



Reply to SMD – 5H79
Attn of:

June 25, 2012

TO: Distribution

FROM: Science Mission Directorate, Airborne Science Program Director

SUBJECT: FY 2013 Airborne Science Flight Program

The Airborne Science Program (ASP) under the Earth Science Division (ESD) of the Science Mission Directorate (SMD) announces the annual call for Flight Requests to use the NASA aircraft observing platforms and capabilities in Fiscal Year 2013 (October 2012 – September 2013). This request applies to all Earth Science activities with NASA or other funded research that require NASA aircraft or NASA facility sensors.

All investigators with approved **or pending** proposals from the Research Opportunities in Space and Earth Sciences (ROSES) announcements that have a requirement for airborne science **must also submit a Flight Request**. The Flight Request is also the method to acquire an estimate if your proposal requires a cost estimate for Airborne Science support. However, for investigators proposing to participate on large, multi-aircraft experiments, such as last year's ROSES 2012: South East Asia Composition, Cloud and Climate Coupling Regional Studies (SEAC4RS), a single Flight Request will be submitted for each mission by the project scientist.

The Airborne Science Program Website is located at <http://airbornescience.nasa.gov>. This site is a centralized portal for all components of the Program. It hosts the Flight Request system, program, platform and instrumentation capabilities, schedules, and points of contact.

The Science Operations Flight Request System (SOFRS) can be reached directly at <http://airbornescience.nasa.gov/sofrs>. Please submit all Flight Requests through this paperless system.

Facility Update

The Airborne Science Program continues to operate the ASP-supported NASA aircraft, consisting of unique highly modified "science-ready" platforms, as well as an aircraft catalog program, which consists of other government, university and

commercial NASA aircraft that have completed NASA safety reviews. See Appendix A for the list of aircraft and their current user fees. ASP's intention in FY2013 is to expand NSERC's (National Suborbital Education and Research Center) responsibilities to include cross cutting science infrastructure and science management throughout the ASP platform (aircraft) and mission portfolio.

The program continues to provide a mix of manned and unmanned assets to conduct a variety of scientific studies. In addition to Appendix A, the list of available aircraft in the program can be found at <http://airbornescience.nasa.gov/>.

The Science Mission Directorate supports selected interdisciplinary science instruments for community use. An interdisciplinary science instrument is funded by one or more NASA Earth Science research program(s), but is available for use by all NASA projects. Typically there is a team that supports the operations on the instrument, and they may or may not be required to deploy with the instrument. If use of an interdisciplinary science instrument is approved by the sponsoring science program manager, only the additional mission-peculiar support costs for the instrument team and possible data processing costs are requested. Non-NASA Aircraft Platform Services are listed in Appendix B and available interdisciplinary science instruments and suitable commercial sensors with point-of-contact in Appendix C. A list of Program Managers is in Appendix D and Flight Request information for Earth Observing System (EOS) Investigators can be found in Appendix E.

IMPORTANT: AVIRIS, MAS, and MASTER investigators are requested to submit FY13 Flight Requests before September 30, 2012 (Note that the AMS instrument is no longer supported by NASA and is being transferred to the USFS). Submitting flight requests by the September 30 deadline allows the ASP, Sensor Teams and NASA Headquarters the opportunity to plan appropriately for the upcoming flight season. Late Flight Requests may need to be moved to the following year since the 2013 campaigns for those instruments will be based on the Flight Requests received by September 30, 2012. Flight requests received after this date and that are approved will be accommodated on a best efforts basis.

User Fees and Flight Requests

A Flight Request is necessary in order to schedule an airborne asset through the Airborne Science Program, but it is not a substitute for a proposal. All Flight Requests should be associated with a NASA grant, proposal, or, if funded from a non-NASA source, deemed to be directly related to a NASA area of interest. If no NASA investigation is associated with the request, it will be handled as a reimbursable mission and may be required to include justification for use of NASA facilities. All airborne assets are subject to user fees, which reflect the marginal cost of using the asset, and are assessed by the organization operating the asset. This is true for both NASA and non-NASA facilities. Reimbursable missions using NASA assets may be subject to additional fees.

