National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS Science Processing Software

## Version 4.0 Status
## Version 5.0 Strategy and Goals

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AIRS Science Processing

November 30, 2004

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# Version 4 Status Update

- Version 4 software development complete – stabilized
- Validation data processing completed
  - Two 16-day segments: Level 0 through Level 3
  - Two-years Match-Up: Fixed Validation Sites
- Verification and Validation Underway
  - Verification by software testers
  - Validation by Validation Team
- Final build planned for mid-December
  - Set final quality flags, remaining critical anomalies
  - Dependent on preliminary validation assessment
- Delivery to GSFC DAAC and NOAA during December

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# Version 4 Timeline

| – Activity – | – Dates – |
|---|---|
| **Coding Complete** | **November 1, 2004** |
| **Validation Data Processing** | **November 8 – 26, 2004** |
| Preliminary Validation | December 6 – 10 2004 |
| Final Build | December 15, 2004 |
| Delivery to GSFC DAAC | December 23, 2004 |
| DAAC I&T | January 2005 |
| Final Validation Report | January 31, 2005 |
| Version 4.0 Live! | February 1, 2005 |

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# Standard Product Activation / Validation Timeline

| Version | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 |
|---|---|---|---|---|---|
| Activation Date | 9/15/03 | 2/1/05 rev | 1/1/06 | 1/1/07 | 1/1/08 |
| Radiance Products (L1) | **Ocean** | **Land** | **Polar** | **Global** | **Global** |
| AIRS Radiance | Prov | Val2 | Val3 | Val4 | |
| VIS/NIR Radiance | Prov | Val2 | Val3 | Val4 | |
| AMSU Radiance | Beta | Prov | Val2 | Val3 | Val4 |
| HSB Radiance | Beta | N/A | N/A | N/A | N/A |
| Standard Products (L2) | | | | | |
| Cloud-Cleared IR Radiance | Beta | Val2 | Val3 | Val4 | |
| Surface Temperature | Beta | Val1 | Val2 | Val4 | |
| Temperature Profile | Beta Prov | Val2 | Val3 | Val4 | |
| Humidity Products | Beta | Val1 | Val2 | Val3 | Val4 |
| Cloud Cover Products | N/A | Val1 | Val2 | Val3 | Val4 |

Beta = Not suitable for scientific investigations.

Prov = Provisionally validated. Useable for scientific investigations with caution. Validated for non-polar, night, ocean only.

Val1 = non-polar, day/night, ocean.
Val2 = Val1 + land.
Val3 = Val2 + polar
Val4 = Global All Cases

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# Version 4 Features (compared to baseline goals)

- **Standard product file size reduction**
  - Level 1B and Level 2 cloud-cleared radiance files reduced in size by 50%
  - Level 3 files also released in compressed format
- **Level 1A**
  - Continue to produce stable products
  - *No liens*
- **Level 1B**
  - Microwave radiances provisionally validated
  - Infrared and VIS/NIR radiances validated
  - *No liens*

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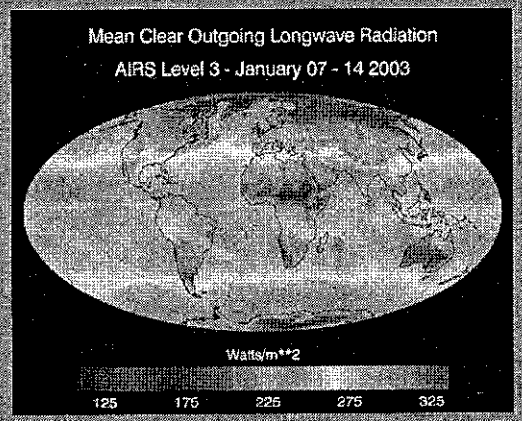
# Version 4 Features (cont'd.) (compared to baseline goals)

- Level 2
  - Extend validation from ocean to land areas
  - Ocean areas – No liens
  - Land areas – Atmospheric retrievals within guidelines
    - Surface retrievals need improvement
  - Retrievals – Validated in accordance to validation table
- Level 3
  - Daily, multi-day and monthly products
  - *Beta products – no liens*



