress Towards the Release of V6

Schedule and Status

Steven Friedman
AIRS Science Processing

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Discussion Topics

- **Status of V6 Development**
 - Level 2
 - Level 3
 - Other PGEs
- **Plans for Completing V6**
 - Closure of issues, PGE and product release
 - Schedule



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AIRS Software Development Activities – Development Status

- **Version 6 development began on 2007-07-11 w/ V5.1.0.0**
 - Since then, more than 60 builds, 17 since last Science Team
 - Several test cycles, last one just before ST MTG
 - Current V6 development version is V5.9.12.0
 - Some Significant Features:
 - Added and tested new start-up options: climate, neural net
 - Improved retrieval yield, esp. boundary layer (also, no pixels left behind)
 - Mitigated the loss of AMSU-A Channel 5 in Level 2 retrieval
 - Trend reduction (bias trends over time)
 - New RTA
 - Improved surface, cloud properties, trace gases retrieval
 - Improved & standardized QC fields



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Level 2 Development Status

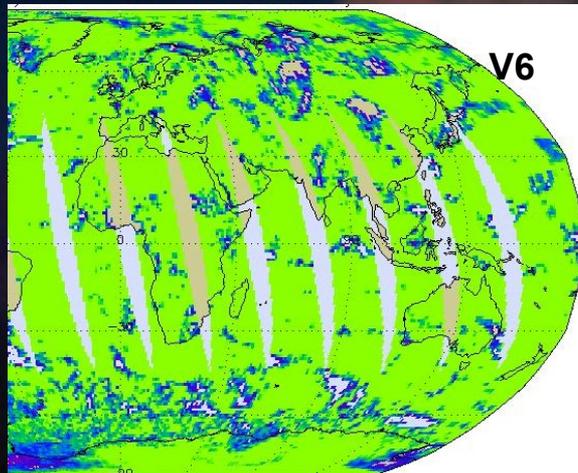
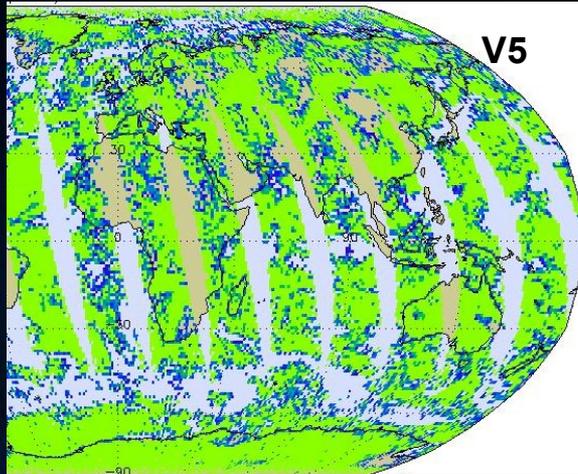
- **Changes Since April 2011 Science Team**
 - Incorporated and tested new water vapor channel set
 - Added Cloud Phase and Ice Cloud optical properties retrieval
 - Numerous small changes to L2 – refinement
 - QC reset to emphasize recent L2 retrieval changes
- **Work still remains, but the list is growing shorter**
 - Low yield in southern hemisphere ocean surface
 - Day/Night differences
 - Trace gas retrievals (final pass)
- **Final Considerations?**
 - Final decision of Water Vapor Channels
(use current channel set or NOAA-Gambacorta)
 - Incorporate SO₂ retrieval (Prata)



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Level 2 Development Status New Products - Example



- **Yield Improvement:
Surface Air Temperature**
 - V5 had gaps around storm systems and also at scattered locations and throughout the southern ocean
 - V6 has smaller gaps just around storm systems

For more details, see Evan Manning's presentation... just 1 presentation away!



