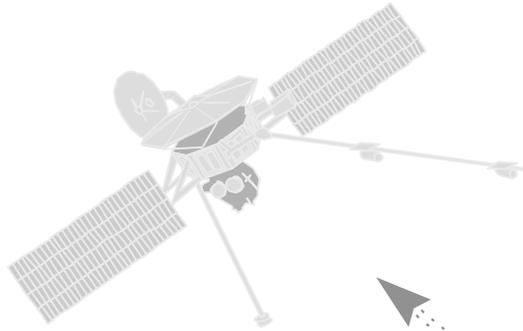


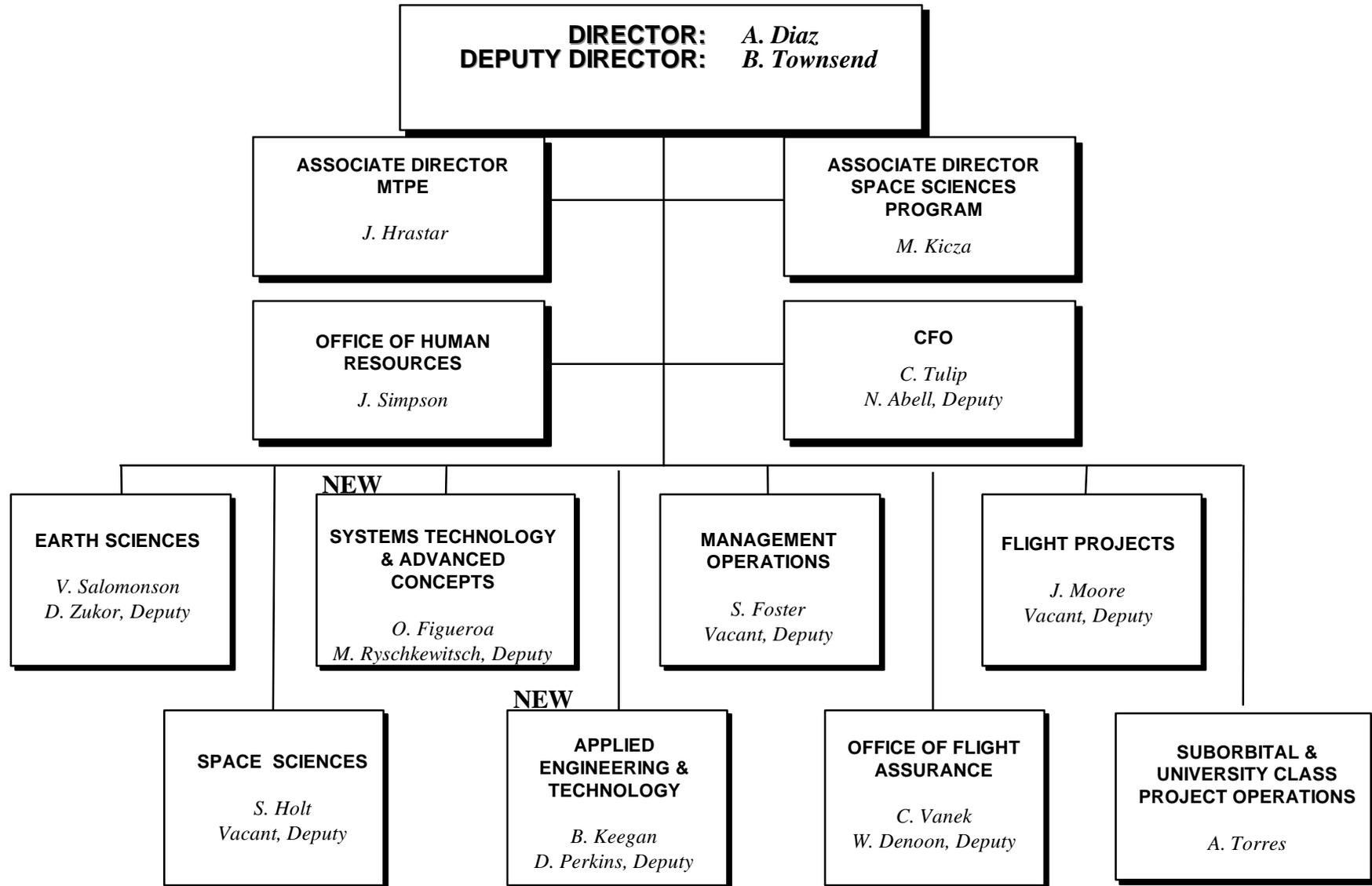
Goddard Space Flight Center



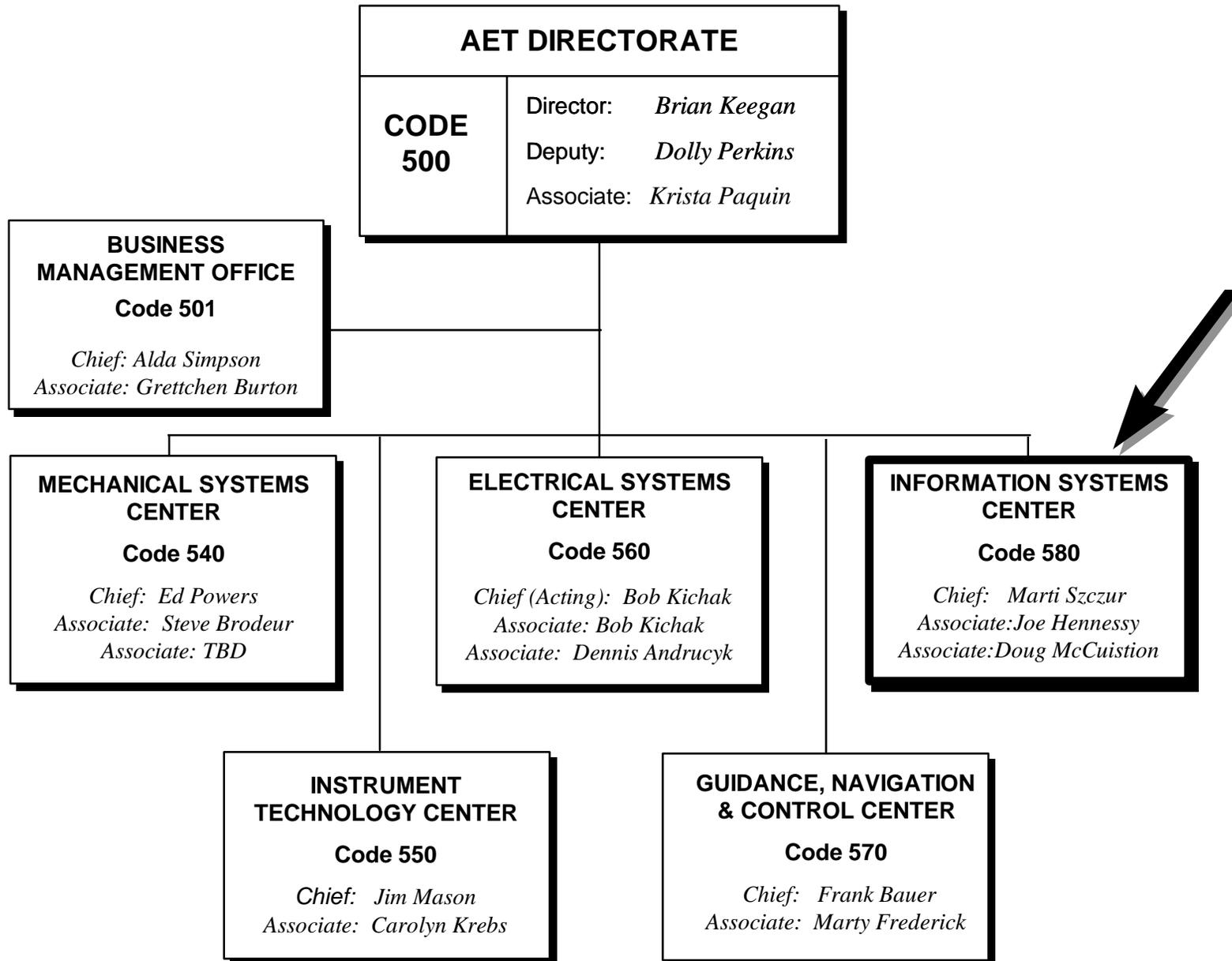
*Overview Briefing  
May 1998*



# GSFC - after reorganization



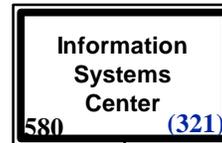
# AETD ORGANIZATION



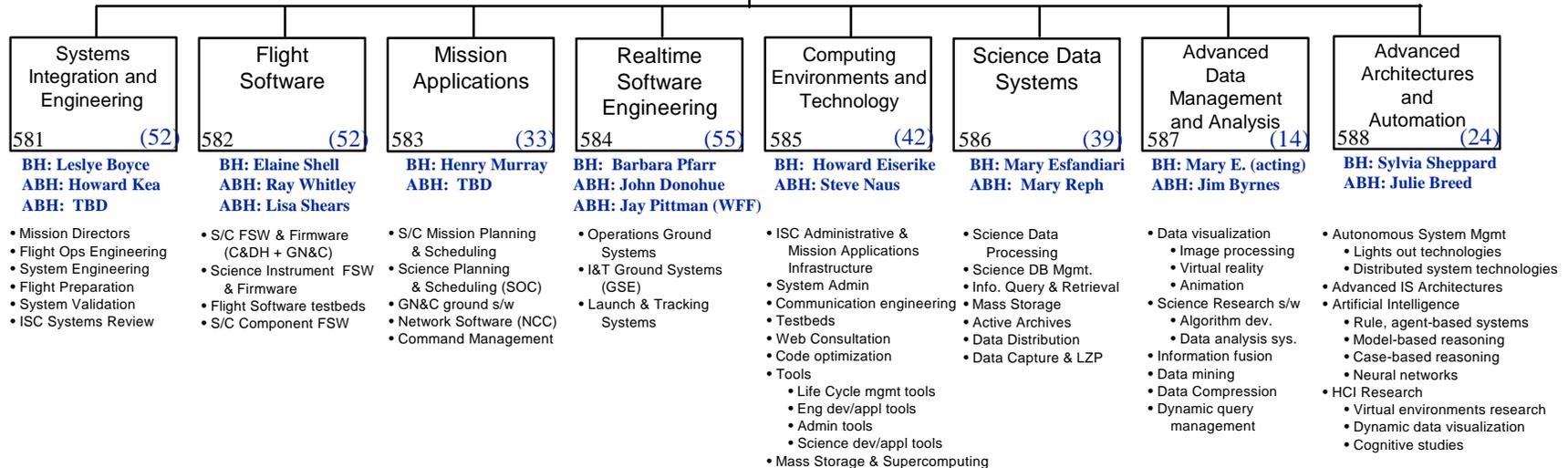
### ISC Mission *(our core business ... our fundamental purpose)*

**To provide high value information systems products and services  
and  
to advance information technologies, which are aligned with customer needs.**

**Chief**, Marti Szczur  
**Associates**, Joe Hennessy & Doug McCuiston  
**Secretaries**, Jeanie Hall & Tracie McNeilly  
**Infrastructure Support Manager**, Den Giblin  
**Staff Engineers**, Vicki Oxenham & Earl Beard  
**AO**, Kecia Ford



Assistant for Technology, Peter Hughes  
 Technology leadership,  
 coordination, review and  
 advocacy



## 580 / Information Systems Center Branch Structure

Branch	Functional Area/Products	Services	Customer Projects/Org