For non-NASA funded Flight Requests to be considered for the NASA subsidized rate, please include on the name and contact information of a NASA sponsor who has agreed to deem the research to be directly related to a NASA area of interest (NASA HQ Science Concurrence) as well as the name and contact information for the funding source. For SMD investigators, the sponsor is the program manager who has issued your grant or contract.

Once a Flight Request is approved and scheduled, the user fees must be forwarded to the performing organization before the flight can occur. For SMD funded researchers using NASA assets, the fees will normally be withheld from the investigator's budget and sent by the sponsor directly to the NASA aircraft or sensor organization. For researchers using non-NASA assets, payment of the fees will vary and the Airborne Science business managers are prepared to assist the investigator through the financial procedures. All ASP missions utilizing SMD instruments, manpower, aircraft or funds must be in compliance with NASA Procedural Requirement (NPR) 7900.3B - Aircraft Operations Management, which can be found at [http://nodis3.gsfc.nasa.gov/npg_img/N PR 7900 003B /N PR 7900 003B .pdf](http://nodis3.gsfc.nasa.gov/npg_img/N_PR_7900_003B /N_PR_7900_003B .pdf)

The Flight Request process is managed by the Earth Science Project Office at Ames Research Center. If you did not receive this message directly and would like to be on further distributions or if you have any questions regarding the Flight Request system or process please contact:

Marilyn Vasques
Flight Request Manager
Marilyn.Vasques@nasa.gov
Tel: 650-604-6120

Questions regarding the Airborne Science Program can be addressed to:

| | | |
|--|----|--|
| Bruce Tagg | or | Randy Albertson |
| Program Director | | Deputy Program Director |
| bruce.a.tagg@nasa.gov | | Randal.T.Albertson@nasa.gov |
| Tel: 202-358-2890 | | Tel: 661-276-7540 |

Please submit your completed FY13 Flight Requests as soon in your planning process as possible.

Sincerely,

Bruce Tagg
Director, Airborne Science Program
Science Mission Directorate

Appendix A

Available NASA Airborne Science Catalog of Platforms

The Airborne Science Program has continued the catalog aircraft program. Listed below are the platforms currently available, points of contact, and associated user's fees on a per hour basis unless otherwise noted. The rates below do not include mission peculiar costs (MPCs) for a given campaign or deployment, it is only the rate of the aircraft from its home base. In the event that the cost of fuel significantly exceeds current rates, this additional cost will be included in the MPC.

NASA ASP Supported Aircraft, Other NASA Aircraft, and Commercial Aircraft are listed below. Other Agency Aircraft are listed in Appendix B.

| Facility | Center/ State | Contact Name | Contact Phone | NASA SMD User Fee (per flight hour) |
|-------------------------------|------------------|-------------------------------|------------------------------|---|
| ASP-Supported Aircraft | | | | |
| DC-8 | DFRC, CA | Frank Cutler Rick Shetter | 661.276.3998 701.330.2126 | \$6500 |
| ER-2 | DFRC, CA | Tim Moes | 661.276.3054 | \$3500 |
| P-3B | GSFC, WFF, VA | Mike Cropper | 757.824.2140 | \$3500 |
| G-3 DFRC | DFRC, CA | John McGrath | 661.276.2588 | \$3000 |
| G-3 JSC | JSC, TX | Jim Alexander Ken Cockrell | 281.244.9870 281.244.8810 | \$2500 |
| Global Hawk | DFRC, CA | Chris Naftel | 661.276.2149 | \$60K/week or \$250K/month for access \$1800/Flt hour up to 150hrs/month |
| Other NASA Aircraft | | | | |
| B-200 DFRC | DFRC, CA | Walter Klein | 661.276.2084 | Call |
| B-200 LARC | LaRC, VA | Bruce Fisher | 757.864.3862 | Call |
| UC-12B | LaRC, VA | Bruce Fisher | 757.864.3862 | Call |
| Cessna 206 | LaRC, VA | Bruce Fisher | 757.864.3862 | Call |
| Learjet 25 | GRC, OH | Al Micklewright Ed Emery | 216.433.2036 216.433.5694 | Call |
| HU-25C Falcon | LaRC, VA | Bruce Fisher | 757.864.3862 | Call |
| C-23 Sherpa | WFF, VA | Mike Cropper | 757.824.2140 | Call |
| Twin Otter (DHC-6) | GRC, OH | Al Micklewright Ed Emery | 216.433.2036 216.433.5694 | Call |
| S-3B | GRC, OH | Al Micklewright Ed Emery | 216.433.2036 216.433.5694 | Call |

