



Institutional Status Review 580/Information Systems Center

**Mike Seablom, Head,
Science Data Systems Branch**

July 26, 2001



Agenda



- TECHNOLOGY HIGHLIGHTS
- GOOD NEWS
 - Awards
- PROJECT/ISC SUPPORT
(Not Reported Elsewhere)
- INSTITUTIONAL STATUS
 - External Outreach
 - Personnel
 - ISO/CMMI
 - Procurement
 - Safety
 - Papers, Conferences, and Seminars
- SPECIAL PRESENTATION
 - Recent Support to the Earth Science Technology Office



ISC Technology Highlights



➤ Code 584 Successful Flight Modem tests

- May 11-16, 2001, successfully flew flight modem on board a NASA P-3 aircraft at 2500ft and 24,000ft from the WFF
 - Tracked aircraft with GPS altitude, latitude, and longitude
 - Data was transmitted via Globalstar to a terrestrial laptop computer that performed all data logging
- June 6, 2001, successfully integrated Flight Modem on board an ER-2 aircraft at the DFRC
 - Operational check flight flew at 2100ft and verified GPS data was transmitted and received at the WFF and successfully logged
 - Currently undergoing functional and electrical checkout flight on board the ER-2
 - Other flight instruments are now being populated and will be integrated to ensure no interference occurs due to Flight Modem. ER-2 ferry flights are scheduled for July 9, 2001 from the DFRC to the WFF



ISC Technology Highlights



- Mike Matthews/Code 584W began gathering requirements for the UDAS project, a technology effort to develop a system to centrally acquire most range data types and route them via network protocols to the appropriate systems for processing
 - Eliminates the “front-end processors” necessary for most systems acquiring range data and opens the possibility of placing UDAS at a remote range to acquire and stream range data back to the Wallops Control Center for processing

- Jeff Lubelczyk/Code 586 led a design review for Goal-Oriented Commanding (GOC), for the Terra Solid State Recorder management tool
 - This tool permits the direct tasking of an instrument, spacecraft, or constellation using general scientific or engineering goals (i.e., it could manage the Terra Solid State Recorder, replacing the current manually intensive, error prone process

- Code 586/Supported Storage Area Network (SAN) Study Team efforts resulting in plans for a GSFC-wide SAN prototype



ISC Technology Highlights



- Code 586/Obtained approval of task plan and initiated work on "An Architecture and Technology Gap Analysis Study for Improved Weather Predictive Capability"- An ESTO Study involving Codes 500, 700, & 900
- Code 586/Provided a cost estimate for formulation of Living With a Star's Solar Dynamics Observatory data system to John Leon/Code 740 who provided updated budget estimates to HQ



ISC Technology Highlights



- Code 588 with support from Code 586 submitted a successful proposal to develop “A SensorWeb application prototype” which had funding approved by ESTO
 - The initial prototype will be completed by December using IP communication and the IRC application layer software to allow communication and cooperative work among sensors
 - Sensors include: rainfall gauges, wind speed sensors, and water level sensors to detect flooding conditions at Beaver Dam Road

- Troy Ames and Jeremy Jones/Code 588's leads of the Instrument Remote Control (IRC) project and the Scientists Expert Assistant (SEA) project demonstrated their software on the Screen Savers TV program on the cable channel TechTV
 - This episode featured software that was being demonstrated at the Java One conference in San Francisco, which both the IRC and SEA attended



ISC Technology Highlights



- Code 588/The JINI Object Information Network (JOIN) project delivered release 1 of the JOINed Digital Library - All functionality originally scheduled for this release was included except for the advanced search feature -This capability will be delivered as an intermediate release scheduled for mid-June
 - This project supports a CIO proposal led by Blanche Meeson/Code 900
 - The release provides a portal to multiple archives(which is transparent to the user) which contain educational materials
 - This release is also a proof-of-concept of a dynamic and distributed archive built upon Java's new JINI technology, and demonstrates the power of this technology which could be applied to many Enterprise strategic goals



ISC Technology Highlights



- Code 588/The Instrument Remote Control (IRC) project supported the FIBRE instrument testing at the CalTech sub-millimeter Observatory on Mauna Kea, Hawaii