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Level 3 Development Status New Products

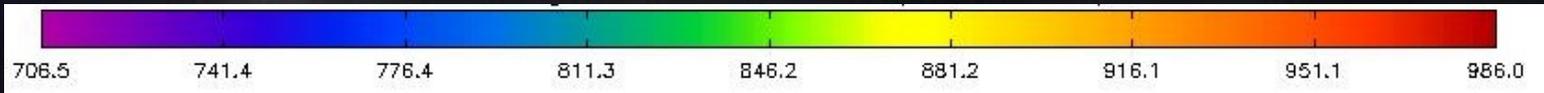
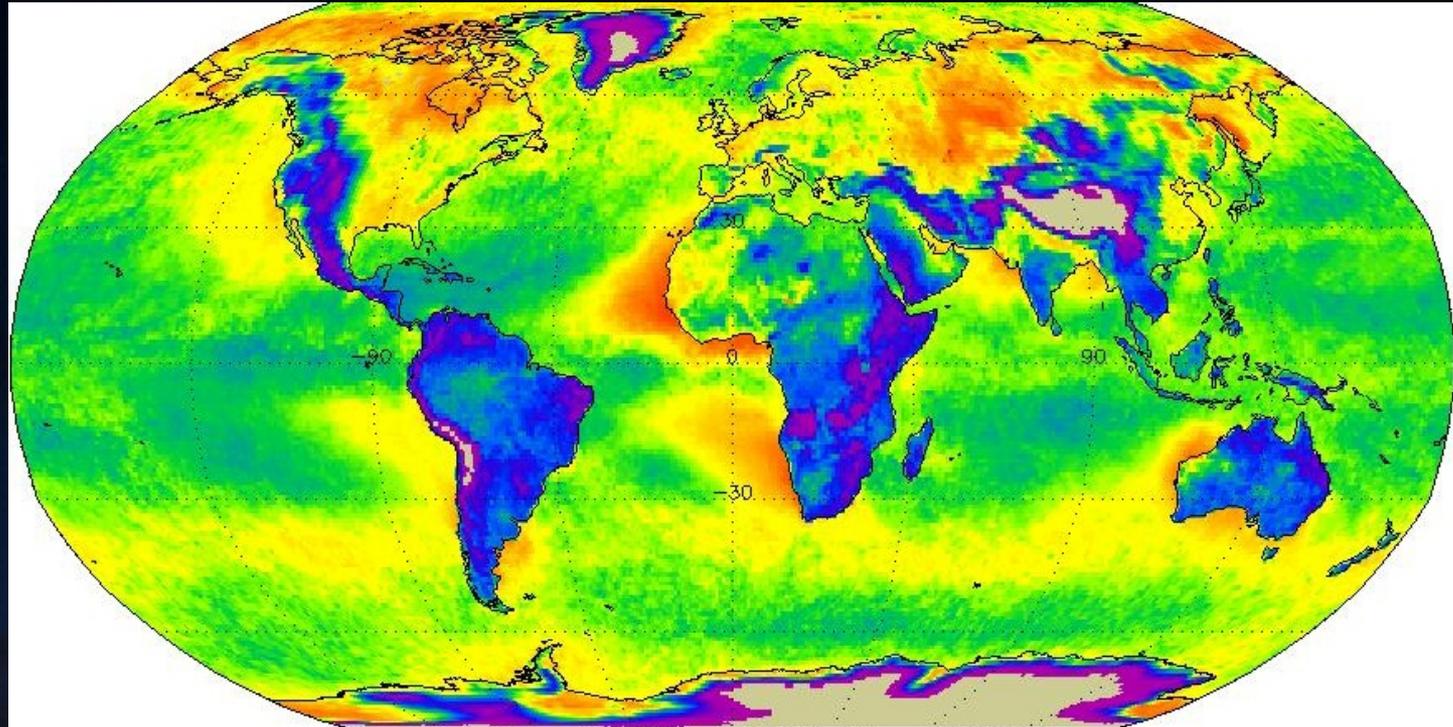
- **Three Level 3 product types planned for V6:**
 - **Level 3 Standard** - *our primary public L3 product*
 - *Conceptually*, L3 standard has not changed between V5 and V6
 - It contains only well-validated fields at roughly instrument vertical resolutions.
 - **Level 3 Support** - *designed for more sophisticated users*
 -  New product for public release in V6
 - Fields represented at higher internal vertical resolutions.
 - Products are verified but not fully validated.
 - **Level 3 Research** - *for internal science team and project use*
 - Includes outputs at internal retrieval steps and residuals
 - Products may not be verified, certainly not validated
 - Intended for research only.



