National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

June 19, 2018

TO: Distribution
FROM: Earth Science Division, Airborne Science Program Director
SUBJECT: FY19 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 Fiscal Year 2019 Flight Requests. This call applies to Earth Science activities anticipated to occur between October 2018 and September 2019 that will utilize ASP supported aircraft, facility instruments, ASP science support assets or any ESD funded activities/missions using aircraft (see Appendix A for definitions and SOFRS requirement decision tree).

Detailed and continually updated aircraft and instrument information can be found on the Airborne Science Program website (https://airbornescience.nasa.gov/). This site is a centralized portal for all program components, including the Science Operations Flight Request System (SOFRS) (https://airbornescience.nasa.gov/sofrs/), platforms, instrument capabilities, schedules, and points of contact information. In addition, investigators in the pre-proposal planning stage may contact Randy Albertson (661-276-7540) or Matt Fladeland (650-604-3325) for help with platform selection, engineering questions or integration concerns. Additional investigator support information can be found in the SOFRS Principal Investigator support section (https://airbornescience.nasa.gov/content/PI_Support).

PLEASE NOTE: All missions utilizing NASA instruments, personnel, aircraft or funds must be in compliance with the NASA Aircraft Operations Management Manual (NPR 7900.3D) (https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=7900&s=3D).

User Fees

All airborne assets (aircraft and instruments) are subject to user fees. These fees reflect the usage cost and are assessed by the organization operating the asset. This is true for both NASA and non-NASA assets. A Flight Request (FR), through SOFRS, is required for scheduling usage of an ASP supported aircraft, a facility instrument, and/or an ASP science support asset. Flight Requests should be associated with a NASA program, 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 and possibly subject to additional fees.

For FRs from requesters outside of the Earth Science Division to be considered for the subsidized rate, please include the name and contact information of a NASA sponsor (NASA HQ Science Concurrence) who has agreed to deem the research to be directly related to a NASA Earth science area of interest as well as the name and contact information of the Funding Source.

Once a Flight Request is approved and scheduled, the user fees must be forwarded to the performing organization(s). In most cases, user fees must be available to the performing center(s) before mission activities, such as integration, can occur. For SMD funded researchers using NASA assets, the fees will normally be withheld from the investigator's budget by the sponsor and sent directly to the NASA aircraft or instrument organization. For researchers using non-NASA assets, the fee payment process will vary and the

Airborne Science business managers together with the aircraft managers at each center are prepared to assist the investigator with the financial procedures.

Integration and Mission Peculiar Costs

In addition to user fees, integration costs (aircraft and instrument dependent) and Mission Peculiar Costs (MPCs) may be applied to the FR budget by the aircraft manager. Detailed information on integration costs and MPCs, including those for satellite communication (SATCOM), is located in Appendix B. All relevant aircraft MPCs should be discussed with the aircraft manager.

ROSES, EOS and Multi-Aircraft Missions

Anyone with a requirement for an Airborne Science Program (ASP) supported aircraft, facility instrument, and/or science support asset **is required to submit a Flight Request**. This includes ESD funded investigators with approved or pending proposals from Research Opportunities in Space and Earth Sciences (ROSES) announcements. The Flight Request is the method to acquire a cost estimate for inclusion in proposals but is not a substitute for a proposal. FR and user fee information for Earth Observing System (EOS) Investigators can be found in Appendix C. If the campaign is planned to take place during multiple fiscal years, a flight request or place holder needs to be submitted for each FY.
Please note, for investigators proposing to participate on large, multi-aircraft experiments, such as the ROSES Call 2018: FIREx-AQ (Fire Influence on Regional and Global Environmental Experiment- Air Quality), a single Flight Request will be submitted for each mission by the Project Manager or Project Scientist.

ASP Supported and Other NASA Aircraft

The Airborne Science Program continues to support an inventory of unique highly modified "science-ready" platforms, as well as coordinate access to other NASA aircraft. See Appendix D for the list of current flight hour costs and https://airbornescience.nasa.gov/aircraft for a detailed list of available aircraft.