| | | | | |
|---|----------|---------------------------------|------------------------------|------|
| T-34C | GRC, OH | Al Micklewright Ed Emery | 216.433.2036 216.433.5694 | Call |
| WB-57F | JSC, TX | Jim Alexander Kevin Lesenski | 281.244.9870 281.244.9664 | Call |
| Unmanned Aircraft Systems | | | | |
| Ikhana | DFRC, CA | Mauricio Rivas | 661.276.3678 | Call |
| SIERRA | ARC, CA | Matthew Fladeland | 650.604.3325 | Call |
| Commercial Aircraft:* | | | | |
| Twin Otter (for use as AVIRIS platform only) (DHC-6) | CO | Michael Eastwood | 818.354.9273 | Call |
| Twin Otter (WFF) (DHC-6) | CO | Mike Cropper | 757.824.2140 | Call |
| King Air | WFF | | | |
| King Air (B-200) | DoE, NV | Bruce Coffland | 650.604.2864 | Call |

*Additional commercial aircraft can be found at <http://www.airbornescience.gov>.

Appendix B Other Agency Aircraft Platforms

This table of platforms is provided for information only as a service to investigators. NASA is not responsible for maintaining or verifying the accuracy of data on non-NASA web sites. The list represents those platforms for which agreements for access by SMD investigators are in place, in work, or have recently been approved by NASA Aviation Management as airworthy and safe to operate. The list should not be considered all-inclusive, but any platform selected by investigators must comply with NASA aviation safety policies, which includes requirements for the use of non-NASA aircraft. Please refer to the NASA Aircraft Operations Management Procedure located at:

http://nodis3.gsfc.nasa.gov/npg_img/N_PR_7900_003B_/N_PR_7900_003B_.pdf

Each of these providers schedules their own platforms, and many include a formal request and allocation system, similar to the Airborne Science Flight Request system. Investigators may conclude their own arrangements with a provider of their choice, to be paid from existing grant/contract funds, or may use the NASA Flight Request for assistance in scheduling and pricing from the Airborne Science Office.

| Federal (non-NASA) | | | |
|--|-----------------------|------------------------|---|
| Owner/Operator | Platform | Location | Information |
| NRL P-3 and C-12 (B-200) – http://www.nrl.navy.mil/planes/index.php | | | |
| NOAA-AOC | Gulfstream IV | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | Citation II- CE550 | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | Gulfstream AC-690 | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | P-3D | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | Lake Seawolf | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | Aero Commander | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NOAA-AOC | Twin Otter DHC-6 | AOC, MacDill AFB FL | http://www.aoc.noaa.gov |
| NSF | HIAPER G-5 | NCAR/Boulder, CO | http://www.eol.ucar.edu/instrumentation/aircraft |
| NSF | C-130 | NCAR/Boulder, CO | http://www.eol.ucar.edu/instrumentation/aircraft |
| ONR/NPS/CIRPAS | Altus 1 (UAV) | CIRPAS/Marina, CA | http://www.cirpas.org/ |
| ONR/NPS/CIRPAS | Pelican | CIRPAS/Marina, | http://www.cirpas.org/ |

| | | | |
|------------------------|----------------|----------------------|---|
| | | CA | |
| ONR/NPS/CIRPAS | Twin Otter | CIRPAS/Marina, CA | http://www.cirpas.org/ |
| ONR/NPS/CIRPAS | Predator (UAV) | CIRPAS/Marina, CA | http://www.cirpas.org/ |
| USDA Forest Service | Navajo | Carlsbad, CA | Bob Lockwood (909) 315-0181 |