- Code 588/Image2000 received complete software release from NASA
 - The software, developed in partnership with Blanch Meeson, Assistant Director of Earth Sciences for Education, Outreach and Applications/Code 900, will be available for download from the Web soon, and will be distributed freely to educational institutions through the Center for Image Processing in Education (CIPE)
 - A grant was also recently issued to the University of Virginia to maintain the code, as well as develop advanced plug-ins for the software



ISC Technology Highlights



- ISC hosted nearly 25 booths and demonstrated ~35 technologies at this years Technology Showcase June 14-16, 2001
 - Code 583 personnel manned the following exhibits
 - Terri Wood, along with Computer Sciences Corporation (CSC), demonstrated the Next Generation of Mission Planning and Scheduling
 - Elizabeth Chandler, along with CSC demonstrated the Scalable Integrated Multi-Mission Simulation Suite (SIMSS), at the Technology Showcase - SIMSS is a suite of reusable software modules that can be configured for ground system simulations and network testing
 - Code 584 personnel manned 7 exhibits
 - Flight Modem Team (included individual and joint demo with OMNI team)
 - Ultra Long Duration Balloon (ULDB) Flight Software & Control Center
 - Wearable Voice Activated Computers (Included 584 Summer Students)
 - Sensor Web Adaptive Resource Management (with Ohio University Students)
 - COTS/GOTS Knowledge Management System
 - Analog Neural Networks
 - Code 586 personnel
 - Jeanne Behnke and Jessica Matthews demonstrated "Innovative Technology for Database Processing" (a project with UAH)



ISC Good News



➤ Awards

- Les Wentz/Code 584, Building 23 FOM, was awarded a Time-Off Teamwork Award from Code 200 for contributions to the B23 HVAC Upgrade Project
 - Cindi Adams received a Certificate of Recognition from the 2001 Women of Color Government & Defense Technology Award committee on June 1, 2001 - The award ceremony is centered around a conference that took place at the Grand Hyatt, Washington, DC, July 19-21, 2001
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- ### ➤ Two ISC CIO IT pilot proposals selected to go forward to NASA CIO for final funding competition
- John Donohue/Code 584 , "Intelligent System Administration"
 - Chris Durachka/Code 585, "Single Sign-on Authentication Application"
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- ### ➤ Ayris Falasca/Code 587 successfully completed PIP Level I on June 29, 2001, Presentation: "Coupled Space Weather Models"



Project/ISC Support



- Ken Lehtonen/Code 584 served on an informal APL Ground System Requirements Review Board for the MESSENGER mission (mission to Mercury)



ISC Institutional Status



➤ External Outreach

- Mike Seablom and Mary Reph/Code586 provided consulting support to Dr. Todd Shurn/Howard University (Systems and Computer Science, School of Engineering) for his Faculty Award for Research Proposal "Meteorological Event Classes for MODIS Data Analysis" submitted on July 6, 2001
- Stephanie Nickens/586 is mentoring a SHARP student doing a research for a paper on COTS products and the cost effectiveness in the maintenance phase
- Jeanne Behnke/586 is mentoring a Space Club student
- UMBC, under grant administered by Jeanne Behnke/Code 586 presented spatial database techniques on "cheap" hardware to Dr T. McGlynn/USRA-Code 660
- Code 588, in collaboration with Howard University, is establishing a study group to investigate the major concepts associated with the Semantic Web and DAML (DARPA Agent Markup Language)
 - A kickoff meeting was held on June 13, 2001
 - Already, the study group has attracted major interest from information science researchers at Bowie State University, UMBC, Goddard, Computer Sciences, GST, Knowledge Evolution Inc. and Mayurtec



ISC Institutional Status



➤ Personnel

– Summer Students working for the ISC:

581	582	583	584	585	586	587	588
3	0	3	3	0	5	1	9

– New Hires/Conversions

- Samari Ghazi-Tehrani joined Code 582 as a Co-op student, June 18, 2001
- Kara Kull joined Code 586 as a Co-op Student, June 18, 2001
- Timothy Esposito converted from Co-op June 3, 2001
- Shawn Forney joined Code 588 as a Co-op student, July 2, 2001
- Joseph-Paul Swinski joined Code 582 accepting a Fresh-Out position, June 4, 2001
- Waka Waktola joined Code 583 accepted a Fresh-Out position, June 18, 2001
- Robert Stancil joined Code 584W accepting a Fresh-Out position, June 18, 2001
- Ryan Boller joined Code 587 accepting a Fresh-Out position, July 16, 2001
- John Jung joined Code 588 accepting a Fresh-Out position, July 2, 2001
- Nargess Memarsadeghi joined Code 588 accepting a Fresh-Out position, July 16, 2001