Federal and Commercial Aircraft

NASA instrumentation may fly on non-NASA Federal aircraft as well as academic and commercial platforms for which agreements for access by SMD investigators are in place or have recently been approved by NASA Aviation Management as airworthy and safe to operate. In accordance with NASA Procedural Requirement 7900.3 Aircraft Operations Management Manual, for all commercial aircraft contracts and agreements, NASA must ensure that the aircraft operator holds and maintains an FAA 14 CFR 121 Certificate or 14 CFR 135 Certificate. Also, if an aircraft is registered internationally and the operations are being conducted internationally, whether the aircraft is modified or flown in a certified condition, an airworthiness and onsite flight readiness and safety review must be conducted. For non-NASA/commercial aircraft, proposals need to include costs associated with NASA safety reviews, which may include travel to offsite facilities. Investigators are responsible for contacting the relevant parties to determine if the platform meets the requirements of the proposed scientific investigation.

NASA does not endorse any commercial product or organization. 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:
(https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=7900&s=3D).

Facility Instruments

Several remote sensing systems are identified as NASA facility instruments, in part because they support multiple science disciplines and a variety of NASA science objectives. They are supported by managers in the ESD Research and Analysis program, and/or the EOS Project Science Office, and are made available to the wider NASA science community via SOFRS. When using a facility instrument, an operations support team may or may not be required to deploy with the instrument. User Fees for the instrument team and data processing costs may be required in addition to aircraft Mission Peculiar Costs (MPC) and flight hour costs. Approval for use of a facility Instrument is granted by the sponsoring science Program Manager/Scientist. Appendix E shows available facility instruments with Point of Contact (POC) info. Appendix F lists Program Managers who make use of the ASP platforms.

All flight requests for US locations should be submitted at least 3 months before the desired collection dates, except in cases of rapid response missions to support hazard mapping. Flight Requests for non-US locations must be submitted at least **6 months** prior to desired data collection dates.

IMPORTANT: AVIRIS, eMAS, MASTER and UAVSAR investigators are requested to submit FY19 Flight Requests before September 30, 2018, to allow the ASP Program Managers, instrument teams and NASA Headquarters managers to plan appropriately for the upcoming flight season. Any Flight Requests received after September 30, 2018 may still be approved but will be accommodated on a "best effort" basis for FY19 or may be scheduled the following year.

SOFRS is managed by the Earth Science Project Office (ESPO) at Ames Research Center. If you did not receive this message directly and would like to be included in further distributions, please send an email to SOFRS_curators@airbornescience.nasa.gov. If you have any questions regarding SOFRS, please see the ASP Flight Request Procedures document (https://airbornescience.nasa.gov/content/SOFRS_User_Guide) and/or contact: Vidal Salazar at: vidal.salazar@nasa.gov or 650-604-5313.

Questions regarding the Airborne Science Program can be addressed to:

Bruce Tagg
Program Director
Bruce.A.Tagg@nasa.gov
Tel: 202-358-2890

or

Randy Albertson
Deputy Program Director
Randal.T.Albertson@nasa.gov
Tel: 661-276-7540