581 / Systems Integration and Engineering <i>Leslye Boyce, Howard Kea</i>	End-to-end data systems engineering of ISC mission systems development activities.	Mission directors, ground sys/flight ops management, sys. eng., flight prep support, SW eng, Sys I&T, AO prep	EOSDIS, HST, STAAC, NGST, MAP, IMAGE, TRACE, POES, AGS, on-orbit missions
582 / Flight Software <i>Elaine Shell, Ray Whitley, Lisa Shears</i>	Embedded spacecraft, instrument and hardware component softwares; FSW testbeds	End-to-end FSW development; simulation s/w; spacecraft sustaining engineering	HST, MAP, TRMM, EO-1, SMEX, SMEX-lite, SPARTAN, EOS AM/PM/Chem, GLAS, XRS XDS, POES, NGST, XTE, EUVE, GRO
583 / Mission Applications <i>Henry Murray, TBD</i>	Off-line mission data systems (e.g., Command man., s/c mission and science P&S, GN&C, NCC	Sys. eng. & implementation, COTs application, testbeds for concept proof/prototyping in ops environment	NCC SPSR, LS7, EO-1, EOS AM1, HST, TRACE, C930, IMAGE SOC
584 / Realtime Software Engineering <i>Barb Pfarr, Jay Pittman, John Donohue</i>	Real-time ground mission data systems for I&T and on-orbit ops (e.g., s/c command & control, launch and tracking services)	Sys. eng. & implementation, COTs application, simulators, testbeds for concept proof/prototyping in ops env.	HST, WFF, ISTP, IMAGE, MAP, SMEX, TRACE, WIRE, EO-1, LS7, HITCHHIKER, SPARTAN, EOS, NGST
585 / Computing Environments and Technology <i>Howard Eiserike, Steve Naus</i>	Tools and services in support of information management	Hands-on sys admin., network manage., business/support tool develop, WWW application	EOSDIS, IFMP, C630, C930, HST, WSC, C250, C450, HST
586 / Science Data Systems <i>Mary Ann Esfandiari, Mary Repp</i>	Science data systems including data processing, archival, distribution, analysis & info man.	Sys. eng. & implementation, COTs application & integration, testbeds, prototyping	EOSDIS, LS7, TRACE, TRMM, HST
587 / Advanced Data Management and Analysis <i>M. Esfandiari (acting), Jim Byrnes</i>	Advanced concept development for archival, retrieval, display, dissemination of science data	Next-gen req. development, testbed for sys evaluation, prototype products	FAST, NEAR, WIND, ULYSSES, C632, C686, C694, C930, C922
588, /Advanced Architectures & Autonomy <i>Sylvia Sheppard, Julie Breed</i>	Technology R&D focused on space-ground automation sys. and advanced architectures	Sys. eng & implementation, human-computer eng., technology evaluations, concept prototypes, sw eng. methods	NCC, STAAC, SOMO, Code SM, EOSDIS, MIDEX, NGST