ISC Institutional Status



➤ Personnel (Continued)

– Open Positions

- 581 - Ground Operations Senior Engineer
- 582 - Flight Software Expert, 2 Experienced Terms, 2 Fresh Outs
- 583 - Planning & Scheduling Expert
- 586 - Large Data Expert
- 587 - Branch Head, Science Information Systems Expert, 1 Fresh Out
- 588 - IS Technology Expert

– Transfers within GSFC

- Jeanie Hall transferred from Code 580 to Code 100, July 15, 2001
- Shaida Johnston transferred from Code 581 to Code 700, July 1, 2001
- James Bangerter transferred from Code 584 to Code 451, July 1, 2001
- Maureen Madden transferred to Code 581 from Code 540, July 2, 2001
- Judith Gibbon transferred to Code 581 from Code 55, June 3, 2001
- Johnny Medina transferred from Code 581 to Code 731, June 3, 2001

– GSFC Departures

- Ludie Kidd Code 581 retired June 6, 2001



ISC Institutional Status



➤ 01 Personnel Summary to Date

– FY01 Personnel Losses:

- Outside GSFC: 16 Within GSFC: 6

– FY01 Gains

- Hire Actions Completed: 22
- Hire Actions in Progress: 15
- Hire Names Identified: 3
- Total: 37

Current FTE Status: 304 FTE Targets - FY01: 299 FY02: 304 FY 03: 289



ISC Institutional Status



➤ ISO 9000 QMS & CMM

- Sally Godfrey/Code 583 completed an Auditor's Transition Class that provided information necessary for performing ISO 9001:2000 audits
- CMMI/Process Improvement
 - Sally Godfrey/Code 583 and Linda Rosenberg met with Code Y representatives on July 19, 2001 to discuss GSFC's Software Development Process Improvement Plan
 - Sally Godfrey/Code 583 completed a class titled, "Mastering Process Improvement" at the Software Engineering Institute in Pittsburgh, PA on June 25-29, 2001



ISC Institutional Status



➤ Procurement

- Jay Pittman (Code 584) supported the WFF Engineering Support Services Procurement Development team which completed its work - CSC won the contract which will be in place August 1, 2001
- Bill Potter/Code 586 and Vanessa Griffin/Code 423 gave a presentation on the ASF commercialization effort to Martha Maiden and other HQ's staff on May 31, 2001
- Kevin Hartnett/Code 586 assisted in the generation of the HST in-house estimate for Option #3 of the Space Telescope Science Institute contract (Option #2, expires on April 30, 2002)

➤ Safety

- Bill Redisch/Code 585 became the ISC point of contact for all Mishap Reporting



ISC Institutional Status



➤ Papers, Conferences, and Seminars

- Tim Ray/Code 584 attended the CCSDS Spring Workshop in Pasadena, CA - The COP-P(command protocol for proximity link communications) state tables that Tim has designed were accepted at that meeting
- Dan Mandl/ Code 584 , a member of the Goddard Toastmasters Club, will present the Toastmaster learning module "Taking the Terror out of Talking" on August 2, 2001 to the SHARP students who are required to present their summer project results
- Ken McDonald and Matt Schwaller/Code 586 represented NASA at the Joint Meeting of the CEOS Working Group on Information Systems and Services (WGISS) and the WGISS Subgroups on Access, Data and Networks in Sioux Falls, SD -Focus of the meeting was the collaboration of WGISS and its member agencies with international science projects, specifically the Global Observation of Forest Cover (GOFC)
- Ken McDonald/586 met with representatives of the Safari 2000 Project to discuss their potential use of EOSDIS systems and tools



ISC Institutional Status



➤ Papers, Conferences, and Seminars(Continued)