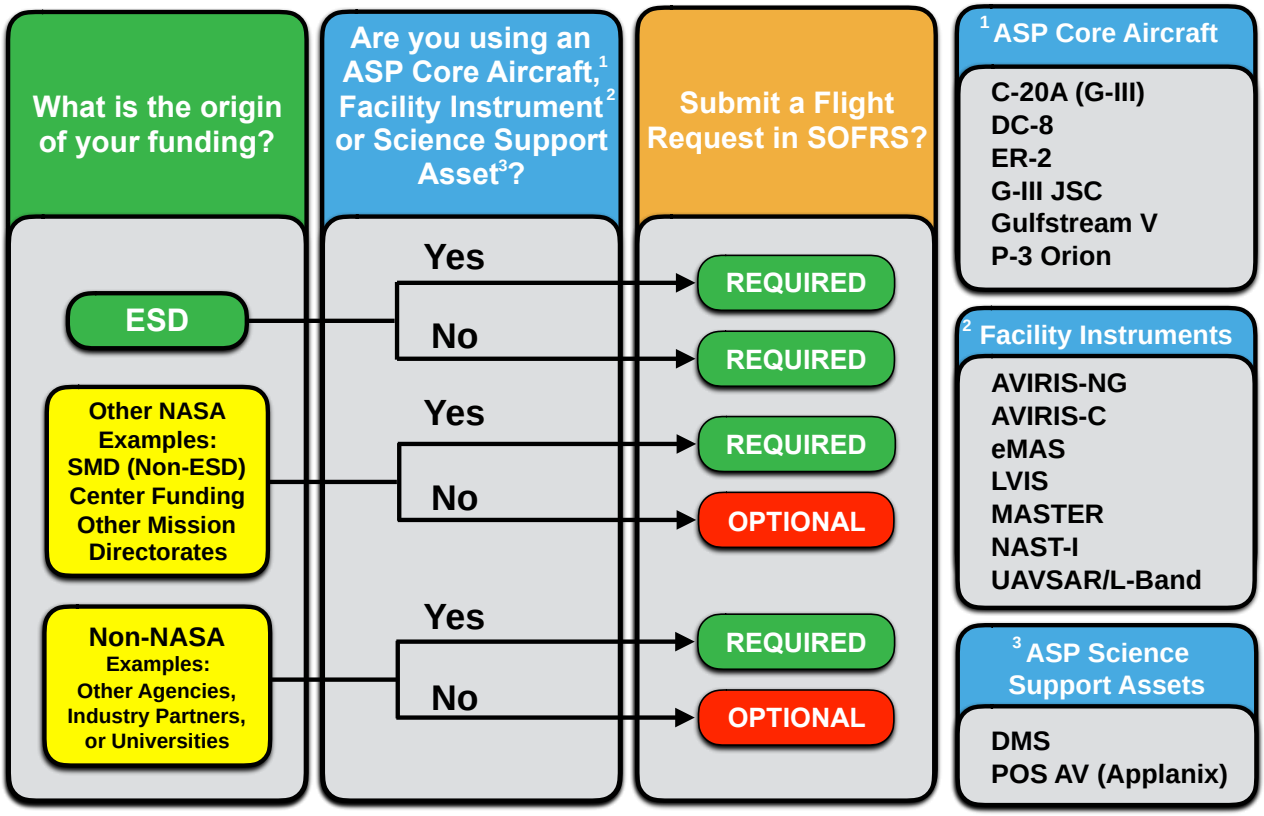
Please submit your completed FY19 Flight Requests as soon in your planning process as possible.

Sincerely,

Bruce Tagg
Director, Airborne Science Program
Earth Science Division
Science Mission Directorate

Appendix A

Decision Tree for Filing a Flight Request in SOFRS



Appendix B
Budgeting for an Airborne Science Mission

Airborne Science Mission Costs
In addition to the usage-based flight hour costs (personnel, fuel, and aircraft operations), additional Mission Peculiar Costs (MPCs) may be included in the Flight Request cost estimate. These include, aircraft integration, aircraft MPCs, the Airborne Sensor Facility (ASF), and National Suborbital Research Center (NSRC) MPCs, and SATCOM MPCs. Please discuss the applicability of any relevant costs with the aircraft manager.

Aircraft Integration
If an instrument has not yet flown on an aircraft or the instrument(s) require(s) significant effort to integrate into the aircraft, "integration fees" will be assessed.

Aircraft MPCs
MPCs include general deployment costs, overtime and personnel augmentation costs, and aircraft support costs.

ASF and NSRC MPCs
The Airborne Sensor Facility (ASF), supports aircraft operations by providing instrumentation, operations, and engineering support. The National Suborbital Research Center (NSRC) provides the aircraft support for many of the aircraft within the Airborne Science Program. Aircraft support includes aircraft facility instrument operations and management, engineering support for payload integration, flight planning and mission management tools, flight navigation data hardware and software support, as well as flight data archiving and distribution.

The Airborne Science Program provides a suite of facility instrumentation and data communications systems for community use. Currently available ASP instrumentation includes stand-alone precision navigation systems, and a suite of digital tracking cameras and video systems. Real-time data communications capabilities, which differ from platform to platform, are integral to a wider Sensor Network architecture. Access to any of these assets is initiated through SOFRS. Both the ASF and the NSRC services will be charged to relevant FRs as an MPC.

Satellite Communication (SATCOM) MPCs
Satellite communications systems of various types are now installed on most of the Airborne Science Program (ASP) supported platforms. The tools referenced below are provided to assist in the development of requirements and for general SATCOM cost reference. After reviewing the SATCOM Requirements and Costing pages in the PI Support section of the ASP website (https://airbornescience.nasa.gov/content/PI_Support), investigators should discuss their requirements with the aircraft manager. The relevant SATCOM lead will be responsible for providing the aircraft manager with the final estimate to be included in the flight request.