Appendix C

Airborne Interdisciplinary Science Instrumentation

The program is supporting flights with NASA-funded sensors, both PI-led sensors or interdisciplinary science instruments. An interdisciplinary science instrument is funded by a particular program manager, or multiple program managers, and is available for use by other investigations. Certain interdisciplinary science instruments are partially supported by the Airborne Science Program, and may be provided for use by approved requesters under the SMD Research and Analysis Program. The following is a table of the NASA Interdisciplinary Science Instruments:

| Instrument | Contact | Telephone |
|---|----------------|------------------|
| Airborne Visible Infrared Imaging Spectrometer (AVIRIS) | Robert Green | 818-354-9136 |
| Enhanced MODIS Airborne Simulator (MAS) | Jeff Myers | 650-604-3598 |
| MODIS-ASTER Simulator (MASTER) | Jeff Myers | 650-604-3598 |
| Digital Camera Systems (DMS, DCS) | Jeff Myers | 650-604-3598 |
| Ames Precision Attitude/position equipment (POS-AV) | Jeff Myers | 650-604-3598 |
| Wallops Precision Attitude/position equipment (POS-AV) | Mike Cropper | 757-824-2140 |
| UAV-Synthetic Aperture Radar (UAVSAR) | Yunling Lou | 818-354-2647 |

The Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) will be available as a NASA Facility Sensor for scientific research and applications. Investigators will be expected to pay for AVIRIS data acquisition and processing costs associated with their investigations. If AVIRIS requirements were approved as part of the original proposal selection, then these costs should already be provided for in your budget or reserved for this purpose at NASA Headquarters. Please contact your Technical Monitor if you have any questions about this. If your AVIRIS requirement is new and was not in the originally selected proposal, then resources must be found within your existing budget or secured through an augmentation request to your Technical Monitor or Program Manager at NASA Headquarters. Furthermore, scenes from the AVIRIS archive (i.e., data that have already been acquired) can be obtained at a nominal cost.

The enhanced MODIS and MODIS/ASTER simulators (eMAS and MASTER) are available for flight on the NASA ER-2 (eMAS) and potentially other aircraft (MASTER) in FY 2013. The calibration and data processing (Level-1b and geolocation) are supported by the Airborne Sensor Facility at NASA Ames Research Center. Higher-level products are possible in some instances; these are supported separately by the eMAS science POC (Dr. Steven Platnick) or other research teams and should not be assumed in any Flight Request.

Additional information on eMAS or MASTER can be obtained from:

Use/Cost Policies: Dr. Steven Platnick (see Appendix E)

Sensor & FY 2013 Schedule: Jeff Myers, Ames Research Center, 650-604-3598

The Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR), a high resolution, fully polarimetric, L-band SAR designed for repeat pass InSAR applications, will be available as a NASA Facility Sensor for scientific research and applications. Investigators are expected to pay for UAVSAR data acquisition and processing costs associated with their investigations, unless they were approved as part of the original proposal selection, then these costs should already be provided for in your budget or reserved for this purpose at NASA Headquarters. UAVSAR will be supported on the G3 aircraft this year, but development is underway to support UAVSAR flights in the future on the Global Hawk. If you are preparing a budget for a NASA proposal, you may estimate the UAVSAR data acquisition costs on the G3 aircraft at <http://uavsar.jpl.nasa.gov/cgi-bin/fps>. If you already have approved flight hours, you may use this website to finalize your flight plans as well. NASA data acquired by UAVSAR are processed at JPL and archived for distribution at the Alaska Satellite Facility (<http://www.asf.alaska.edu/>), where you may download the processed data products at no charge. For more information about UAVSAR, visit <http://uavsar.jpl.nasa.gov>. JPL's Earth Science Airborne Suborbital Instruments and Measurements website can be found at <http://airbornescience.jpl.nasa.gov>

Satellite communications systems of various types are now installed, or in the process of being installed, on most of the core science platforms. Iridium sat-phone modems, with data rates up to 9.6Kb/sec, are standard equipment on the DC-8, ER-2 806 and P-3B aircraft, and are included in the new NASDAT (NASA Airborne Science Data and Telemetry system) navigation data recorders (the follow-on to the prototype REVEAL (Research Environment for Vehicle-Embedded Analysis on Linux) boxes) to be deployed in CY2013. Payload use of the Iridium service through the NASDATs is available globally and is provided as part of the flight hour cost of the platform. Inmarsat BGAN (Broadband Global Area Network) airborne sat-com terminals are installed on the DC-8, the P-3B, and the DFRC B200, for use on a cost-reimbursable basis. BGAN service supports up to 432Kb/sec duplex data rates. The Global Hawk UAS includes a Ku-band sat-com system as standard mission equipment, with data rates in excess of 1Mb/sec. Use of these systems is quoted as a Mission Peculiar Cost by the aircraft manager. (It should be noted that, unlike the Iridium modems, BGAN and Ku-Band service degrades rapidly at latitudes above ~60 degrees.)