## Why create an ISC?

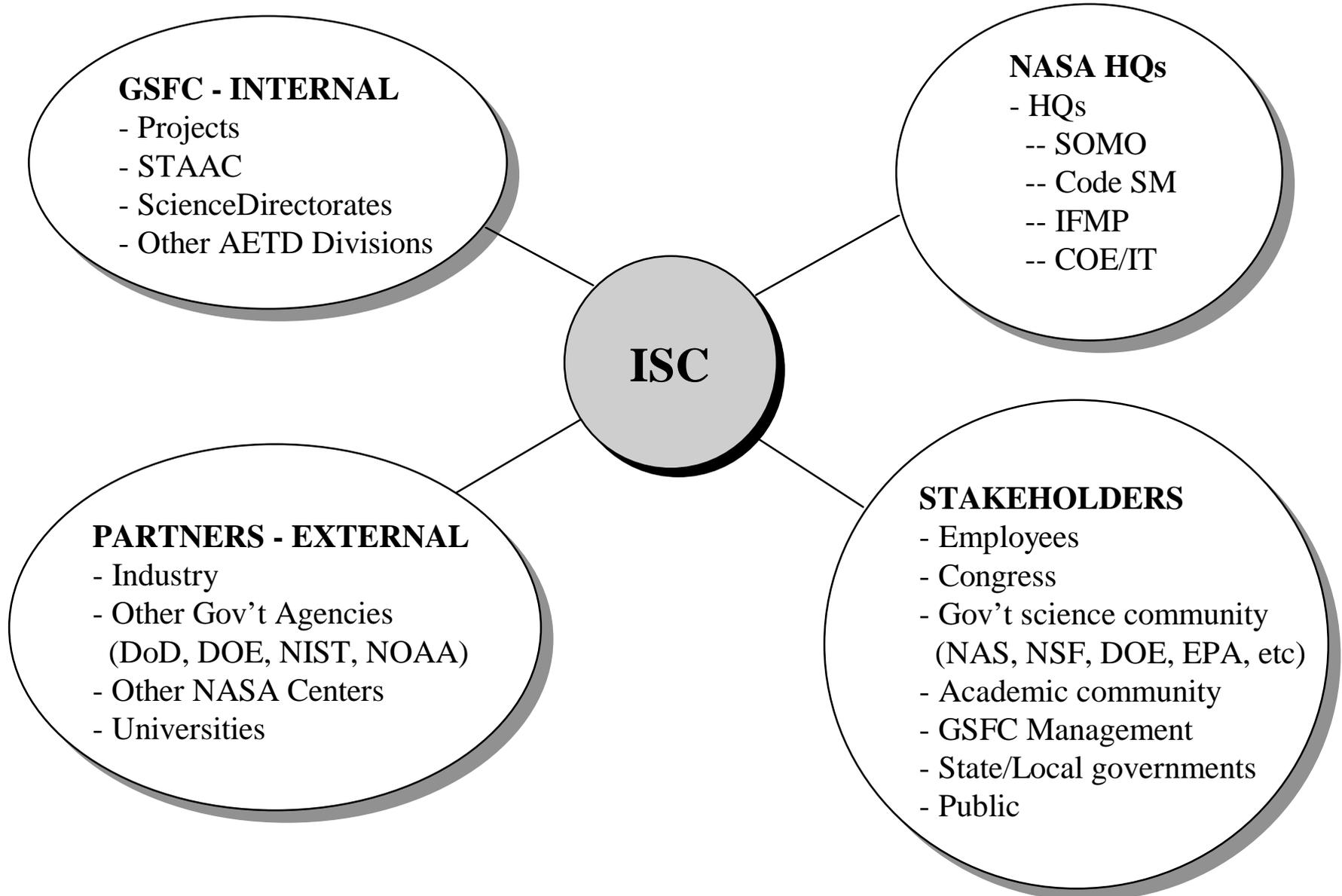
- Integrate expertise/leadership in information system development
- Promote organizational collaboration, partnerships, and resource sharing
- Stimulate design/development of seamless end-to-end flight and ground systems
- Enable flexibility to effectively support many simultaneous projects by improved access to critical mass of discipline expertise.
- Enhance career growth and opportunities including multi-disciplinary opportunities
- Improve communications among information system professionals