Please note that the ASP management would like to flight-track non-NASA aircraft (using NASA instrumentation, funding or personnel) during their missions. Flight-tracking devices and support are available from ASP for that purpose.

Iridium sat-phone modems, with data rates up to 9.6Kb/sec, are standard equipment on the Global Hawk, DC-8, ER-2, P-3 aircraft and the Gulfstream V. These are included in the new NASDAT (NASA Airborne Science Data and Telemetry system) navigation data recorders. 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 supporting up to 432Kb/sec duplex data rates, are installed on the DC-8, the P-3, WB-57F, ER-2 and the Gulfstream V. An INMARSAT Requirements document and preliminary estimating worksheet may be found in the website: https://airbornescience.nasa.gov/content/INMARSAT_Requirements_and_Estimating_Sheet

The Global Hawk UAS and WB-57F include a Ku-band sat-com system (data rates in excess of 1Mb/sec) as standard mission equipment. Use of either BGAN or Ku systems are quoted as a SATCOM MPC to the Investigator in the FR. It should be noted that BGAN and Ku-Band service degrades rapidly at latitudes above ~70 degrees. Ku contracts are month long and vary based on coverage location and the current contract pricing. Sample Ku costs by region can be found in the website: https://airbornescience.nasa.gov/content/SATCOM_Requirements_and_Costing.

Appendix C
SPECIAL ADDENDUM FOR EOS INVESTIGATORS PLANNING FOR NASA'S FY 2019 SCIENCE MISSION DIRECTORATE AIRBORNE SCIENCE PROGRAM

June 19, 2018

Introduction
This addendum contains specific guidance for Earth Observing System (EOS) Investigators in responding to the ASP Annual Call Letter.

EOS investigators have responsibility for instrument 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. It is incumbent upon all investigators to plan carefully and combine missions with other investigators whenever possible.

Flight Request
The Annual Call Letter for the development of the FY 2019 Earth Science Division (ESD) Airborne Science Program plan is available electronically at https://airbornescience.nasa.gov. Flight Requests should be submitted at https://airbornescience.nasa.gov/sofrs/.

EOS Team Members and Instrument Investigators should choose Dr. Steven Platnick as the funding source in the Flight Request.

Similarly, Interdisciplinary Investigators should enter the appropriate science discipline manager (please see Appendix F).

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 for the 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 2019, as in previous years, aircraft flight hour costs have been instituted by the SMD Airborne Science Program (see Appendix D). Flight hour fees will be withheld automatically from each EOS investigator's budget and transferred directly to the appropriate flight account at Armstrong, 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 hour costs from a Special Aircraft Support Fund, subject to scientific priorities, programmatic balance, and availability of funds in FY 2019 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 (MPC) in their entirety. The total amount available for both flight fees and MPC will be up to $300K in FY 2019.

In addition to flight hour costs, certain instrument 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 2019. 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 Center. An investigator should contact the appropriate Resource Analyst or Contracting Officer to make such arrangements. Data from many instruments, 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: 3Q57
Washington, DC 20546
Phone: 202-358-2890
Email: bruce.a.tagg@nasa.gov

Appendix D
Available NASA Airborne Science Platforms

Below are the platforms currently available, Points Of Contact (POC), and associated user's fees (on a per hour basis unless otherwise noted). The listed rates are for the aircraft from its home base only and do not include Mission Peculiar Costs (MPC) for a given campaign or deployment. In the event that the cost of fuel significantly exceeds current rates, this additional cost will be included in MPCs. Also, included in MPCs are overtime and/or personnel augmentation, if required and/or used.

NASA ASP-Supported Aircraft and Other NASA Aircraft are listed below.

