

# Information Systems Center/580

## AETD Institutional Status Review



Presented by:

Henry Murray  
Head  
Mission Applications Branch  
Information Systems Center

March 25, 1999



# AGENDA



- 
- **TECHNICAL ACCOMPLISHMENTS**
    - Mission Support
    - Science Support
  
  - **TECHNOLOGY AND NEW MISSIONS**
    - Technology Activities
    - Technology Program
    - Proposal Activities
  
  - **TECHNICAL/TECHNOLOGY ISSUES**
  
  - **INSTITUTIONAL SUPPORT**
    - Infrastructure and Mission Support
  
  - **INSTITUTIONAL STATUS**
    - ISO9000
    - Center Operations
    - Budgets
    - Collaborations and Outreach
    - Institutional Issues
  
  - **SPECIAL PRESENTATION**
    - Carla Matusow, Code 583, on "Auto Products"
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# TECHNICAL ACCOMPLISHMENTS



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## MISSION SUPPORT

### ➤ WIRE (581/582/583/584/586)

- Completed Pre-launch Preparations and Testing and Supported the WIRE Launch and Spacecraft Recovery Period
- Provided Changes to ACS FSW Data which enabled Despin and Recovery
- Generated Project Management Plan for using WIRE as a Technology Testbed although Funding Sources need to be Identified
  - Testbed Facility will Provide a Resource for AETD to Accelerate Technology Infusion

### ➤ MAP (582)

- Delivered Multiple FSW Builds to Support MAP Flight Hardware Tests – Mongoose, ACE, Transponder RSN, PSE and Housekeeping RSN
- Completed ACS FSW Build Test for Mongoose and ACE – Began MAP System Test Phase
- Delivered Updated Version of MAP DEU Instrument FSW
- MAP FSW has moved to Project Level CCB Control



# TECHNICAL ACCOMPLISHMENTS



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## MISSION SUPPORT

- **EO-1 (582/584)**
  - **Draft GSFC to TRW ICD and EO-1/Landsat MOU Generated**
  - **A Near "Flight Ready" WARP FSW Build was Integrated into the Flight Box and the Formal FSW Acceptance Test Program is 50% Complete – No Anomalies have been Uncovered which would Suggest Hardware Modifications**
  
- **Landsat-7 (581/584/586)**
  - **Completed Mission Operations Support Plan and Ground Station Tracking Certification**
  - **Completed Level-1 Products Distribution System (LPDS) Release 2.0 January 26**
  - **Supported Level-1 Products Generation System (LPGS) Site Acceptance Test**
    - **Readiness Review held by EROS Data Center (EDC)**
  - **Completed and Delivered Landsat-7 Processing System (LPS) 4.1B Software Patch March 1**



## TECHNICAL ACCOMPLISHMENTS



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### MISSION SUPPORT

- **AM-1 (581/583)**
  - **Supporting Preparation for the AM-1 Spacecraft End-to-End Test Scheduled for March 29-31**
    - Flight Dynamics System will Provide Daily Products
- **NGST (582/588)**
  - **Initiated FSW Operations Working Group with STScI**
  - **Implemented Spectroscopy Support for Scientist's Expert Assistant (SEA) in the Exposure Time Calculator**
- **IMAGE (584/586)**
  - **Completed IMAGE Deep Space Network Compatibility Test in January using ASIST CCSDS Ground Telecommand Services Software**
  - **Designed Architecture for LAN/WAN Communications for the MDEX/IMAGE Spacecraft DSN Compatibility Test Trailer RF and DSN End-to-end Testing**
- **XDS (582)**
  - **Delivered "Tight Temperature Control" FSW for I&T in Japan**



# TECHNICAL ACCOMPLISHMENTS



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## MISSION SUPPORT

- **HST (582/584)**
  - **Completed FSW Build Test of all On-orbit Functionality plus many Enhancements for SSM 486 FSW Flight Version 1**
    - **Entire SSM FSW Team is Ready for early Service Mission**
  - **Participated in Gyro 3 Anomaly and Prepared a 3-gyro Version of the Safehold Recovery Load**
    - **Patched the Gyro Motor Current Test to Prevent the Test from Failing except for a "Hard" Gyro Failure**
  - **Completed Validation of a new "Full-up" FSW Testbed using FPGA NSSC-1 and STINT Chips which were Developed for 582 by Omitron**
    - **Testbed is being used for Aft Shroud Cooler Hardware Test**
  - **Vision 2000 Control Center Systems went Operational on February 15**
    - **Everything Working well, except for One File Problem that led to a Safemode which is Resolved**
  - **Completed the Development of an HST Flight Operations Relocation Transition Plan as Commissioned by Code 441, Obtained Endorsement from STScI**



