STATEMENT OF WORK

FOR

NASA BALLOON OPERATIONS CONTRACT

JUNE 22, 2013

Statement of Work

1.0 Background

The NASA Balloon Program Office (BPO) provides management of NASA's high altitude scientific balloon activities funded by the Astrophysics Division within the National Aeronautical and Space Administration (NASA) Science Mission Directorate (SMD). The BPO provides this support in accordance with the Program Commitment Agreement (PCA) for the Research Carriers Program. BPO is managed within Goddard Space Flight Center's (GSFC) Sub-Orbital and Special Orbital Project Directorate (SSOPD), Code 800, located at Wallops Flight Facility (WFF). The BPO oversees management of the contract for operation of the Columbia Scientific Balloon Facility (CSBF), located in Palestine, Texas. BPO's flight manifest includes approximately 18 flights that are launched annually from Fort Sumner, New Mexico and McMurdo, Antarctica. Launches from Palestine, Texas and other remote locations are conducted depending upon SMD requirements. The nominal mission model is a fall Fort Sumner balloon campaign of up to 9 flights, an Antarctic Long Duration Balloon (LDB)/Ultra Long Duration Balloon (ULDB) campaign of 3 – 4 flights, and another remote campaign to be conducted either from Sweden, New Zealand, or Australia each year (Table 1).

The majority of NASA's balloon flights are in support of new or recurring science. Flights are also conducted in support of technology development and student outreach. NASA balloons flights are categorized as Conventional, LDB, or ULDB.

Conventional flights last from a few hours up to two days depending upon the winds aloft. Conventional flights utilize Zero Pressure Balloons (ZPB) that remain within line-of-sight (LOS) of the launch site ground station or that of a downrange ground station.

LDB flights last from a few days up to several weeks. LDB flights also utilize ZPB but are allowed to go beyond LOS of the launch ground station, thus requiring use of over-the-horizon (OTH) telemetry, command, and control systems via earth orbiting satellites. LDB flights utilize LOS during the initial and final phases of the flight and incorporate robust regenerative power systems. Normally, LDB flights are conducted closer to polar latitudes during the local summer in order to leverage longer periods of daylight, which is conducive to achieving extended flight durations using ZPB. LDB flights can be as short as four days and over fifty days when flown at extreme south polar latitudes.

ULDB flights are those that incorporate Super Pressure Balloons (SPB) that are able to sustain longer flight durations and minimal diurnal altitude excursions caused by expansion and contraction of the balloon as affected by daily heating and cooling of the lifting medium (helium). ULDB flights are designed to sustain flight durations upwards of 60 to 100 days and are better suited for operation at middle latitudes that are otherwise not conducive for achieving extended flight durations using ZPB. ULDB flights operate at polar latitudes as well. ULDB flights incorporate similar support systems as LDB flights.

2.0 Scope

This Statement of Work (SOW) is for the NASA Balloon Operations Contract (NBOC) and requires the Contractor to operate and maintain the CSBF, a government-owned facility located in Palestine, Texas. In addition, it includes the operation and maintenance of NASA owned and leased facilities located at

Fort Sumner, New Mexico; NASA owned facilities located at McMurdo, Antarctica and Alice Springs, Australia; and for operations conducted from other remote locations. NASA balloon remote launch locations include Swedish Space Corporation's Esrange facility located near Kiruna, Sweden and as yet to be established site in New Zealand. The Contractor shall provide the labor, material, and equipment to support the management, operations, engineering, launch services and technical support services for the NASA Balloon Program at the CSBF and its remote sites.

The NASA BPO has overall management responsibility of the contract, all programmatic elements such as mission selection, funding, interagency and international agreements, administration of grants, government-owned facilities and properties, and the approval and oversight of all ground and flight safety processes. NASA provides management oversight of the NBOC through the NASA Contracting Officer's Representative (COR). The Contracting Officer (CO) will assign the COR who is nominated by the Chief of the Balloon Program. The COR will be assigned following the award and prior to the start of the contract. The Contractor shall report directly to the COR and BPO Chief. Authorizations and approvals will be provided through the COR and CO as required. Direction of work will be given by NASA to the Contractor only with cognizance and approval of the COR.

The Contractor shall be responsible for providing management, engineering and technical services, balloon flight operations, and administrative support that is necessary to execute the NBOC. The Contractor shall operate in compliance with applicable federal and state laws and within all applicable government and NASA agency regulations, requirements, standards, policies, and procedures to include the documents specified in Applicable Standards and Policies Documents - Attachment O.