- **Mission/Project Support Areas**
  - Mission Planning, Control & Monitoring
  - Information System Integration & Test
  - On-board flight software & flight software testbeds
  - Attitude & Orbit prediction and determination systems
  - Data capture, processing, management and distribution systems
  - Spacecraft and instrument telemetry processing
  - Simulators for testing of subsystems, systems and procedures to verify flight readiness
  - Acquisition data/network systems
  - Advanced data visualization (mission ops applications)
  - Performance modeling and capacity planning for science data processing systems
  - Operations support and anomaly investigation for orbiting spacecraft
- **Science Support Areas**
  - Science data product processing/algorithm implementation
  - Data archiving and mass storage
  - Data retrieval and distribution
  - High performance science computing and parallel processing
  - Science data visualization
  - Image analysis and processing system
- **Cross-cutting Technology Support Areas**
  - Human Computer Interaction (HCI)
  - Software engineering methods and processes
  - Tools: mission/project management and administrative
  - Advanced information systems architecture and standards
  - Intelligent Systems/Autonomy
  - Computer Administration Services/Network Services

- **Science focus**
- **Stewardship/taxpayer investment**
- **Performance-Based Contracting**
- **Workforce - vital, effective, energized**
- **Budget/cost constraints ...cost effective**
- **Outreach**
- **Partnerships**
- **Technology transfer**
- **Unique, 1st-of-a-kind focus**
- **Be competitive, but don't compete with industry**
- **Meet existing commitments**

References: NASA Strategic Plan, Space Science Enterprise Strategic Plan, Earth Science Enterprise Strategic Plan, GSFC Strategic Implementation Plan, GSFC 7 High Priority Objectives, AETD/STAAC (SALT) Retreat Results, Tompkin's Future Missions Presentation, SOMO Space Operations Management Plan, ISC Brainstorming Notes (Profile in 5 years), Connerton's NASA TRL Levels and Technology Transfer Presentation

# Who are the ISC “Customers”?



- **Choices/options...no one size fits all**
- **Skilled, experience resources on their projects**
- **Flexibility**
- **Responsiveness**
- **Customers want to drive the solutions ... they do not want an “ISC Agenda”**
- **High quality products and services**
- **Management commitment in terms of resources**
- **Customer-oriented business practices**
- **End-to-end systems**
- **Focal point -- emerging technology and strategic focus - technology awareness**
- **Low cost, cost-effective solutions**
- **New way of doing business**

*Note: All “customers” come with dollars and all are seeking ISC products/services*

- *Flight Projects*
- *STAAC*
- *Other technology programs (e.g., SOMO, Code SM)*
- *Scientists (internal and external)*
- *Other GSFC (including institutional)*

- *(the “critical few” targets we believe are most important to move us toward our vision)*