# TECHNICAL ACCOMPLISHMENTS



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## MISSION SUPPORT

- **IceSat (582/583)**
  - **Significant Progress integrating GLAS-unique FSW Changes into the MAP Mongoose V Architecture**
    - **FSW Executes in the GLAS Breadboard Test Environment**
  - **Met with ICESAT Project and the Flight Dynamics Analysis Branch, Code 572, to Understand High-level Attitude and Orbit Determination Requirements**
  - **Supported Code 572 in the Generation of a Cost Estimate for Flight Dynamics Analysis Support and a Flight Dynamics System**
  
- **WFF Range (584)**
  - **Supported Successful Langley Drop Model Project on February 9 – the Test Involved Dropping a Remote Controlled Model of a Fighter Jet from a Helicopter and Studying Flight Characteristics**
  
- **TRMM (582)**
  - **Delivered and Certified Updated On-orbit FSW to Expand TDRS Position Continuity Limits**
  - **Delivered and Certified On-orbit FSW Patch to Increase Allowed Variance between Solar Array Sensed and Commanded Positions**
  
- **SWAS (582)**
  - **Certified new On-orbit FSW Patch to Manage Playback of Onboard Data Storage**



## TECHNICAL ACCOMPLISHMENTS



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### SCIENCE SUPPORT

- **Triana (582/587/588)**
  - **Drafted ACS FSW Requirements Document in Conjunction with GNCC**
  - **Completed Conversion of Solar and Lunar Models to C, C++ and DH**
  - **Started Development of a TRIANA/Eta Model using Parallel Processing Techniques on the CRAY T3E for the NASA Center for Computation Sciences (NCCS) (Eta models are used for Cloud Cover and Precipitation Forecasting)**
  
- **SIRTF IRAC (582)**
  - **Delivered IRAC Command and Telemetry (C&T) Firmware for IDM Hardware Testing**
  
- **ESDIS (586)**
  - **Conducted a 24-hour End-to-end Test of the EOSDIS Core System at the Goddard DAAC on February 11-12**
    - **Ingested 24 hours of MODIS Data**
  
- **Code 900/WFF (Code 584)**
  - **Developing a Wavelet Signal Processing Program to Identify Dominant Ocean Waves and Produce an Energy vs. Phase Relationship**



## TECHNOLOGY AND NEW MISSIONS



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### TECHNOLOGY ACTIVITIES

- **Space Objects Technology Group (SOTG) (Code 581)**
  - **Presented Activity to Space Operations Management Office (SOMO)/ Consolidated Space Operations Contract (CSOC) which was very Favorably Received**
  - **Competed Phase 2 Prototype IDL and Initiated Phase 3 Demonstration – Pursuing other Funding Sources for Phase 3**
  
- **Software Engineering Laboratory (SEL) (Code 581)**
  - **Annual Directors Meeting was held in February and Future SEL Projects were Discussed**
    - **SEL will focus on 12 Studies over the next 4 Years to Include Current Initiatives**
  
- **Operating Missions as Nodes on the Internet (OMNI) (Code 581/586/588)**
  - **Collaboration with ESC, Glenn Research Center and CISCO Systems, Inc.**
  - **NGST, SOMO/CSOC, NPP, Glenn Research Center and CISCO Systems, Inc. have seen the Demo**
  - **Successfully Conducted Tests of OMNI at Radio Frequency Simulation Operations Center**



## TECHNOLOGY AND NEW MISSIONS



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### TECHNOLOGY ACTIVITIES

- **Scientist's Expert System (SEA) (Code 588)**
  - **Demonstrated SEA in the NGST Booth at the American Astronomical Society Meeting in Austin, Texas**
  
