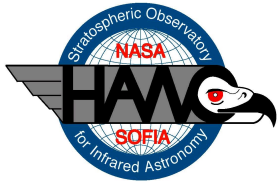


HAWC Technical and Programmatic Management

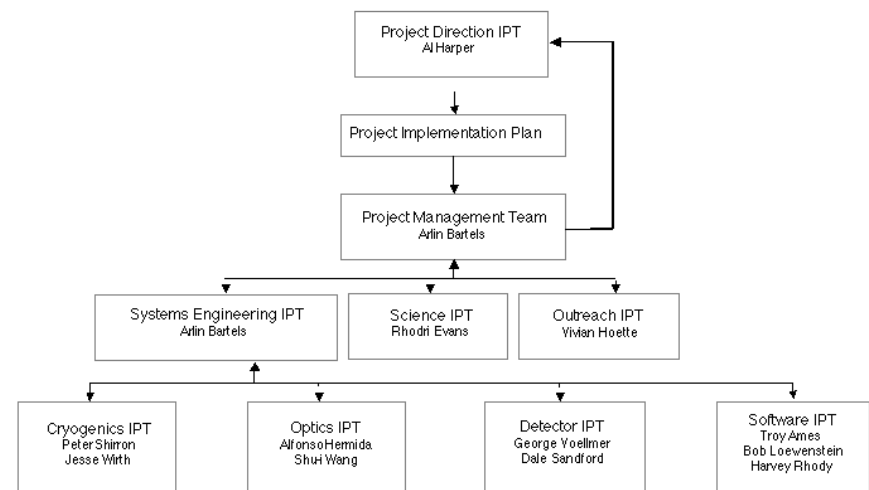
Arlin Bartels, Instrument Manager,
GSFC



Program organization chart reworked to reflect true working arrangement



- Full-time Project Manager installed
- Project Manager co-ordinates Systems Engineering IPT
- Electronics IPT absorbed into Cryo, Opto-mechanical, and Detector IPTs
- SOFIA Interface and Airworthiness IPTs absorbed into Systems Engineering IPT
- Subsystem IPTs have shared leads (one at each institution)





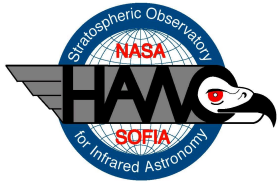
Technical Management Approach



HAWC is successfully implementing a true IPT approach



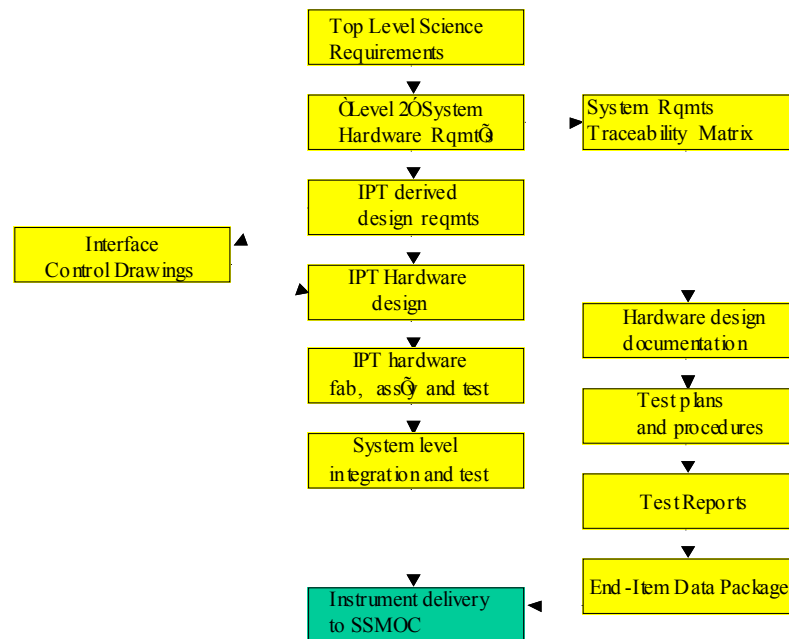
- IPT: “Integrated Product Team”
- Subsystem IPT leads:
 - Responsible for all aspects of delivering a working subsystem (design, fab, test, schedule, budget, documentation, quality control)
 - Leads have supplied subsystem grass-roots budgets and schedules
 - Worked with Systems Engineering IPT to establish subsystem requirements as described in PIP
- Systems Engineering IPT:
 - Establishes ICDs between subsystem IPTs
 - Makes performance trades between subsystems
- Science IPT:
 - Responsible for science community outreach
 - Responsible for verifying end-item performance and science user documentation



Top level hardware requirements flow down into the design, fab and test of HAWC hardware