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AIRS Software Development Activities – Level 3 Development Status



New Level 3 Support field: Boundary Layer Top Pressure (Daytime Image)



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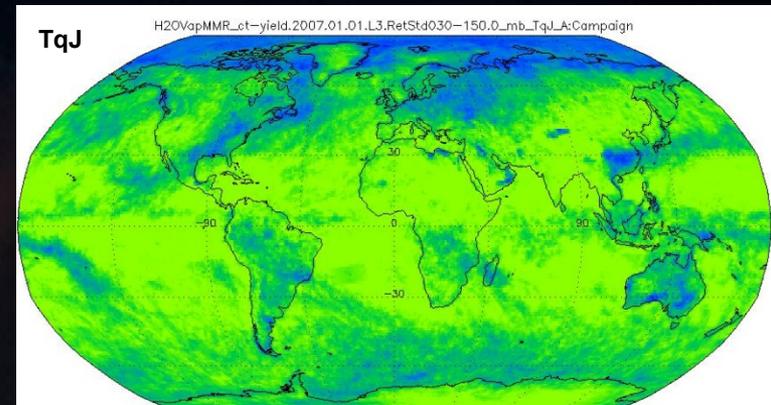
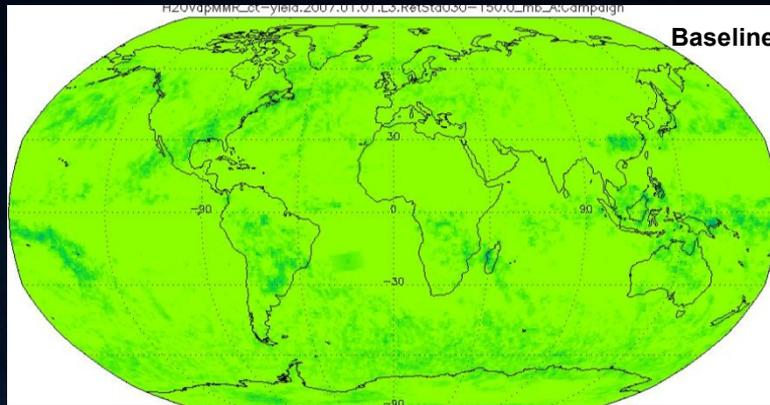
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AIRS Software Development Activities – Level 3 Development Status: TqJoint

- **“TqJoint Grids” – a new addition to the Level 3 Standard Product**
- **TqJoint Grids contain data for a common set of observations across water vapor and temperature at all atmospheric levels**
 - A unified temperature and water vapor QC filter is used throughout the atmosphere
 - Visual appearance will be the same
 - Yields tend to be lower especially in cloudy regions
 - Other data fields are also included
 - They must also pass their own QC restrictions
 - The original “ascending” and “descending” grids are also preserved
 - Should be more suitable for climate process studies