- **Instrument Remote Control (IRC) (Code 588)**
  - **Completed Version 1 of a Remote Control Prototype Demonstrating an End-to-end Implementation of an Instrument Controller that sends Commands to and Receives Data from an Instrument Simulator**
  - **Presented a poster at the American Astronomical Society Meeting in Austin, TX on January 6, 1999, titled "Using XML for Instrument Description, Communication and Control of the SOFIA/HAWC Instrument"**
  
- **VMOC/SERS (588)**
  - **Installed SERS at USNA SAIL**
  - **Began Exploration of Administrative System Requested by Dan Goldin**



## TECHNOLOGY AND NEW MISSIONS



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### TECHNOLOGY ACTIVITIES

- **ComPASS (Code 588)**
  - **Held Meetings with STScI and AGI to Discuss Potential Partnerships in Developing ComPASS**
  
- **Information Visualization (InVision) (Code 588)**
  - **Completed and Delivered the Clementine Lunar Ice Video in January**
  - **Conducting Negotiations with Sun Microsystems and the Center for Image Processing in Education (CIPE) for Potential Image2000 Collaboration**
  - **Supplied Initial Description and Focus of the MODIS Snow and Ice Video to Code 900 for Review**
  - **Completed and Delivered Java Advanced Imaging (JAI) API Demonstration**
  
- **Advanced Engineering Services and Environments (AESE) (Code 588)**
  - **Researching existing COTS products for Product Models (PM) task**
    - **GENSAT looks promising**



# TECHNOLOGY AND NEW MISSIONS



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## TECHNOLOGY PROGRAM

### ➤ **ISC Technology Planning**

- **Completed 'Review' Version of ISC Strategic Technology Process and Technology Roadmap**
  - Currently under review by ISC Management Team
- **Distribution to Chief Technologist and other Engineering Center Assistant Chief Technologists for Review and Comment**
- **Plan review of Technology Roadmap by ISC "External Advisory Council" in May**
- **Began Analysis of new Presidential Initiative for Information Technology for the 21st Century (IT2); Working with Code 900 on GSFC Implementation**

### ➤ **Other**

- **Strong ISC Participation (6 people) at NASA Intelligent Synthesis Environment Workshop in February**
  - Helped Formulate Program Plan and Identify Initial GSFC Staffing needs

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# TECHNOLOGY AND NEW MISSIONS



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## TECHNOLOGY PROGRAM

➤ **Other (Continued)**

- **Presented Overview of Control Center Systems (CCS) and Scientist's Expert Assistant (SEA) at STAAC's Technology Commercialization Office's "New Commercial Technology Projects" Meeting**
- **Supported Earth Sciences Enterprise (ESF) Post 2000 Mission Studies with Paul Caruso, Ken Ford, et al**
- **Hosted Separate Presentations for NASA Visiting Committee and Lee Holcomb, CIO for NASA, on ISC's "Technical Program Introduction" and "Demonstrations of Key Technology Activities"**
- **Supported the SOMO non-CSOC review of all ISC Technologies in February and Detail Interchange with CSOC Management Team in March**
- **Delivered draft of Digital Earth Program Plan to Code 930**



## TECHNOLOGY AND NEW MISSIONS



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### PROPOSAL ACTIVITIES

- **MIDEX/SWIFT (Code 581/582)**
  - Supporting MIDEX/Swift Step 1 Proposal (June 99) as Swift/BAT and Swift Figure of Merit Flight Software Lead
  
- **MIDEX/Advanced Solar Corona Explorer/Spartan (Code 581/582/584)**
  - Supporting Flight Software and Ground Data Systems
  
- **Discovery/VESPER (Code 580/581/584)**
  - Providing Systems Engineering and Instrument Ground Support Equipment
  - Provided Red Team Review Member
  
- **ESSP/VOLCAM (Code 581)**
  - Providing Ground Data System Concepts and Designs
  
- **New Millennium/ST-5/Nanosats (Code 581/588)**
  - Providing Innovative Data System Technologies and Operations Concepts
  
- **New Millennium/ST-5/Disturbance Reduction System (JPL)(Code 581)**
  - Providing Ground Data System Concepts



## TECHNICAL/TECHNOLOGY ISSUES



ISSUES	ACTION PLANS	STATUS
<p><b><u>FUNDING:</u></b></p> <ul style="list-style-type: none"><li>• Loss of SOMO/CSOC institutional funding (315-XX) will impact labs and infrastructures</li></ul>	<p>Once budget figure is known, ISC will prioritize and modify or terminate projects as needed</p>	<p>Budget cuts expected to be forthcoming</p>