# Version 5 Objectives

- **Level 1**
  - Improve microwave standard products
- **Level 2**
  - Improved Error Estimation
  - Eliminate (or minimize) IR Tuning
  - IR-only Cloud Clearing
  - Include IR Spectral Emissivity in retrievals
  - Trace Gas Profiles: $CO_2$, CO, $CH_4$, $O_3$, $SO_2$, Aerosols
  - Extend validated retrievals to polar regions
  - Consensus clear flag
- **Level 3**
  - Quantization Product (added to existing set)
  - Formal error propagation

# Version 5 Methodology Improvements

- **Improved Project and Science Team Coordination**
  - Early definition of goals and objectives
  - Defined requirements and responsibilities
  - Coordinated schedules
  - More CCB involvement
- **Fewer software deliveries**
  - Demonstration of new features prior to incorporation into software baseline
  - Earlier integration into baseline
  - Longer validation period

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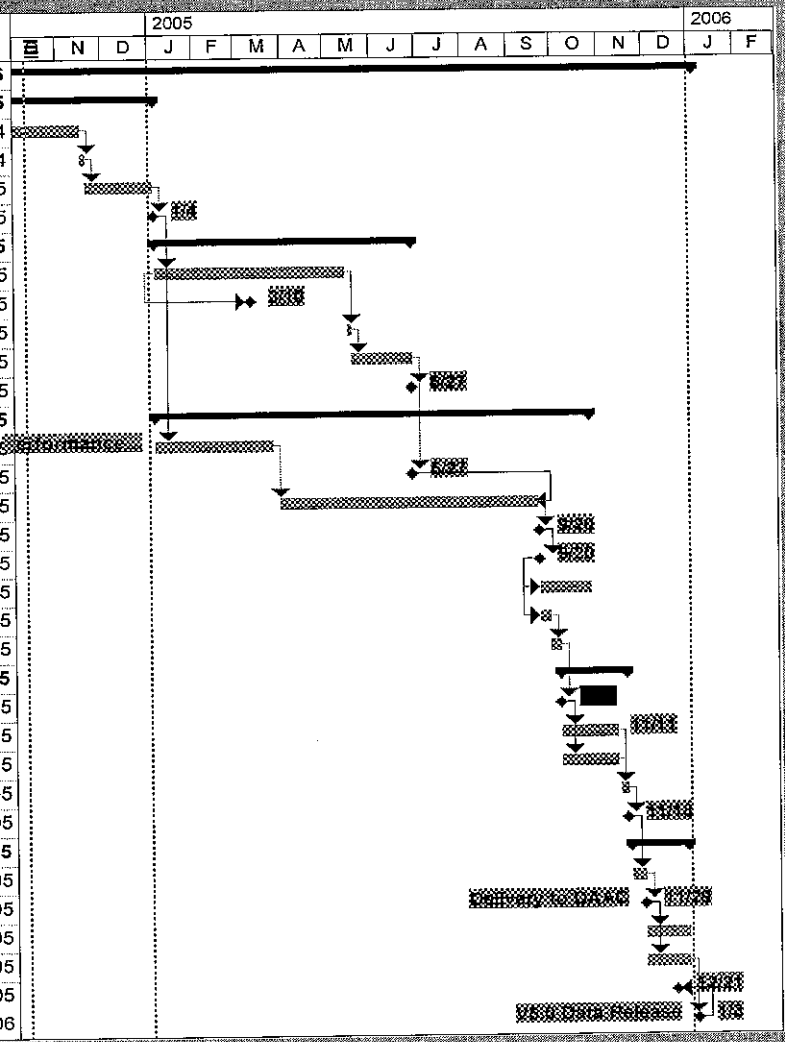
# Schedule