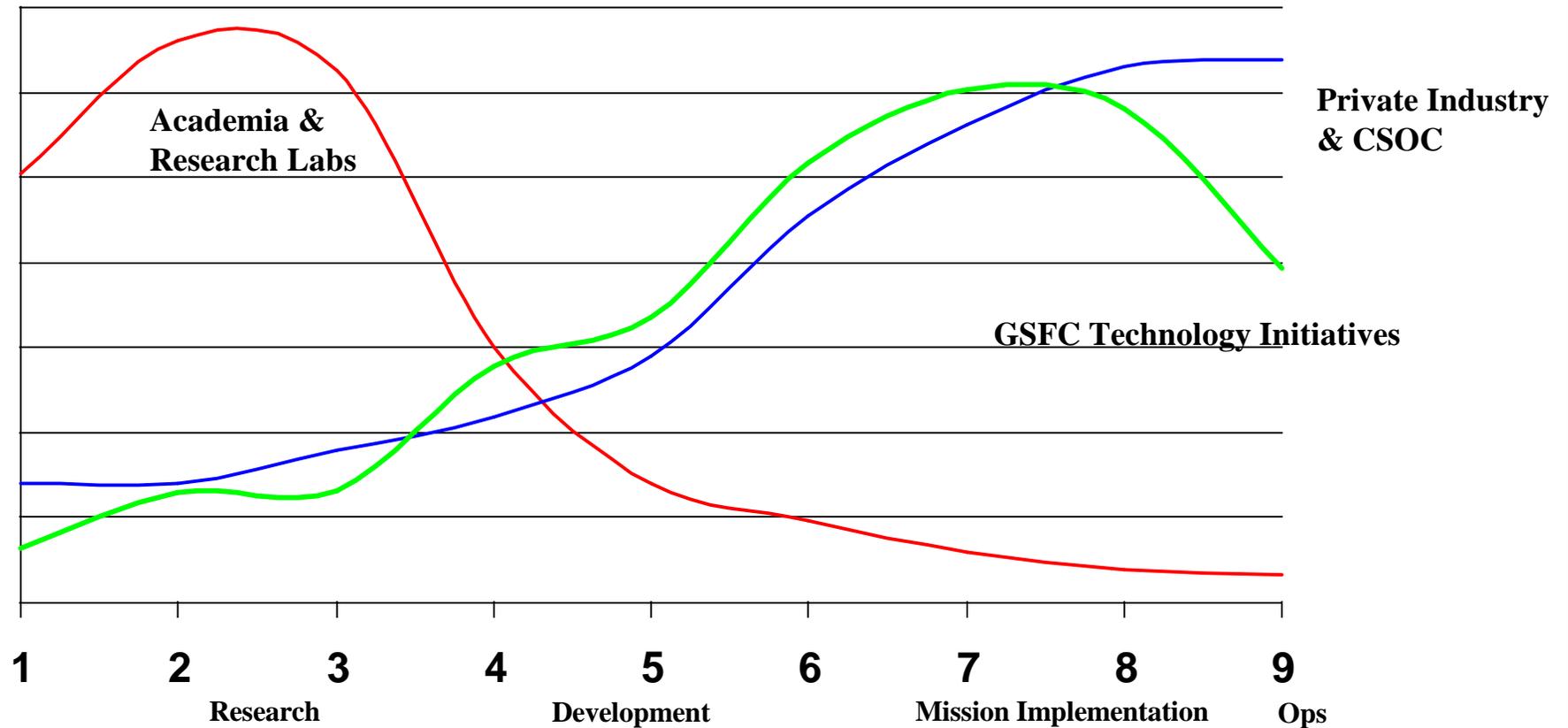
- 1. Advance leading-edge information systems technology**
- 2. Clearly define the scope of ISC business, and deliver high value products and services that satisfy customer needs**
- 3. Build a diverse, talented, innovative, energized, internationally recognized, workforce of employees and managers**
- 4. Establish open, flexible, collaborative relationships with customers and partners**

## **Advance leading-edge information systems technology**

A significant portion of ISC “business” is information systems technology development with focus on the following in priority order:

1. “Smart” instruments and mission autonomy
2. Science data analysis technologies
3. Advanced IS architectures
  - Scaleable computing environments
  - High performance communications
  - High performance computing environments
  - Intelligent Synthesis Environment
  - Information systems security
4. Large scale data management
5. Rapid/advanced software development tools and methodologies
6. Modeling/simulation tools and technologies