# INSTITUTIONAL SUPPORT



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## INFRASTRUCTURE AND MISSION SUPPORT

- **Mission Directors (581)**
  - **Team Lead by E. Herring to Determine an Administrative Home is Recommending Code 580, along with Recommendations on Improved Supporting Processes**
  - **Three Mission Directors Brought on Board**
  - **Five Mission Director Hires in Work – Three trainees and two experienced**
  
- **IFMP (585)**
  - **Recovery Period for KPMG completed at end of March; Overall Testing at MSFC behind Schedule**
  - **Reassessment of Schedule/Architecture in early April**
  
- **CSOC IMOC Systems Design Review (581/586)**
  - **ISC Provided Six Technical People to Support the Review**
  - **Proposed Architecture for GSFC Control Centers has some Concerns**
  - **IOA not Baselined; Issues being worked**
  - **ISC Identifying IMOC GSPM**
  
- **White Sands Complex (WSC) TCP/IP Data Interface Service Capability (WDISC) Operational Readiness Review Successfully held on February 22**
  
- **Code 450 (585)**
  - **On Target for 50 of 55 Systems Operational by end of March (~SOHO, WIND, POLAR, ACE (2)) – 29 Systems Operational at end of February**



# INSTITUTIONAL STATUS



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## ISO 9000 PROGRESS

### ➤ ISO 9000 STATUS

- Updated Code 580 Handbook based on Latest GPG's
- Trained ISC Personnel on Relevant GPG's and PG's/WI's
- DNV Audit against the ISC Handbook and ULDB Team had Excellent Results
- Completed Development of Product Plans for all Teams within Audit Scope
- Tagged TYPE 2 and 3 Calibration Equipment



# INSTITUTIONAL STATUS

## Center Operations



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### PERSONNEL STATUS

Full Time Civil Servants:	291 (as of 3/1/99)
Part Time Civil Servants:	13
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Total Aboard as of 3/1/99	304

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- Gains from 11/1/98 - 3/1/99 = 10
  - Phase II Reorganization (7)
  - Realignment (2)
  - Reassignment (1)
- Projected/potential gains = 19
  - ROB/CPP/RFOs:
    - ROBs to be posted (3)
    - CPPs posted (6)
    - CPPs to be posted (9)
    - RFO posted (1)
- Losses from 11/1/98 - 3/1/99 = 9
  - Lost to Other GSFC Codes (3)
  - Retirement (6)
- Projected Losses (2)
- Open Positions on Web site (33)