The Contractor shall be responsible for development and delivery of launch hardware and launch concepts, ground support equipment, and balloon flight support equipment. The Contractor shall be responsible for balloon manufacturing quality assurance and working with the balloon manufacturer to insure delivery of balloon vehicles within schedule and cost in compliance with NASA requirements. The Contractor shall be responsible for maintenance and required modifications for all flight and ground support systems to achieve NASA cost, schedule, technical, and programmatic requirements. The Contractor shall be responsible to provide engineering, analysis, and reports in support of thermal, mechanical and electronic systems to include Failure Mode and Effects Analysis (FMEA), project plans, test reports, and reviews as required. The Contractor shall be responsible for administrative support of its personnel, procurements, and facilities maintenance to include timely and accurate financial and status reports in accordance with the contract.

This SOW contains Core Requirements required on the effective date of the contract through the period of performance, including the new end date with exercise of an option. The contract also contains an Indefinite Delivery Indefinite Quantity (IDIQ) mechanism where specific requirements are issued under Task Orders (TOs). IDIQ task work orders include but are not limited to: design and analysis, fabrication, integration, testing, operations field support, and the acquisition and provision of hardware or services. Complex tasks, long lead time development or procurement efforts, or long-term support functions may be required. In such instances, the respective project team may be comprised of civil servant and contractor personnel. This work is highly variable and covers a wide spectrum of requirements. Requirements and standards of performance for IDIQ task orders will be determined on an individual basis and included in each TO.

The Contractor shall provide operational flight support as a Core Requirement to implement the Balloon Program Mission Model. Table 1 presents the projected Baseline Mission Model and the projected IDIQ Mission Model. The Baseline assumptions are as follows:

a. 15-18 Missions including Conventional, LDB, and ULDB;
b. 1 to 2 Domestic and 2 Foreign Campaigns;
c. 2 Independent Launch Teams; and
d. 3 Simultaneous flights.

Table 1. Mission Model

BASELINE MISSION MODEL																				
Campaign	**FY15**				**FY16**				**FY17**				**FY18**				**FY19**			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Conventional																				
Fort Sumner[1]				9				9				9			3	9				9
Australia																		3		
Palestine[2]							2													
LDB/ULDB																				
New Zealand[3]		1				1								2						
Sweden[4]											4									
Antarctica	3				3				3				4				4			
IDIQ MISSION MODEL																				
Special IDIQ[5]			3																	
FY Total				**16**				**15**				**16**				**18**				**16**

The following specifics apply to the Mission Model:

1. Fall Fort Sumner flights planned for a given Fiscal Year (FY) may actually be flown in the following FY schedule as a carryover flight. Carryover flights are those launched on October 1 or later.
2. Palestine flights currently include "hand-launch" or small scale missions due to safety restrictions.
3. New Zealand missions are ULDB global circumnavigation with recovery in South America or New Zealand/Australia;
4. Sweden missions are from Sweden to Canada and have flight durations of four to six days; and
5. Special IDIQ campaigns or missions will require supplemental funding and a specific TO.

3.0 Core Requirements

3.1 Technical and Business Management and Facilities Support

The Contractor shall provide all technical and business management functions necessary to plan, organize, implement, and deliver all requirements within the scope of the NBOC as described in this SOW.

3.1.1 Contract Transition Phase Out Plan – The Contractor shall provide a phase-out plan in accordance with the contract schedule. The plan shall address: requirements for transition of personnel and equipment, completion or transition of development projects, accommodations for incoming personnel, completion or handover of campaign or flight operations, and other ongoing functions or tasks in order to insure seamless transition of the contract. The Contractor shall make available to the successor all written and electronic operating and maintenance instructions, documentation, vendor information, hardware/software utilities and all other policies and procedures developed in the performance of this contract.

3.1.2 Quality Assurance – The Contractor shall develop, implement, and maintain a Quality Management System compliant to International Organization for Standardization (ISO) 9001. The system shall be in accordance with NASA Policy Directive (NPD) 8730.5. The Balloon Program operations include critical but not complex systems. Should support of a specific project be designated as critical and complex, the Contractor shall be compliant to Aerospace Standard (AS) 9100 for that project. The Government may choose to audit, or have a third-party audit at the government's convenience, the Contractor's quality management system to ensure compliance with the applicable standard. The Quality Management System shall be compatible and consistent with the risk posture defined by NASA Procedural Requirements (NPR) 7120.8, NASA Research and Technology Program and Project Management Requirements, and the Research and Technology Program Commitment Agreement for Research Programs. The QMS should not create unnecessary requirements that fail to produce benefits commensurate with the resources required for their implementation.

The Quality Management System shall include the development and maintenance of a Quality Manual which shall be submitted by the Contractor and approved by the NASA in accordance with the contract schedule. The Contractor shall review the Quality Manual annually and any updates or affirmation as to "no change" shall be submitted to NASA. The manual shall include how the Contractor will implement a process to maintain written fabrication, inspection, maintenance, refurbishment, assembly, test, and operating procedures for all critical systems and processes. The Contractor shall identify safety and mission critical systems and processes for concurrence by NASA. The manual shall address how the Contractor will implement the requirement to maintain a monitoring, inspection, test, and quality control program that documents compliance of fabricated and procured items with design drawings and specifications. The manual shall also include a risk management plan that identifies, controls, and monitors critical processes, products, and performance characteristics.