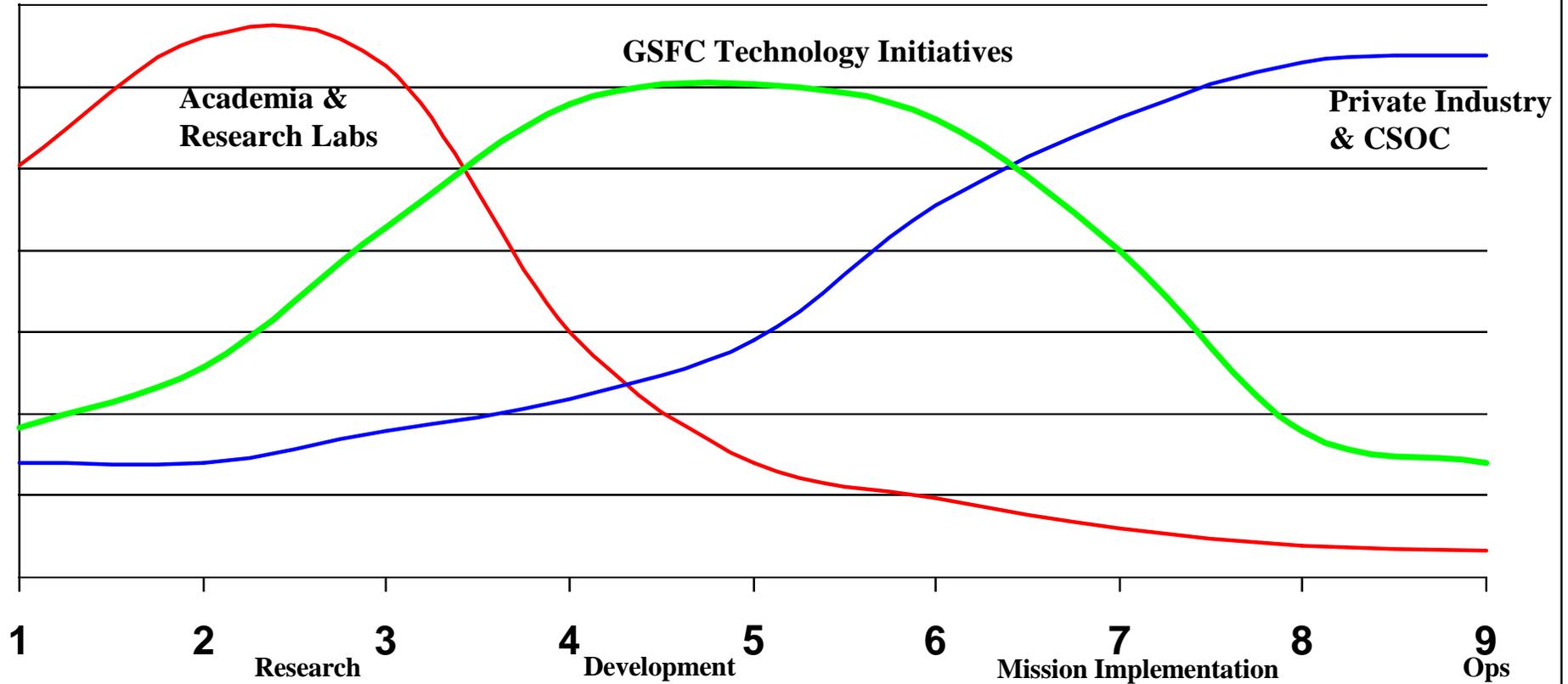
# Technology Work Distribution Current State



## Technology Readiness Levels (TRLs)

*Disclaimer: This graphic is relational only*

# Technology Work Distribution Goal State



## Technology Readiness Levels (TRLs)

*Disclaimer: This graphic is relational only*

- *Chartered Strategic Technology Planning Team (STP) in early April*
- *STP accomplishments:*
  - Defined ISC Technology Management Program
    - Survey showed that related technology development program planning either in-progress or proprietary (government and industry)
  - Defined ISC Technolgy Program processes and documents
    - Identified Target Audience and Objectives
    - Detailed guidance documents for Program Management:
      - ISC Technology Program Plan
      - *ISC Technology Focus Area Plans (TFAP)*
        - Directly tied to 6 ISC focus areas (previous page)
      - *ISC Integrated Technology Plan*
        - How the TFAP's fit within and across the Technology Plan
- *Finalizing Scope and Contents of ISC Tech Focus Area Plans*
- *Chartering initial Focus Area Team to develop Focus Area definition, technology steps and challenges/enablers*

**Clearly define the scope of ISC business, and deliver high value products and services that satisfy customer needs.**

### **5 YEAR PROJECTION FOR ISC PRODUCTS AND SERVICES**

#### **Increased Focus**

- Flight software
- Science analysis/processing systems and tools
- Science data management
- End-to-end mission engineering
- Science and mission proposal support systems
- Science/mission planning systems
- Adv. Info. Sys. Architectures
- Technology R&D

#### **Decreased Focus**

- Mission control center systems development
- Trending (engineering) systems development
- Flight dynamics products
- Sustaining engineering
- Operations
- Maintenance
- System administration
- Routine development, test, and operations support tools
- GSFC institutional routine work

- Completed cataloging of all ISC branch products and services.
- Completed consolidation of products and services into categories anticipating More, Same, and Less support
  - Based on Customer Forum and ISC retreat results
- Began understanding and planning ISC resource shift from ‘Less’ to ‘More’ focus areas.

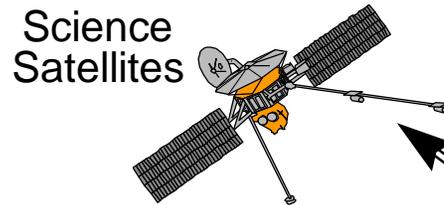
### **Build a diverse, talented, innovative, energized, internationally recognized, workforce of employees and managers.**

- Increase ISC capabilities in software engineering, system engineering, technology, and programming.
- Ensure that ISC employees who get visible, “good assignments/positions” reflect the diversity of the ISC workforce.
- Develop an ISC that is internationally recognized for innovation in technology and leadership excellence.