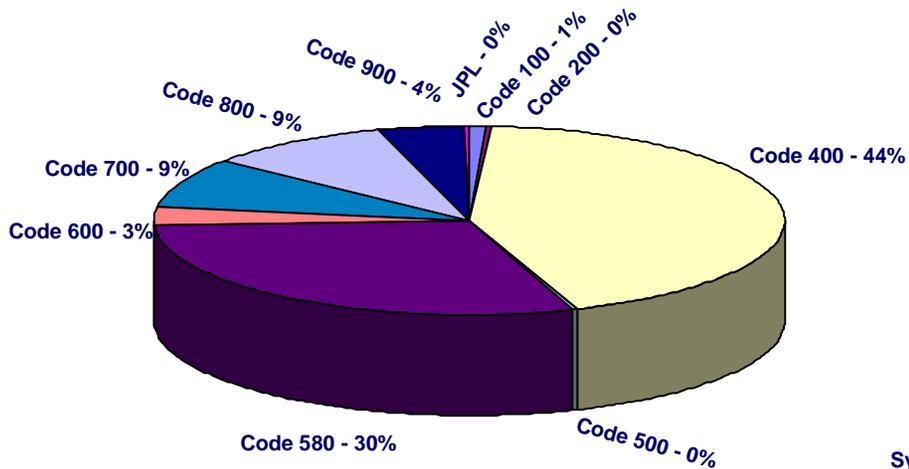


# INSTITUTIONAL STATUS Center Operations

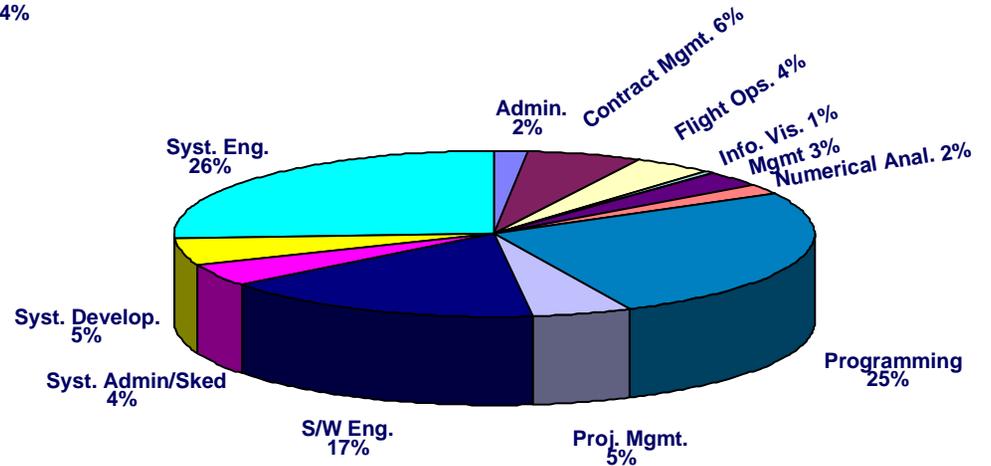


## ISC SAMPLE WORKFORCE BREAKDOWN

Percentage of Employees by Directorate Supported



Percentage of Skills Applied to Current Work



Note: "0% indicates totals are <1%"



# INSTITUTIONAL STATUS Center Operations



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## AWARDS AND PAPERS/CONFERENCES

- The following ISC Personnel attended the Second International Symposium on Spacecraft Ground Control and Data Systems (SCD II) on February 8-12 in Foz do Iguacu, Brazil:
  - Carla Matusow/583 Presented a Paper Titled "Automated Flight Dynamics Product Generation for the EOS AM-1 Spacecraft"
  - Mike Prior/584 wrote a paper Titled "WIRE Autonomous Commanding Activities" that Tim Ray Presented
  - Tim Ray/584 Presented a paper on "An Object-Oriented Interface to the CCSDS Ground Telecommand Services"
  - Jeremy Jones/588 Presented a Paper Titled "Next Generation User Support Tools"
- Dave McComas/582 Presented "Using Automated Code Generation for Attitude Control Flight Software Engineering Process" at GSFC's SEL Workshop
- HST Vision 2000 Team Received a Nomination from CEO Michael Dell for a Computerworld/Smithsonian Innovative Technology Award



# INSTITUTIONAL STATUS Center Operations



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## AWARDS AND PAPERS/CONFERENCES

- **584.W Abstract on the NASA WFF Mobile Range Control System has been Accepted for the International Telemetry Conference which will be held in Las Vegas, NV from October 25-28**
- **Ken Lehtonen's Abstract "The Development of a Virtual Company to Support the Reengineering of the NASA/GSFC HST Control Center System" was accepted for the Third Annual Virtual Company Conference in May**
- **586/Attended Microsoft Explorer Conference and Gathered Information on E-commerce and Data Warehousing**
- **586/Bob Schweiss and his Team Received the Outstanding Teamwork Award for DES Development for Landsat-7**
- **Participated in Teacher Workshop for DC Regional Botball '99 in March**
- **Attended the Maryland Technology Showcase in Baltimore in December**
- **580/Kecia Ford and Linda White received Institutional Support (Infrastructure) awards at the recent GSFC Quarterly Honor Awards**



## INSTITUTIONAL STATUS



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### COLLABORATIONS AND OUTREACH

- **Code 586/587 Initiated Science and Information Systems Seminar Series in March with the First Speaker Dr. Horace Mitchell/Code 930 on DIGITAL EARTH**
- **KIST Database Development Underway – Products to be Tested by Teachers in July**
- **Virginia Tech (VT) Responded to and Won Two AO's for the NanoSat Missions because of last Summer's Outreach Activity – they will Team with the Air Force and Build two 'Basketball' Size Satellites that will Measure the Deviations in the Air Force's GPS System**
  - **VT will Develop the Design and Fabrication, and Perform the Operations from the University**
- **Code 581 Conducted A Day With NASA, an Elementary Outreach Program, in March**
- **Code 586 Conducted a 24-hour end-to-end test of the EOSDIS Core System at the Goddard DAAC on February 11-12; Ingested 24 hours of MODIS data**
- **Code 586 Judged Science Fair Projects for Glen Dale Elementary School in February**