Facility	Center/ State	Contact Name	Contact Phone	NASA SMD User Fee (per flight hour)
NASA ASP-Supported Aircraft				
C-20A (G-III) AFRC	AFRC, CA	John McGrath	(661) 276-2588	$3000 (full reimbursable rate $6000)
DC-8	AFRC, CA	Tim Moes Ken Norlin	(661) 276-3054 (661) 276-2046	$6500
ER-2	AFRC, CA	Brian Hobbs Kevin Walsh Ken Norlin	(661) 276-2557 (661) 276-3686 (661) 276-2046	$5000
G-III JSC	JSC, TX	Derek Rutovic	(832) 205-3854	$3500
Gulfstream V	JSC, TX	Derek Rutovic	(832) 205-3854	$3000
P-3	WFF, VA	Mike Cropper	(757) 824-2140	$4000
Other NASA Aircraft				
B-200 AFRC	AFRC, CA	Frank Batteas	(661) 276-3786	Call
B-200 LaRC	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
B-200 WFF	WFF, VA	Mike Cropper	(757) 824-2140	Call
B-200/UC-12B	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
C-130 Hercules	WFF, VA	Mike Cropper	(757)-824-2140	Call
C-20B	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
C-23 Sherpa	WFF, VA	Mike Cropper	(757) 824-2140	Call
Cessna 206	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
Dragon Eye	ARC, CA	Matthew Fladeland	(650) 604-3325	Call
G-III LaRC	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
Global Hawk	AFRC, CA	Frank Cutler	(661) 276-3998	$350K/month for use of aircraft and team $2000 per Flt hour
HU-25A Guardian	LaRC, VA	Bruce Fisher	(757) 864-3862	Call
Ikhana	AFRC, CA	Mauricio Rivas	(661) 276-3678	Call

Facility	Center/ State	Contact Name	Contact Phone	NASA SMD User Fee (per flight hour)
Other NASA Aircraft (Cont.)				
S-3B	GRC, OH	James Demers Anthony Royce	(216) 433-2039 (216) 433-3868	Call
SIERRA	ARC, CA	Sally Cahill	(650) 604-5671	Call
T-34C	GRC, OH	James Demers Anthony Royce	(216) 433-2039 (216) 433-3868	Call
T-34C	WFF, VA	Mike Cropper	(757)-824-2140	Call
Twin Otter GRC (DHC-6)	GRC, OH	James Demers Anthony Royce	(216) 433-2039 (216) 433-3868	Call
UH-1 Huey Helicopter	WFF, VA	Mike Cropper	(757) 824-2140	Call
WB-57F	JSC, TX	Charlie Mallini	(281) 483-3463	Call

Appendix E
NASA Facility Instruments and Science Support Assets

Several remote sensing systems are considered as NASA facility instruments, in part because they support multiple science disciplines and a variety of NASA science objectives. They are supported by managers in the ESD Research and Analysis program, and/or the EOS Project Science Office, and are made available to the wider NASA science community via the Flight Request process. In most cases, instrument and Science Support Assets operating and data processing costs are recovered from the requesting individual or their sponsors.

Facility Instruments	Contact	Telephone
AVIRIS (C and NG)[1] Airborne Visible Infrared Imaging Spectrometer. C-Classic and NG-Next Generation	Robert Green	(818) 354-9136
eMAS, Enhanced MODIS Airborne Simulator	Jeff Myers	(650) 604-3598
LVIS, Land, Vegetation, and Ice Sensor	Bryan Blair	(301) 614-6741
MASTER MODIS-ASTER Simulator	Jeff Myers	(650) 604-3598
NAST-I, National Airborne Sounder Testbed-Interferometer	Anna Noe	(757) 864-6466
UAVSAR[2], UAV Synthetic Aperture Radar	Yunling Lou	(818) 354-2647
Science Support Assets		
POS AV, Ames and Wallops Flight Facility	Jeff Myers	(650) 604-3598
DMS, Digital Mapping System	Jeff Myers	(650) 604-3598

[1]NASA Instrument Concurrence by Hank Margolis is required for the use of AVIRIS-C and AVIRIS-NG. [2]NASA Instrument Concurrence by Craig Dobson is required for the use of UAVSAR.

AVIRIS-C and AVIRIS-NG

JPL operates the AVIRIS-C (Classic) and AVIRIS-NG (Next Generation) Imaging Spectrometers, which are available as NASA facility instruments for scientific research and applications. Investigators are expected to pay for JPL Imaging Spectrometer data acquisition, calibration, engineering support and processing costs associated with their investigations. If JPL Imaging Spectrometers are required as part of an approved proposal, then these costs should be included in the proposal budget or reserved for this purpose at NASA Headquarters. Please contact your Technical Monitor if you have any questions about this. If your JPL Imaging Spectrometer requirements are new and were 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.