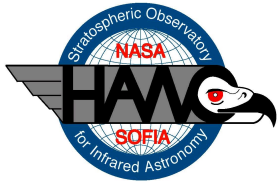


HAWC life cycle, from science Requirements definition to hardware delivery

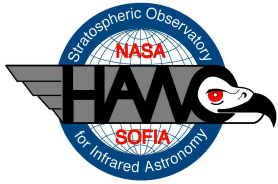


Distributed Systems Engineering approach has been successfully implemented

- Science Requirements definition complete
- System Level performance requirements definition complete
- Subsystem Level hardware performance requirements flowdown complete
- Subsystem Level software performance requirements flowdown in progress
- ICD development in progress



HAWC Programmatic Management



Working relationship between UC and GSFC has been formally documented



- Statement of Work has been signed by both UC and GSFC
- Covers period of performance 9/30/97 – 9/29/01
- Broken out by IPT:
 - Defines tasks to be completed within each IPT
 - Defines institution/organization responsible for each task within an IPT
 - Doubles as Work Breakdown Structure (WBS) dictionary
 - Doubles as Receivables/Deliverables List



Budget agreement between UC and GSFC has been reached



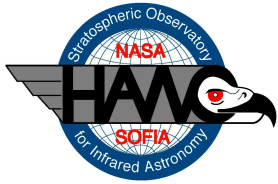
- HAWC budget distribution between member institutions is complete
- Financial structure is in place
 - Resource analysts in place at UC and GSFC
- Total budget: \$3.5 M
 - UC portion: \$2.000 M
 - GSFC portion: \$1.029 M
 - RIT portion: \$471 K
- Management arrangements between GSFC and NASA-Ames are in place



Overall HAWC budget and spending profile are in good shape



- “Grass-roots” costing exercise performed by IPT leads subsequent to PDR (12/98) still valid
- Recent design revisions have reduced complexity
- Prior to CDR, the costing exercise will be repeated as an “estimate-to-complete” to ensure that each IPT is still on track per original budget.
 - Adjustments will be made as required within original budget
- Spending profiles at UC, GSFC, and RIT currently on track

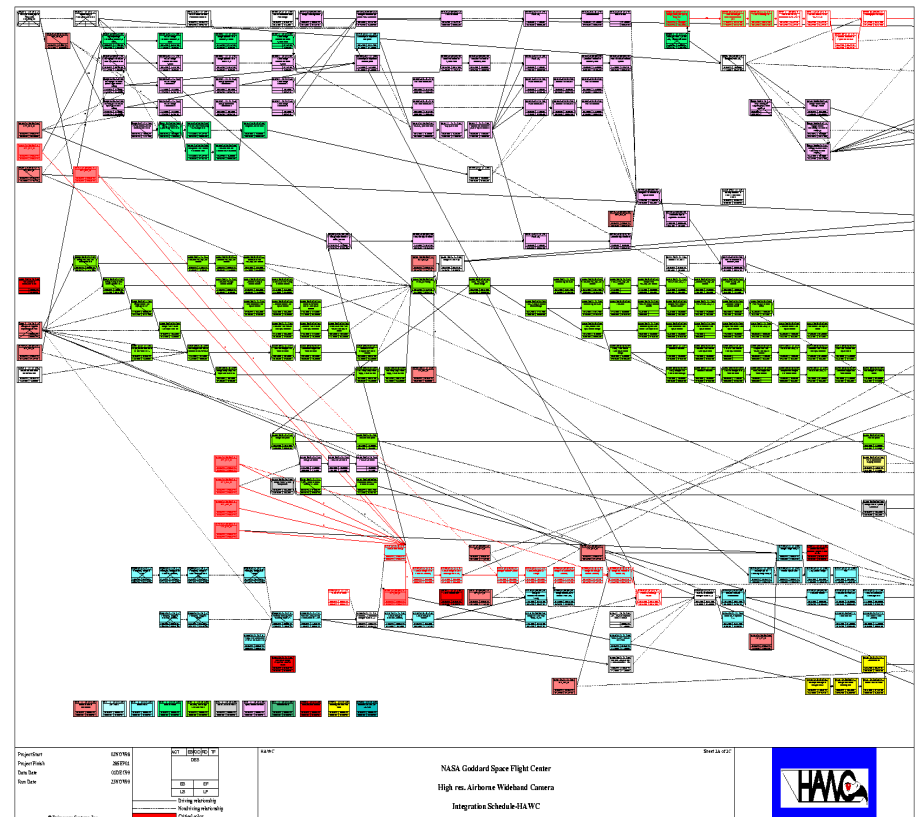


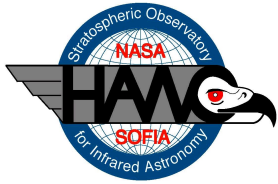
Program Master Schedule provides planning tool to ensure on-time delivery