TqJ example: 150 hPa Water Vapor

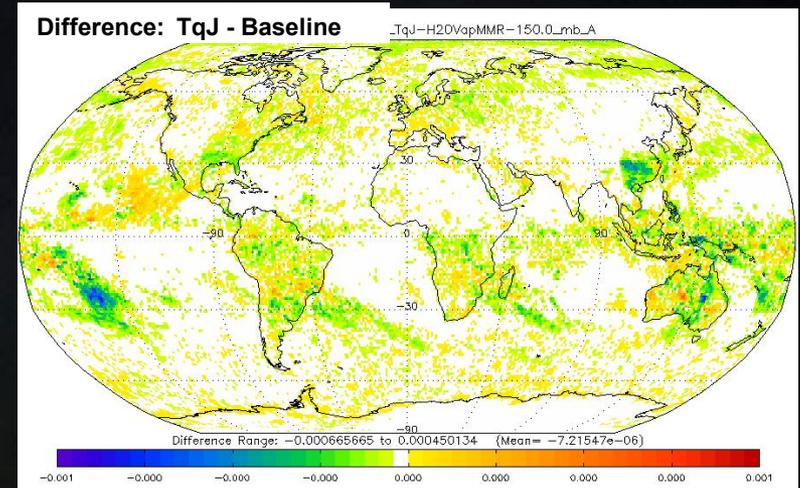
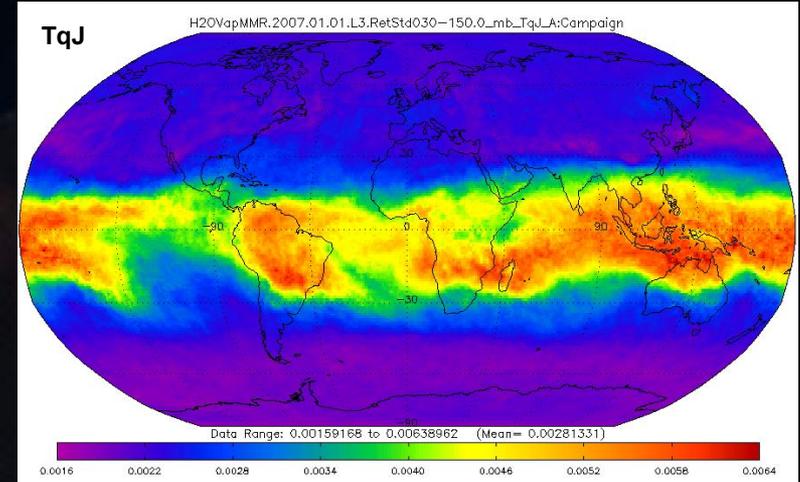
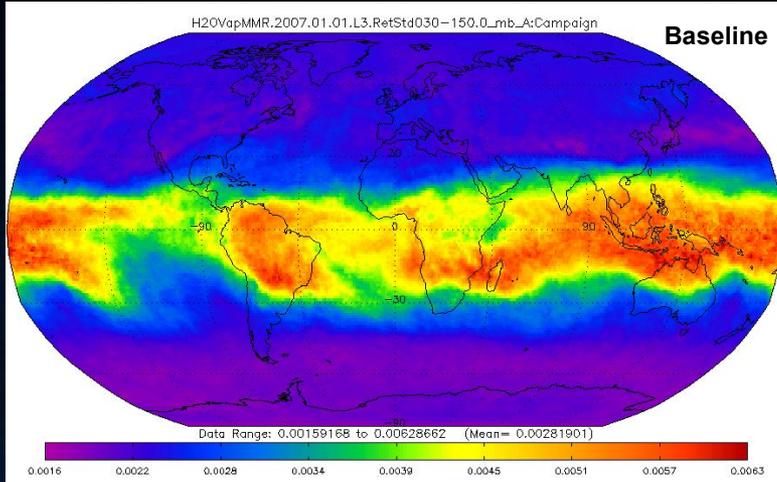


0.0 12.5 25.0 37.5 50.0 62.5 75.0 87.5 100.0

- Original grid has almost 100% yield for q @ 150 hPa.
- TqJ has lower yield, because TqJ requires good retrieval of T & q down to the surface. This effect will be noted at the top of the atmosphere and especially in cloudy regions.