- Rich Ullman and Jeanne Behnke/Code 586 co-chaired a poster session on "EOS Tools and Systems" at the American Geophysical Union spring meeting in Boston
- Robin Pfister/Code 586 led 2 half-day EOS Tools Training sessions at George Mason University
- Robin Pfister/Code 586 conducted the EOS Clearing House (ECHO) Data Provider Workshop at Goddard
 - Participants included representatives from data centers at ASF, ECS, EDC, GHRC, GSFC, JPL, LaRC, NASDA, NSIDC, ORNL, and SEDAC
 - Attendees learned technical details of ECHO APIs and expressed an interest in initiating prototype interfaces for metadata population and ordering capabilities
 - Detailed discussions on several technical issues and a special topic telecon with Oracle on spatial metadata issues were very successful

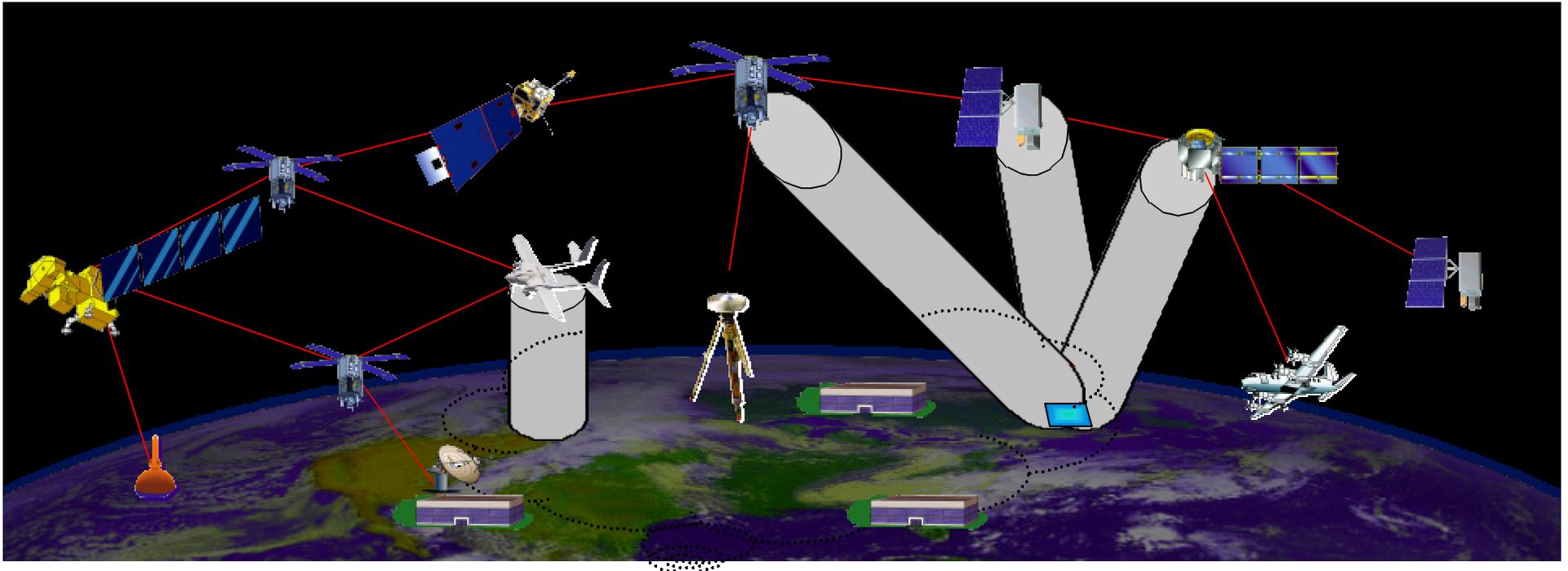


Recent Support to the Earth Science Technology Office

Michael Seablom
Branch Head, Science Data Systems Branch

Institutional Status Review
26 July 2001

Intelligent Sensor Web



- **Highly synergistic and automated science data collection and mission operations**
- **Multiple spacecraft and platforms perform dynamic planning for target of opportunity**
- **Real time collaborative information sharing between sensors, spacecraft, or investigators**
- **Supports future measurement schemes**
- **Intelligent data collection to minimize Kalman filter computations**