AVIRIS-NG is a facility instrument available for research campaigns using the commercial Twin Otter, King Air, NASA ER-2 platforms and is available for integration on the Gulfstream V. AVIRIS-C is also flying on the NASA ER-2 on a regular basis as part of the HyspIRI Airborne Preparatory Campaign. AVIRIS-C can be flown on the Twin Otter for particular investigations or AVIRIS-NG can be used for flying higher spectral and spatial sampling collections for Visible to Shortwave IR imaging spectroscopy (380 to 2510 nm). Furthermore, scenes from the AVIRIS-C archive (i.e., data that have already been acquired) can be obtained and can be located at: http://aviris.jpl.nasa.gov. AVIRIS-NG data archive and details can be found at: https://avirisng.jpl.nasa.gov/.

MASTER and eMAS

The MODIS/ASTER airborne simulator (MASTER) is currently available for flights aboard the NASA ER-2. It may also be integrated on the DC-8 or the P-3B, although it's expected to fly mainly on the ER-2 in FY19. The enhanced MODIS simulator (eMAS) is currently available; please contact Jeff Myers at 650-604-3598 for more information. 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), the MASTER instrument PI (Dr. Simon Hook), or other research teams and should not be assumed in any Flight Request.

Additional information on eMAS or MASTER can be obtained from: Jeff Myers, (650) 604-3598, Use/Cost Policies: Dr. Steven Platnick (see Appendix C), instrument and FY2019 Schedule: Jeff Myers, (650) 604-3598.

UAVSAR

UAVSAR/L-band: The Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR), a high resolution, fully polarimetric, L-band SAR designed for repeat pass InSAR applications, is available as a NASA facility instrument 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. These costs should already be provided for in your budget or reserved for this purpose at NASA Headquarters. UAVSAR currently flies on the C20-A and JSC's G-III aircraft and has also flown test flights on the Global Hawk.

UAVSAR/P-Band/AirMOSS and UAVSAR/Ka-Band/Glistin-A: UAVSAR can also be configured to operate in P-band (also known as AirMOSS) or Ka-band (also known as GLISTIN-A). The P-band and Ka-band instruments are currently not classified as facility instruments although users may request these instruments through SOFRS by selecting UAVSAR and adding the specific frequency (Ka-band or P-band) in the comment field. Flight requests for Ka-band and P-band will incur instrument usage fee in addition to the standard user fee for the Armstrong C20-A or the JSC G-III.

All UAVSAR Flight Requests should clearly identify: (i) a target data collection window (ii) the desired instrument (UAVSAR L-band, P-band, or Ka-band) and (iii) a preliminary flight plan. Flight plans can be prepared using the UAVSAR Flight Planning Tool at http://uavsar.jpl.nasa.gov/cgi-bin/fps. After submission of a preliminary plan, the UAVSAR science coordinator will contact you to refine the data collection strategy and the finalized plan will be used to estimate flight hours and mission peculiar costs. Users are responsible for ensuring that their entire science experiment is accounted for within the submitted Flight Request; any expansion of the scope of the science experiment will require new Flight Request approval.

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.

NAST-I

The National Airborne Sounder Testbed-Interferometer (NAST-I) is a high spectral resolution ($0.25cm^{-1}$) and high spatial resolution (0.13 km linear resolution per km of aircraft flight altitude, at nadir) scanning (2.3 km

ground cross-track swath width per km of aircraft flight altitude) interferometer sounding system that was developed to be flown on high-altitude aircraft to provide experimental observations needed to finalize the specifications and to test proposed designs and data processing algorithms for the Cross-track Infrared Sounder (CrIS) flying on the Suomi NPP (SNPP) and Joint Polar Satellite System (JPSS) platforms. Because the NAST-I infrared spectral radiance and temperature, humidity, trace species, cloud and surface property soundings have unprecedented spectral and high spatial resolution, respectively, the data can be used to support a variety of satellite sensor calibration / validation and atmospheric research programs. The NAST-I covers a spectral range from ~ 600-2900 cm^{-1} (3.5-16 microns) with 0.25 cm^{-1} spectral resolution, yielding more than 9000 spectral channels of radiance emission/absorption information. The NAST-I passive infrared (IR) Michelson interferometer is often flown with the NAST passive microwave sounding instrument (NAST-M, from MIT LL) to provide an all-weather sounding capability. The NAST-I instrument has flown numerous science missions on the ER-2, WB-57, and Proteus aircraft, and the team has evaluated efforts needed to become operational on the DC-8. Additional information can be obtained from Anna Noe (anna.m.noe@nasa.gov, 757-864-6466) or Dr. Allen Larar (Allen.M.Larar@nasa.gov, 757-864-5328).