### **Establish open, flexible, collaborative relationships with customers and partners.**

#### **such that**

- ISC has an expanded and more balanced customer base, with an increased focus on the scientists, STAAC, and other technology organizations.
- ISC has an effective, trusting relationship with all key customers.
- ISC has stable funding sources for building “capacity” – technology, start-up, outreach, etc.
- ISC has effective partnerships and alliances with academia, industry, other government agencies, and other NASA centers



- NGST Adaptive Scheduling
- Real-time Weather Assessment for Remote Sensing Spacecraft

Data Archives



- HST/V2K Data Warehousing

Science PI's



- Remote Instrument Control
- NGST Scientist's Expert Assistant

MOCC

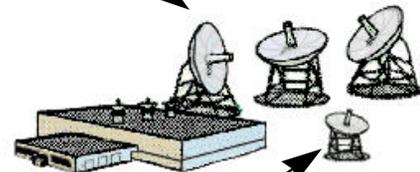


- SMEX GDS & Automation
- Mission Ops Automation
- Java-based Remote Command & Control
- S/C Emergency Response System

Remotely-Located FOT Member or PI



- TRACE Automation & Remote Notification
- Remote Instrument Control



	Task	Sponsor	GSFC Lead/Code
<b>- Technology Development Tasks</b>			
1	Remote Intelligent Agents	Code SM, SOMO	Walt Truszkowski/588
2	Agent-Builder Toolkit	SBIR/Phase II	Walt Truszkowski/588
3	Collaborative Agent Development Environment	SBIR/Phase I	Jim Rash/588
4	MOPSS (Mission Planning and Scheduling)	Code S Projects	Bill Potter/584
5	HST Vision 2000 Java Graphical User Interface	HST, SOMO	Ken Lehtonen/585
6	HST Vision 2000 Health & Safety Data Mining Tool	HST, SOMO	Ken Lehtonen/586
7	Virtual Mission Ops Center & S/C Emergency Response System	Code SM, SOMO	Julie Breed/588
8	HST Scientist's Expert Assistant	NGST	Jeremy Jones/588
9	NGST Adaptive Scheduling	NGST, SOMO	Lou Hallock/582
10	JAVA-based S/C Interface to Telem. & Comm. Handling (JSWITCH)	SOMO	Henry Murray/583
11	IP Instrument Control (IPIC)	SOMO	Gary Meyers/581
12	Desktop Satellite Data Processor	SOMO	Barbie Brown/588
13	SAFE Protocol (aka, S/C as a node on the Internet)	SOMO	David Sames/588
14	Adaptive Scientific Data Processing	SOMO	Mark Stephens/566
15	LandSat7 Health & Safety Monitoring with State Modeling	LandSat7	Bill Potter/584
16	LandSat7 Real-time Cloud Cover Assessment	SOMO	Bill Potter/584
17	Visual Analysis Graphical Editor (VisAGE)	SOMO	Matt Brandt/588
18	JAVA GenSAA	SOMO	Karl Mueller/588
19	JAVA Real-Time Attitude Determination System	SOMO	Wendy Shoan/583
20	High-Rate Telemetry Acquisition System Prototype	SOMO	Barbie Brown/588
21	Low-cost, PC-Based NASCOM 4800 Bit Block Processor	SOMO	Michael Max/581
22	Remote Instrument Control	DDF	Troy Ames/588
<b>- Applied Technology Infusion Tasks</b>			
1	ISTP (DSN Scheduling, Automation & Platform Independence)	SOMO	Ron Mahmot/584
2	TRACE (Mission Ops Automation, Laptop-based GDS)	TRACE Project	Keith Walys/581
3	MIDEX Advanced Ground System Technology	MIDEX Project	SCoyle/581 JBreed/588
4	NCC98	SOMO	Tony Maione/450
5	System Support Process (formerly Renaissance)	SOMO	Gary Meyers/581
6	Spacecraft Artificial Intelligence Laboratory	SOMO	Randy Seftas/588
7	Cooperative Autonomy Laboratory	Code SM	Bob Connerton/581
8	Software Engineering Laboratory	Code Q, SOMO	Scott Green/581
9	Mission Ops Automation (GRO ROBOT, XTE AMOS, ...)	Code S	Bob Sodano/581