Web links to remote sensing industry organizations that responded to a request for information (RFI) in April 2004 are provided for information only as a service to investigators. NASA does not endorse any commercial product or organization, and other comparable systems may exist within the industry. NASA is not responsible for maintaining or verifying the accuracy of data on non-NASA web sites. Investigators are responsible for contacting vendors to determine if the product meets the requirements of the proposed scientific investigation. **Before any actual data collection flights utilizing NASA personnel, property or funds, all vendors are subject to**

airworthiness/flight safety reviews in accordance with NASA Aviation Safety Policy for Non-NASA Aircraft.

Information on commercially available remote sensing services can be found at:

<http://www.mapps.org>

<http://www.asprs.org/>

Additional information is also available at:

| Instrument Type | Instrument | Organization | Website |
|------------------------------|---|-----------------------------|---|
| Hyperspectral Imagers | •HYMAP | Hyvista | http://www.hyvista.com |
| | •PROBE-1 | Earth Search Sciences, Inc. | http://www.earthsearch.com/ |
| | •CASI-550 | ITRES | http://www.itres.com |
| | •CASI-1500 | ITRES | |
| | •SASI-640 | ITRES | |
| | •TRWIS-III | Northrop Grumman | http://www.northropgrumman.com |
| | •LWHIS | Northrop Grumman | http://www.northropgrumman.com |
| LIDAR Systems | •Airborne Laser Terrain Mapper | Optech | http://www.optech.ca |
| | •SHOALS LIDAR Bathymeter | | |
| | •Laser Terrain Mapper (Optec ALTM 2050) | Sanborn | http://www.sanborn.com/ |
| | •LVIS | GSFC | http://lvis.gsfc.nasa.gov/ |
| | •Airborne Topographic Mapper (ATM) | WFF | http://atm.wff.nasa.gov/ |
| RADAR Systems | •X-Band IFSAR | INTERMAP | http://www.intermap.com |

Appendix D NASA Program Managers

This table of NASA Program Managers is provided for information only as a service to investigators.

| SCIENCE | | |
|----------------------------|---------------------|---|
| Name | Organization | Code |
| David Considine | NASA – SMD | Modeling Analysis and Prediction |
| Paula Bontempi | NASA – SMD | Ocean Biology and Biogeochemistry Tropospheric Chemistry Program |
| Craig Dobson | NASA – SMD | International Polar Year & Radar |
| Diane Wickland | NASA – SMD | Terrestrial Ecology Program |
| Jared Entin | NASA – SMD | Hydrology Program |
| Garik Gutman | NASA – SMD | Land Use-Land Cover |
| Richard Eckman | NASA – SMD | Atmospheric Chemistry Modeling and Analysis Program |
| Ken Jucks | NASA – SMD | Upper Atmosphere Research Program |
| Ramesh Kakar | NASA – SMD | Atmospheric Dynamics and Remote Sensing Program |
| John LaBrecque | NASA – SMD | Earth Surface Interior |
| Jeff Grossman | NASA – SMD | Astro-Materials Curation |
| Eric Lindstrom | NASA – SMD | Oceanography |
| Hal Maring | NASA – SMD | Radiation Science Program |
| Tom Wagner | NASA – SMD | Cryosphere and International Polar Year |
| Bruce Tagg | NASA – SMD | Airborne Science Program |
| Woody Turner | NASA – SMD | Biological Diversity |
| SENSORS | | |
| Parminder Ghuman | NASA – GSFC | Earth Science Technology Office (IIP) |
| Ed Torres-Martinez | NASA - GSFC | Earth Science Technology Office (AITT) |
| Joe Famiglietti | NASA - GSFC | Earth Science Technology Office (ACT) |
| Mike Seablom | NASA - GSFC | Earth Science Technology Office (AIST) |
| SATELLITES | | |
| Steve Platnick | NASA - GSFC | EOS Project Science Office |
| Jeff Masek | NASA - GSFC | Landsat Program |
| APPLIED SCIENCE | | |
| Lawrence Friedl | NASA – SMD | Applied Science Program |
| Michael Goodman | NASA – SMD | Disaster Management (Frank Lindsay?) |
| Lucien Cox | NASA – SMD | Applied Science |
| | | |