Activities



- Presented “An Earth Science Sensor Web Simulation” to the ESTO in March, 2001
 - Received approximately \$100K to participate in a technology gap study focusing on 14-day weather forecasting predictive skill
 - ESTO will consider funding the proposed simulator at a later date
- Worked with Julie Breed (Head, 588) in proposing a prototype sensor web using existing technology
 - Troy Ames (588) submitted a proposal which ESTO has funded
 - Proposal will test an existing software architecture to couple data collected by rain gauges and a river flood monitor to produce flood forecasts



ESTO Weather Study



Purpose:

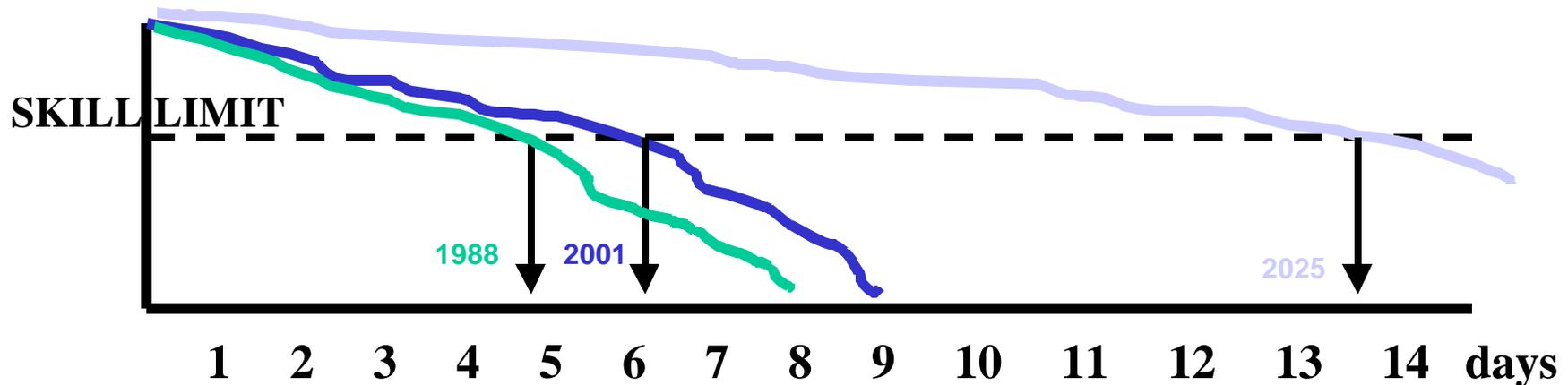
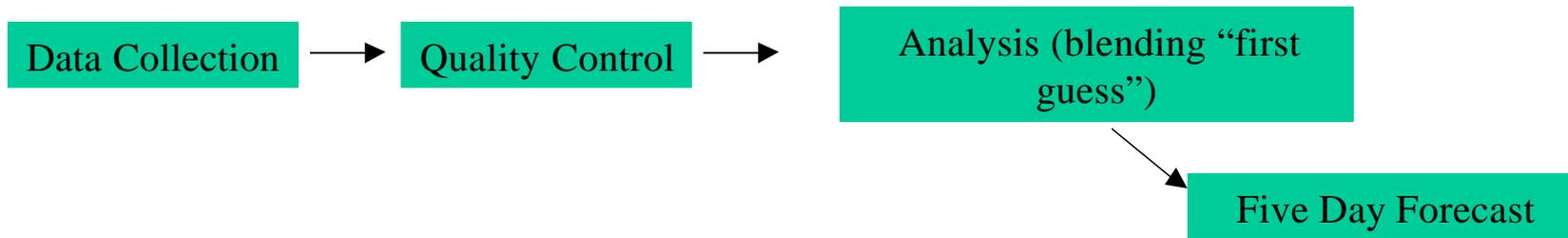
- Identify the science applications and technology improvements needed to enable skilled weather forecasts of 10 -14 days in the 2025 timeframe.

Deliverables:

- A high-level architecture concept and the identification of key enabling technologies that need research investment by NASA

Weather Forecasting Basics

- Before we can predict the weather for tomorrow we must first know what the weather is today. We do not know the weather at the appropriate temporal and spatial scales to make accurate, long range forecasts.
- Today, approximately 200,000 useful weather observations are collected across the globe every six hours



Two-way Interactive SensorWeb and Model / Assimilation System

*“... in the year 2025, models and data will become indistinguishable” --
Richard Anthes*