LVIS

The Land, Vegetation, and Ice Sensor (LVIS) is an airborne, full-waveform, scanning laser altimeter, designed and developed at NASA's Goddard Space Flight Center (GSFC). By combining precise GPS, attitude sensor data, and the range and return waveforms, LVIS produces large area maps of surface topography, and any vertical height and structure. Interested users are encouraged to contact Bryan Blair (James.B.Blair@nasa.gov, 301-614-6741) (alternate contact: David Rabine David.L.Rabine@nasa.gov, 301-614-6771)) for further details of the facility capabilities with respect to data requirements. Standard data products include: Level1b - the geolocated return laser waveform and Level2 - elevation and height products extracted from the Level1b waveform using standard algorithms. The decimeter-accurate topography maps and precisely geolocated return waveforms produced by LVIS provide Earth scientists with a unique data set for studies such as topography, hydrology, land ice, sea ice, biodiversity, and ecology.

Science Support Assets

ASP science support assets include the POS-AV system for georeferencing airborne sensor data and the high resolution Digital Mapping System (DMS). Both assets are managed by the Airborne Sensor Facility.

POS AV User fees apply

POS AV (Position and Orientation Systems) are standalone precision navigation systems specifically designed for direct georeferencing of airborne sensor data. By integrating precision GPS with inertial measurement technology, POS AV provides high-resolution aircraft attitude and position data for use by Lidars, imaging systems, and air sampling instruments. These systems and their support staff are in high demand. Loans may be restricted to “expert users”. Please contact Jeff Myers regarding availability (650-604-3598).

DMS User fees apply

The Digital Mapping System (DMS) is a 22-megapixel digital camera that acquires high resolution natural color or panchromatic aerial imagery. Data acquired by DMS are used by a variety of scientific programs to monitor variation in environmental conditions, assess global change, and respond to natural disasters. Geo-referenced image products may be generated, when used in conjunction with a POS AV system.

Appendix F
NASA Program Managers/Scientists

This table of NASA Program Managers/Scientists is provided for information only, as a service to investigators. Please click on the program title to access the focus area website.

Name	Organization	Area of Responsibility
Airborne Science		
Bruce Tagg	NASA - SMD	Airborne Science
Atmospheric Composition		
Hal Maring	NASA - SMD	Radiation Science Program
Barry Lefer	NASA - SMD	Tropospheric Composition
Carbon Cycle & Ecosystems		
Hank Margolis	NASA - SMD	Terrestrial Ecology and Carbon Monitoring System
Garik Gutman	NASA - SMD	Land Cover/Land Use Change
Ken Jucks	NASA - SMD	Upper Atmosphere Research Program
Woody Turner	NASA - SMD	Climate and Biological Response
Paula Bontempi	NASA - SMD	Carbon Cycle and Ecosystems - Ocean Biology and Biogeochemistry
Climate Variability & Change		
David Considine	NASA - SMD	Modeling, Analysis, and Prediction
Eric Lindstrom	NASA - SMD	Oceanography
Tom Wagner	NASA - SMD	Cryosphere and International Polar Year
Earth Surface and Interior		
Craig Dobson	NASA - SMD	Geodetic Imaging Program
Ben Phillips	NASA - SMD	Earth Surface Interior
Water and Energy Cycle		
Jared Entin	NASA - SMD	Hydrology Program
Weather		
Tsengdar Lee	NASA - SMD	Atmospheric Dynamics and Precipitation Program
ESTO		
Parminder Ghuman	NASA - GSFC	Earth Science Technology Office (IIP)
Robert Smith	NASA - GSFC	Earth Science Technology Office (AITT)
Mike Little	NASA - GSFC	Earth Science Technology Office (AIST)
Sachidananda Babu	NASA - GSFC	Earth Science Technology Office (SLI)
Satellites		
Steve Platnick	NASA - GSFC	EOS Project Science Office
Applied Science		
Lawrence Friedl	NASA - SMD	Applied Science Program
David Green	NASA - SMD	Disaster Management
Lucien Cox	NASA - SMD	Applied Science