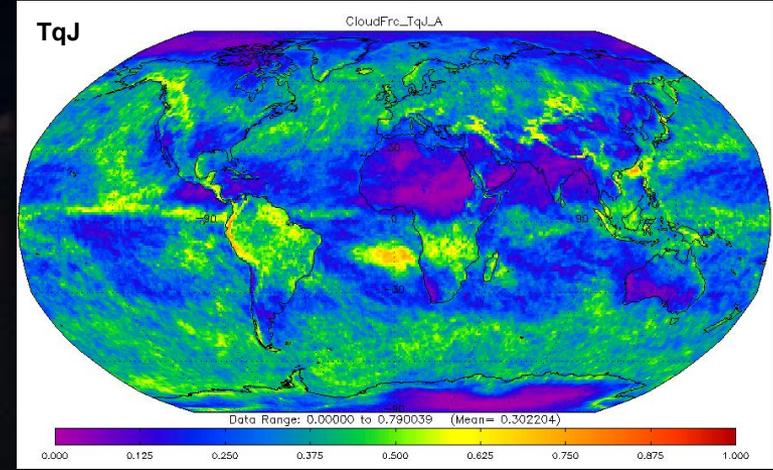
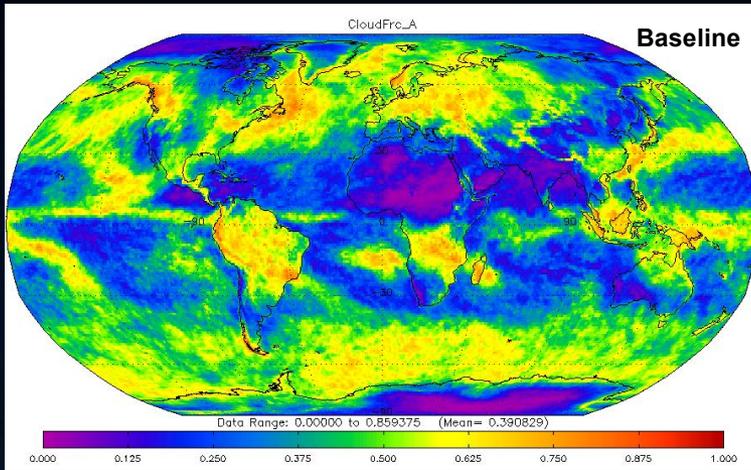
TqJ example: 150 hPa Water Vapor (Cont'd)



- Fields look the same... but
- Differences show that TqJ is somewhat dryer on average because of lower yield in cloudy/wet areas.



TqJ example: Cloud Fraction



- Cloud fraction shows the biggest TqJ difference.
- Cloud fraction in the “baseline” grid has almost 100% yield and reflects the distribution of clouds:
 - 39% cloudiness global mean
- Cloud Fraction in the “TqJoint” grid has values only for cases where we could retrieve T & q down to the surface:
 - 30% cloudiness global mean



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What about the rest of V6?



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V6 Level 1C Status

- **No significant changes in direction since last Science Team**
- **Level 1C possible release for V6**
 - Level 1C products will not be produced at the GES DISC
 - We will publish algorithm for L1C calculations
 - May need to address additional issues... probably in V7
 - radiometric discrepancy between detectors
 - maybe Cij
 - Hand-off to NOAA to support creation of new BUFR product?



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V6 Calibration Subset V6 Climate Subset

- **V6 Calibration Subset**
 - Will be very similar to V5
 - Basic algorithm unchanged, but rules have been tweaked
- **V6 Climate Subset**
 -  NEW product based on Calibration Subset product
 - Is derived from L1B and L2 products
- **Both “subset” products are still under development**