3.1.3 Reliability and Quality Management – The Contractor shall develop, implement and maintain a Reliability and Quality Assurance (R&QA) Program in accordance with the Quality Manual. The Contractor shall develop, submit to NASA, and implement the R&QA Plan. The

Contractor shall annually review the R&QA Plan and any updates or affirmation as to "no change" shall be submitted to NASA. The R&QA Plan shall define how the Contractor will track and record quality performance, maintain results, implement changes, and provide continuous improvement. The R&QA Plan shall cover, at a minimum, the following:

a. Balloon film monitoring, inspection, testing, and quality control;
b. Balloon fabrication monitoring, inspection, testing, and quality control;
c. Mission/Safety critical flight and ground support hardware and software;
d. Mission/Safety critical hardware and software qualification requirements;
e. Mission/Safety critical operational procedures; and
f. Mission/Safety critical system fabrication and test procedures.

The Contractor shall be responsible for identification and notification of balloon systems' parts and materials subject to Government-Industry Data Exchange Program (GIDEP) and NASA advisories (NPR 8735.1). The Contractor shall comply with NASA-mandated product assurance actions by the BPO, specifically the conduct of Government Mandatory Inspection Points (GMIP) for critical systems and processes (NPR 8735.2). The Contractor shall identify inspection points with concurrence by NASA in the fabrication and refurbishment processes of flight systems and track quality progress.

3.1.4 Configuration Management – The Contractor shall provide a Configuration Management process for the development, approval, and control of hardware, software, and documentation under the purview of the Contractor. This process shall be documented in a Configuration Management Control Plan, and shall be approved by NASA. The plan shall include how documents (engineering drawings, schematics, wiring diagrams, procedures, specifications, etc.) are identified as controlled documents, the associated level of control, and maintenance and revision process. The plan shall define the process for identification, control, and verification of the development, reconfiguration, and refurbishment of all mission and safety critical systems and processes.

The Contractor shall establish and maintain an internal repository to accumulate and document reporting requirements and documentation as required by this Statement of Work. The NASA CO, COR, BPO Chief, Performance Monitors, and any others designated NASA shall be permitted access to the system.

3.1.5 Risk Management – Risks regarding safety, cost, schedule, support systems, and technical aspects associated with the mission or campaign shall be identified and tracked by the Contractor in accordance with NPR 8000.4. The Contractor shall define how risks will be elevated and tracked in the R&QA Plan. The Contractor shall notify the COR and BPO Chief of safety and mission critical risks as soon as they are known. The Contractor shall present risks to the Balloon Program during CSBF Quarterly Reviews and other mission or campaign reviews as applicable or at the request of NASA.

3.1.6 Safety and Health Management - A comprehensive and proactive health and safety program is required. The Contractor shall perform the requirements of this contract using the safety and health guidelines provided within the Occupational Safety and Health Act, NPR

1800.1, NASA Safety Manual, NPR 8715.3, the GSFC Environmental Policy and Program Management, Goddard Policy Directive (GPD) 8500.1, and any other NASA or federal regulations that may apply to US government contractors during the terms of this contract. The Contractor shall ensure that employees are aware of and trained regarding safety and health requirements, policies, and procedures associated with their jobs and positions. The Contractor shall submit the Safety and Health Plan to NASA. The Contractor shall annually review the Safety and Health Plan and any updates or affirmation as to "no change" shall be submitted to NASA.

3.1.7 **Training and Certification** – The Contractor shall establish and implement a training and certification program that conforms to all NASA requirements for training, licensing, and certification for the work being performed under the NBOC. This shall be documented in the Training and Certification Plan. The plan shall be maintained by the Contractor and updated as required. The plan shall address how the Contractor will identify, maintain, schedule, conduct, and document training, licensing, and certification.

a) Personnel Training and Certification - The personnel training program shall keep employees current with all aspects of their responsibilities to the Balloon Program. The Contractor shall provide access to adequate training, licensing, and certification of its personnel so to fulfill their responsibilities in support of the Balloon Program and in compliance with applicable NASA or federal regulations. Training to be provided shall include but will not be limited to personnel safety and health, in-house job training, technical applications, Information Technology (IT) security, workmanship and inspection, heavy equipment and crane operation, Operations Safety Supervisor (OSS), high pressure operations, and ordnance handling. The Contractor shall obtain licenses or permits to conduct in-house training as required by NASA or at the request of NASA.

b) Equipment Certification - The Contractor shall establish a certification program and procedures to ensure all flight and ground support systems meet NASA requirements. The program shall include equipment under NASA recertification processes to include but not limited to: igniter testers, non-flight pressure vessels, hoses, and all lifting devices and equipment (LDE). The certification program shall also include certification and/or refurbishment of support hardware that does not fall under NASA required recertification processes but that is in accordance with manufacturer specifications and best practices.