Appendix E

SPECIAL ADDENDUM FOR EOS INVESTIGATORS PLANNING FOR NASA'S FY 2013 SCIENCE MISSION DIRECTORATE AIRBORNE SCIENCE PROGRAM

June 1, 2012

INTRODUCTION

This Addendum contains specific guidance for Earth Observing System (EOS) Investigators in responding to the annual call for Flight Requests to use the NASA Airborne Science Program observing capabilities in Fiscal Year 2013.

EOS investigators have responsibility for sensor support and maintenance, and each investigator should plan on paying the cost of aircraft operations. It must be recognized that there are many demands for aircraft support of other NASA satellite missions, the NASA Science Programs, and other users. Hence, it is not likely that all of the proposed aircraft missions can be accomplished, and it is incumbent upon all investigators to plan carefully and combine missions with other investigators whenever possible.

FLIGHT REQUEST

NASA is making the annual Call Letter for the development of the FY 2013 Science Mission Directorate (SMD) Airborne Science Program plan available electronically via the Internet at <http://airbornescience.nasa.gov/>. Flight Requests should be submitted at <http://airbornescience.nasa.gov/sofrs>.

EOS Team Members and Instrument Investigators should enter the following in the "Funding Agency Sponsor" box of the Flight Request form:

Dr. Steven Platnick
EOS Senior Project Scientist
NASA/Goddard Space Flight Center
Mail Stop 610
Greenbelt, MD 20771
Phone: 301-614-5636
FAX: 301-614-5620
Internet: Steven.Platnick@nasa.gov

Similarly, Interdisciplinary Investigators should enter the following in the box:

(Discipline Manager)
Earth Science Division
Science Mission Directorate
NASA Headquarters

300 E St. SW
Washington, DC 20546

The EOS review of Flight Requests and setting of priorities will be accomplished by the EOS Senior Project Scientist and the Associate Director for Research, Earth Science Division. To enable the most equitable allocation of available resources, you are asked to send a copy of your Flight Request to the Team Leader or Principal Investigator of your science team who will be called upon to help prioritize multiple requests from a single investigation team.

In FY 2013, as in previous years, user fees for aircraft hours have been instituted by the SMD Airborne Program (see Appendix A). Flight fees will be withheld automatically from each EOS investigator's budget and transferred directly to the appropriate flight account at Dryden, Wallops, Johnson, Langley, Glenn or appropriate contract for cooperative aircraft. However, the EOS Project Science Office will consider supporting up to 50% of EOS flight fees from a Special Aircraft Support Fund, subject to scientific priorities, programmatic balance, and availability of funds in FY 2013, with the remaining 50% or more coming from the individual investigator budgets. Depending upon the number and scope of the Flight Requests, the Special Aircraft Support Fund will also be used to pay mission peculiar costs (MPCs) in their entirety. The total amount available for both flight fees and MPC will be up to \$300K in FY 2013.

In addition to flight fees, certain sensor operation and data production costs ("data fees") have been instituted by the Science Mission Directorate. Data fees, if any, are the responsibility of each individual investigator and will not be subsidized by the Special Aircraft Support Fund in FY 2013. In some cases, investigators may be able to avoid overhead charges by their home institutions by having the government transfer data fees directly from their accounts to the appropriate data account at a NASA Field Center. An investigator should contact the appropriate Resource Analyst or Contracting Officer to make such arrangements. Data from many sensors, e.g., photography on most aircraft, are available at no cost or only nominal cost for approved flights.

Scheduling and final flight year approvals are the responsibility of:

Bruce Tagg
Director, Airborne Science Program
Earth Science Division
Science Mission Directorate
NASA Headquarters
300 E St. SW; Mail Suite: 3N71
Washington, DC 20546
Phone: 202-358-2890
Internet: bruce.a.tagg@nasa.gov