| D | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | **V5.0 Development** | **340 days** | **Mon 8/23/04** | **Tue 1/3/06** |
| 2 | **Preliminary Planning** | **92 days** | **Mon 8/23/04** | **Tue 1/4/05** |
| 3 | Concept Development | 60 days | Mon 8/23/04 | Mon 11/15/04 |
| 4 | Science Team Meeting | 3 days | Tue 11/16/04 | Thu 11/18/04 |
| 5 | Solidify Requirements | 28 days | Fri 11/19/04 | Mon 1/3/05 |
| 6 | Finalize contents and tasks | 0 days | Tue 1/4/05 | Tue 1/4/05 |
| 7 | **Prototype and Characterization** | **121 days** | **Wed 1/5/05** | **Mon 6/27/05** |
| 8 | Initial proof of concept | 91 days | Wed 1/5/05 | Fri 5/13/05 |
| 9 | In-Process Status report | 0 days | Thu 3/10/05 | Thu 3/10/05 |
| 10 | Presentation of prelimnary res | 2 days | Mon 5/16/05 | Tue 5/17/05 |
| 11 | Final development | 28 days | Wed 5/18/05 | Mon 6/27/05 |
| 12 | Delivery of code | 0 days | Mon 6/27/05 | Mon 6/27/05 |
| 13 | **Development and Integration** | **203 days** | **Wed 1/5/05** | **Mon 10/24/05** |
| 14 | In-house Improvements | 56 days | Wed 1/5/05 | Fri 3/25/05 |
| 15 | Final Inputs to CCB | 0 days | Mon 6/27/05 | Mon 6/27/05 |
| 16 | Development and Unit Test | 120 days | Wed 3/30/05 | Mon 9/19/05 |
| 17 | CCB Approval to build 5.0 | 0 days | Tue 9/20/05 | Tue 9/20/05 |
| 18 | Initial build and delivery to TDS | 0 days | Tue 9/20/05 | Tue 9/20/05 |
| 19 | Controlled Anomaly Quickfix | 24 days | Wed 9/21/05 | Mon 10/24/05 |
| 20 | TDS SI&T | 5 days | Wed 9/21/05 | Tue 9/27/05 |
| 21 | TDS end-to-end checkout | 5 days | Wed 9/28/05 | Tue 10/4/05 |
| 22 | **Testing** | **33 days** | **Tue 10/4/05** | **Fri 11/18/05** |
| 23 | Operational in TDS | 0 days | Tue 10/4/05 | Tue 10/4/05 |
| 24 | Sustained Testing | 28 days | Wed 10/5/05 | Fri 11/11/05 |
| 25 | Validation Data Processing | 28 days | Wed 10/5/05 | Fri 11/11/05 |
| 26 | Preship Review preparation | 5 days | Mon 11/14/05 | Fri 11/18/05 |
| 27 | Preship Review | 0 days | Fri 11/18/05 | Fri 11/18/05 |
| 28 | **Transfer V5.0 to DAAC** | **25 days** | **Mon 11/21/05** | **Thu 12/29/05** |
| 29 | Packaging and Shipping | 5 days | Mon 11/21/05 | Tue 11/29/05 |
| 30 | Delivery to DAAC and NOAA | 0 days | Tue 11/29/05 | Tue 11/29/05 |
| 31 | JPL Support to DAAC | 20 days | Wed 11/30/05 | Thu 12/29/05 |
| 32 | DAAC I&T | 20 days | Wed 11/30/05 | Thu 12/29/05 |
| 33 | Validation Report Due | 0 days | Wed 12/21/05 | Wed 12/21/05 |
| 34 | Public Data Release V5.0 | 0 days | Tue 1/3/06 | Tue 1/3/06 |



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# V5 Key Activities

| Activity | Dates |
|---|---|
| Conceptualization | Through December 2004 |
| Prototype and characterization | Through May 2005 |
| Delivery of code | No later than June 27, 2005 |
| JPL integration and test | June – September 2005 |
| Operational in TDS | October 2005 |
| Validation data processing | Ends mid-November 2005 |
| Delivery to GSFC DAAC | End of calendar year 2005 |