HAWC schedule (portion)

- Schedule is used as a program plan, not just a progress tracking vehicle
- Includes tasks at all three institutions
- Baseline schedule has been established against which progress will be measured and reported
 - GSFC planners will provide routine informal milestone reporting to UC, RIT, and SOFIA
- Current delivery schedule is lean but achievable
 - 43 days management reserve against 9/30/01 delivery
- Total number of items currently tracked: ~ 500
- Items designated as “program milestones”: 68
- Critical path:
 - Primary: Detectors
 - Secondary: Software
 - Tertiary: Cryostat
- Schedule includes airworthiness milestones

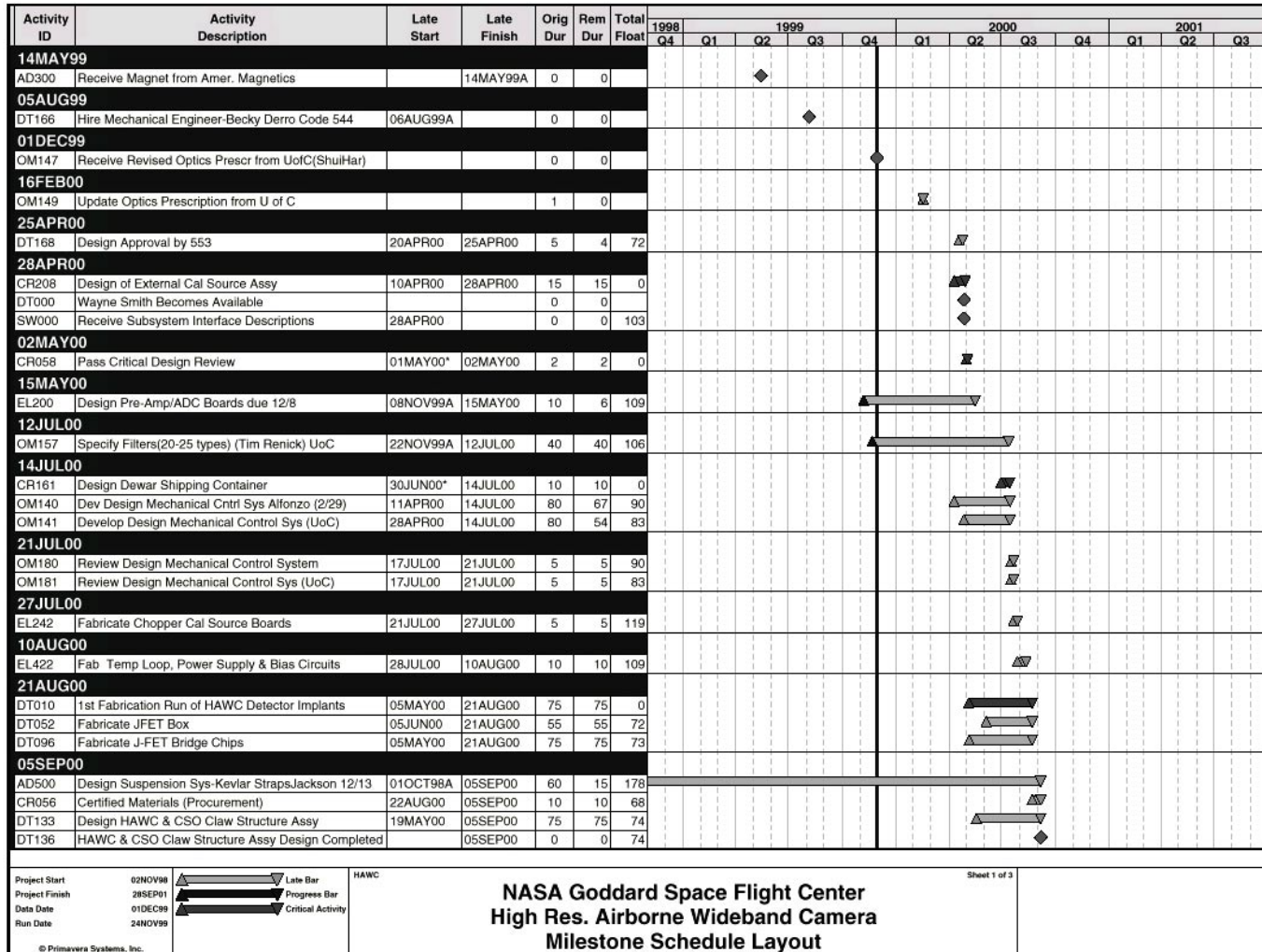


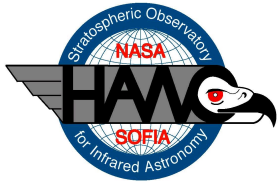


Program Milestone Schedule

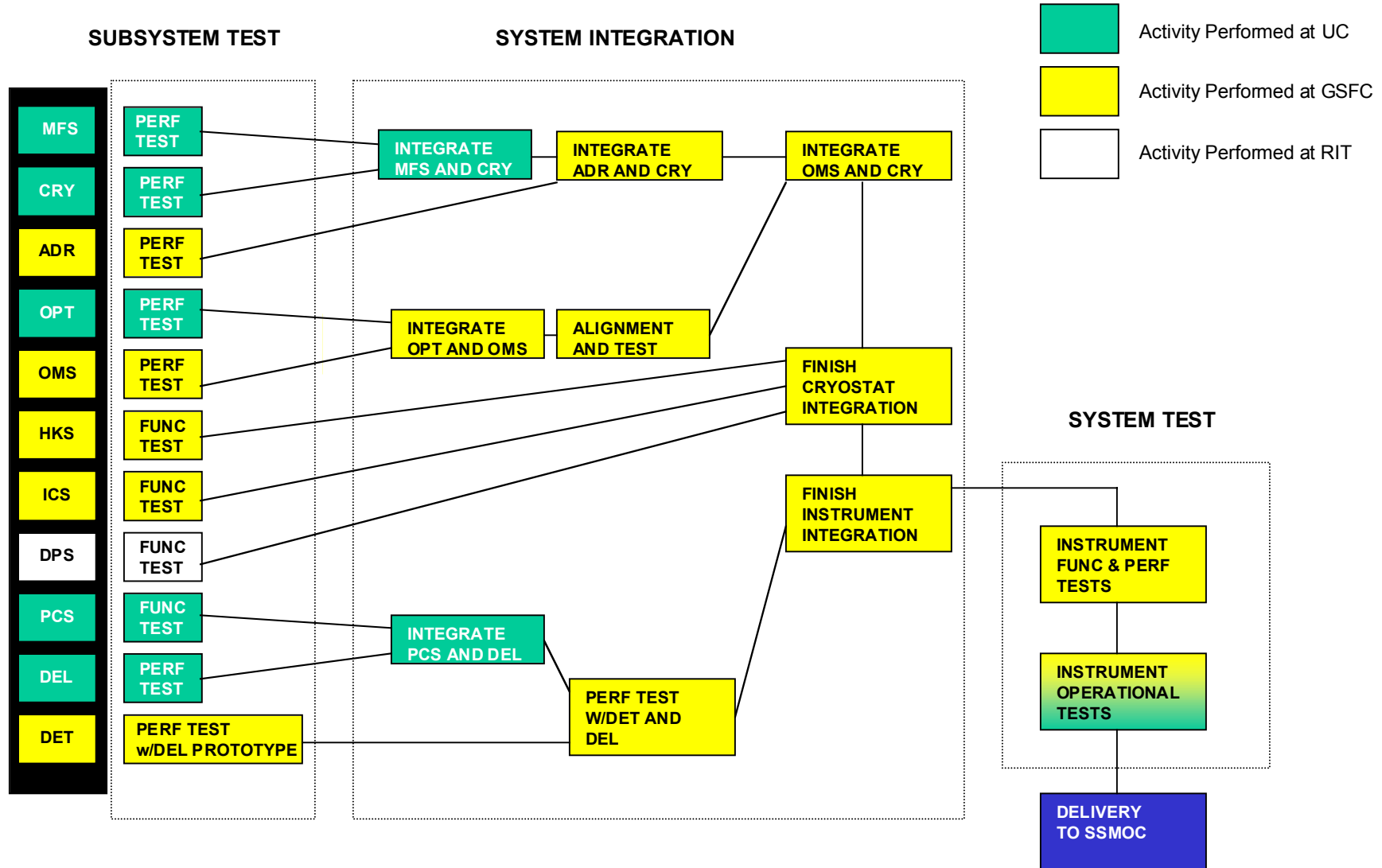


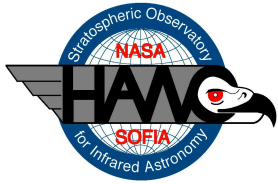
NOTE: "LATE FINISH DATE" MILESTONE SCHEDULE





HAWC Integration Schedule accounts for subsystem delivery schedule





Summary

- Action items and review committee issues have been resolved:
 - Science Requirements definition complete
 - System and Subsystem Level hardware requirements established
 - MOU between GSFC and UC in place
 - Budget issues resolved
- HAWC requests recommendation to move forward into detailed design