## INSTITUTIONAL STATUS



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### COLLABORATIONS AND OUTREACH

- **Mark Lupisella/584 Presented an Overview to the Goddard Solar System Working Group on Mars Mission Planning and Possible Cosmological/Astrobiological Themes for an Astrobiology Proposal**
- **Mark Lupisella/584 Discussed the Possibility of using Lake Vostok (Antarctica) in Preparation for Human Mission to Mars to the NSF Lake Vostok Science Workshop Team**
- **Dennis Melvin/584 Presented an Overview on Gyro Data Reduction and Analysis on March 10 – Mr. Melvin has Developed greatly Improved Methods for Analyzing Sounding Rocket Performance using Inexpensive Software Tools**
- **Jay Pittman/584 Presented an Overview of NASA activities to Computer Science and Math Majors at the Eastern Shore Campus of the University of Maryland**
- **Code 588 Presented Proposal for Educational and Amateur Use of SEA Technology to the Technology Commercialization Office**



# INSTITUTIONAL STATUS



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## COLLABORATIONS AND OUTREACH

- **Debby Parks/584 gave a Presentation about the Solar System to 3rd Grade Classes of Broadwater Academy in Exmore, VA**
- **Sue Semancik/584 Presented an Overview on the SAFS System to Gravity Probe B Project Personnel from MSFC, Stanford University, Lockheed and GSFC**
- **Ted Sommers/584 gave WFF Control Center tours to two MEC Classes, two School Groups, MSFC Center Director, the FBI, and Teachers and Students in NEWMAST Program**
- **Code 586 Presented Coincidence Search Prototype to NASA CIO on January 29**
- **Code 586 Participated in the Oak Ridge National Laboratory (ORNL) DAAC User Working Group meeting in Cincinnati, Ohio**
- **Code 586 Supported DAAC Operations Working Group – Discussed the Updated ECS M&O Process and Shared Lessons Learned from the End to End Tests at the AM-1 DAACs**



# INSTITUTIONAL STATUS



## INSTITUTIONAL ISSUES

ISSUES	ACTION PLANS	STATUS
<p><b><u>VACANCIES:</u></b></p> <ul style="list-style-type: none"><li>• Expediency of PD, CPP, etc. processing, impacting expeditious job fills and other personnel actions</li><li>• Code 582 FSW Civil Servant staff continue to depart GSFC with huge salary increases – Newest loss is Triana ACS FSW Lead</li><li>• Loss of SOMO/CSOC institutional funding (315-XX) will impact labs and infrastructures</li></ul>	<p>Improve personnel processes that ISC has control over or can influence</p> <p>Prioritizing work and targeting new hires; using contractors wherever possible</p> <p>Once budget figure is known, ISC will prioritize and modify or terminate projects as needed</p>	<p>Closed. ROBs eliminated and multi-position CPPs implemented; dedicated OHR rep. assigned; 580 matrix in place; increased dialogue with OHR</p> <p>CS staffing inadequate to support existing commitments and new mission/proposal requirements</p> <p>Budget cuts expected to be forthcoming</p>



# INSTITUTIONAL STATUS



## INSTITUTIONAL ISSUES

ISSUES	ACTION PLANS	STATUS
<p><b><u>FACILITIES:</u></b></p> <p>HVAC construction disruptive and counterproductive for employees:</p> <ul style="list-style-type: none"><li>- Doubled time in temporary housing</li><li>- "Unexpected" loss of office space due to HVAC throughways</li><li>- Also, repainting offices w/in 6 months and damaging newly-carpeted floors</li></ul>	<p>Improved coordination by Facilities, with Directorate and Eng. Centers would lessen impacts</p> <p>Advance planning with Eng. Center Infrastructure Support Mgr. recommended</p>	<p>Open. Need for transition space increased due to exhilarated renovation schedule</p>