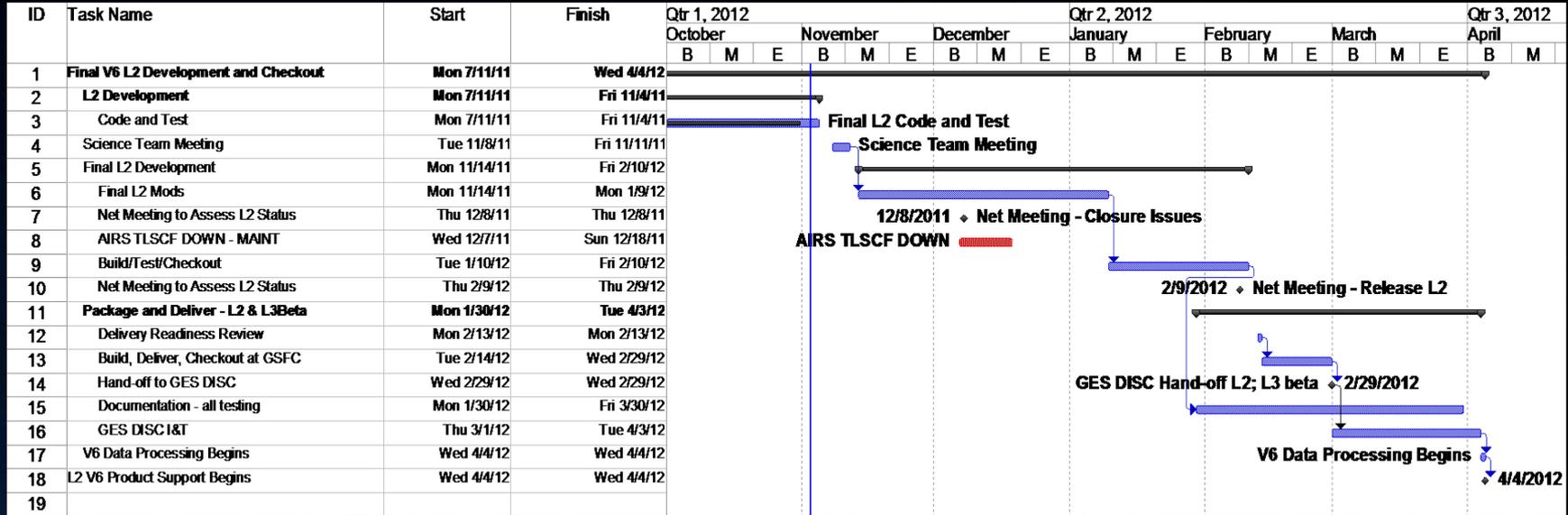


V6 Product Development Status

- **Current Status**
 - L1B – no changes planned
 - L2 – nearly complete (release soon)
 - L3 – under development (release beta with L2)
 - Calibration Subset – under development
 - Climate Subset – under development
 - CO2 – under development
- **Given schedule and resource limitations, V6 deliveries to the GES DISC will be staged.**
 - L2 to be released early 2012
 - L3 and other products released mid-2012
 - CO2 – TBD schedule



V6 Schedule – Level 2



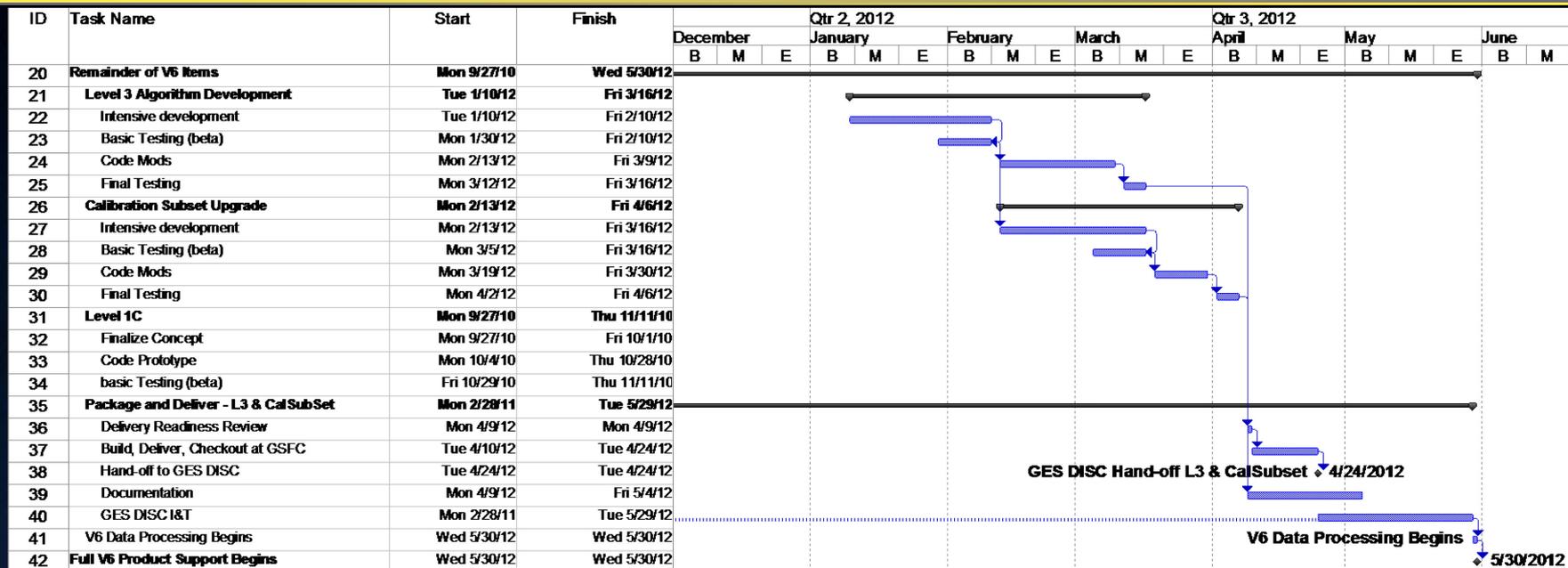
- End Development 1/9/12
- End Test 2/10/12
- Deliver 2/17/12
- Hand-off to GES DISC 2/29/12
- GES DISC I&T 4/3/12
- Public Release 4/4/12

AIRS TLSCF will be down for data archive maintenance 12/7/11 - 12/18/11.

It will take weeks, and weeks, and weeks (OK, months) to restore all archived data. Please be patient when using the JPL system.



V6 Schedule – the “rest of the story”



- End Development 3/16/12
- End Test 3/16/12
- Deliver 4/13/12
- Hand-off to GES DISC 4/24/12
- GES DISC I&T 5/29/12
- Public Release 5/30/12





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A large, dark astronomical image of a nebula, likely the Helix Nebula, showing intricate, glowing structures in shades of blue, purple, and pink against a black background. The central text is overlaid on this image.

Back-up Manning L3 Products for V6



New Level 3 Research Product

Preliminary field list for public L3 support:

- Tropo_CCI, Strato_CCI, IR_Precip_Est
- SST_Best
- MWSST
- MW_Emis_24GHz, MW_Emis_89GHz, MW_Emis_31GHz, MW_Emis_50GHz
- SO2_Indicator
- Dust_Score
- TAIRSup, H2OCDSup, O3VMR
- SurfClass_Count
- bndry_lyr_top
- CAPE, Convec_Inhib, Press_LCL, Press_Equil_Lev, Press_LFC, Temp_LCL, Temp_LFC, LCL_Pot_Temp, LCL_Equiv_Pot_Temp, Lifted_Index
- ice_cld_opt_dpth, ice_cld_eff_diam, ice_cld_temp_eff, ice_cld_fit_reduced_chisq
- spectral_clear_Counts
- MODIS_emis_10_hinge, MODIS_LST



New Level 3 Research Product (Cont'd)

Preliminary field list for Private L3 research:

- Retrieval_Type_Count, MWSurfClass_Count
- Tdiff_IR_MW_ret, Phys_Resid_AMSUA_15, Initial_CC_Score, Cloudy_Reg_Score
- CC_noise_eff_amp_factor, CC1_noise_eff_amp_factor
- totCldH2OStd, CC1_Resid, CCfinal_Resid, CCfinal_Noise_Amp
- Tdiff_IR_MW_ret, Tdiff_IR_4CC1, TSurfdiff_IR_4CC1, TSurfdiff_IR_4CC2
- AMSU_Chans_Resid, TotCld_4_CCfinal, Surf_Resid_Ratio
- Temp_Resid_Ratio, Water_Resid_Ratio, Cloud_Resid_Ratio
- O3_Resid_Ratio, CO_Resid_Ratio, CH4_Resid_Ratio, MWCheck_Resid_Ratio
- CldClearParam
- TAirClim, TAirSCCANN, TAirMWOnly, TAirCldyReg, TAir1Ret
- H2OCDClim, H2OCDSCCANN, H2OCDMWOnly, H2OCDClidyReg, H2OCD1Ret
- TSurfClim, TSurfSCCANN, TSurf1Ret
- TSurfAirClim, TSurfAir1Ret,
- CBTmOBT1231,
- Phys_resid_AMSUA, Phys_resid_IR_Window_*