The Contractor shall define the configuration and certification processes for flight and ground systems including but not limited to launch equipment, ground support equipment, flight hardware, flight support equipment, science provided items to include but not limited to pressure vessels, high voltages, non-ionizing radiation, mechanical integrity, radiological sources, cryogens, and hazardous gasses. The Contractor shall define the process by which all hazardous or potentially hazardous items are identified and can be evaluated.

3.1.8 **Information Technology** - The Contractor shall develop and maintain an IT Security Plan, which will include the Information Technology Security Management Plan (ITSMP) and the System Security Plan (SSP). The IT security plan shall be in accordance with NPD 2810.1, NASA Information Security Policy, and NPR 2810.1, Security of Information Technology, and shall include as a minimum the security measures and program safeguards planned to ensure that the information technology resources acquired and used by the Contractor and subcontractor personnel:

a) Are protected from unauthorized access, alteration, disclosure, or misuse of information processed, stored, or transmitted;
b) Can maintain the continuity of automated information support for NASA missions, program and functions;
c) Incorporate management, general and application controls sufficient to provide cost-effective assurance of the systems' integrity and accuracy;
d) Have appropriate technical, personnel, administrative, environmental, and access safeguards;
e) Document and follow a virus protection program for all IT resources under its control; and
f) Document and follow network intrusion detection and prevention program for all IT resources under its control.

For non-Government furnished information technology resources, the Contractor shall meet the requirements of the NASA Minimum Interoperability Software Suite (NASA Standard (STD)-2804) and the Minimum Hardware Configurations (NASA STD-2805) Standards. Office Automation generated products communicated electronically to and from Contractor owned or operated information systems shall conform to minimum standards as required by the NASA Chief Information Officer and defined in the executive notices issued by that office within 3 months of the issuance of such notices. In addition, the daily operation of the Contractor's information technology resources shall, under no circumstances, impact the operation of NASA network resources beyond that which is caused by the transmission or receipt of (deliverable products) or administrative communications (email) which are compliant with the NASA Minimum Interoperability Software Suite Standard. NASA network resources are the NASA Corporate Network and interconnected NASA data networks, including Wide Area Network (WAN), remote access and guest services, as well as those systems utilizing or connected to the data networks.

In order to comply with the Section 508 Standards for Electronic and Information Technology, the Contractor shall perform all software application development in compliance with the technical standards delineated in 36 Code of Federal Regulations (CFR) Part 1194.21 Software Applications and Operating Systems unless approved otherwise by NASA.

3.1.9 **Contract Management** - The Contractor shall be responsible for managing the day-to-day activities required to support the NBOC. This includes providing the supervision necessary for the operation of the contractor-operated facilities in Palestine, Texas, Fort Sumner, New Mexico, and remote locations such as McMurdo, Antarctica, Esrange, Sweden, and Alice

Springs, Australia. Unless otherwise designated by the COR, the Contractor shall be the principal interface and point of contact for all NASA approved users of CSBF balloon flight services. Financial arrangements and waivers of established technical or procedural criteria with approved users shall be administered by NASA. The Contractor shall administer waivers of liability and hold harmless for all users of CSBF flight services.

3.1.10 **Reviews** - The Contractor shall participate in, and provide technical support for all BPO meetings such as the Balloon Working Group, Quarterly Contractor Reviews, and Monthly Status Reviews. These meetings and reviews include presentations and discussions on the Contractor's implementation status, impacts on the Program due to proposed requirement changes or budget and funding conditions, or any other aspect of the program for which the Contractor is responsible. The Contractor shall provide a written weekly status report and participate in informal weekly teleconferences with the BPO.

The Contractor shall participate in and provide panel membership for all technical reviews in support of the Balloon Program at the direction of NASA. The Contractor shall be responsible for formally presenting and critically reviewing all elements of support and readiness including requirements, status, schedule, etc. Reviews shall contain presentations by each discipline associated with the campaign or mission. The Contractor is responsible for closing all action items assigned to them prior to implementation and readiness. Technical reviews shall include but are not limited to:

a. Project Initiation Conferences (PIC) - Conducted for all LDB, ULDB, and major campaigns approximately 9 months prior to campaign initiation;
b. Mission Readiness Reviews (MRR) - Conducted for all campaigns at least 3 months prior to campaign initiation or prior to shipment of hardware;
c. Flight Readiness Reviews (FRR) - Conducted for all missions prior to declaration of flight readiness; and
d. System Design Reviews - Conducted for all new or re-designed flight and ground support systems.

3.1.11 **Facilities** - The Contractor shall provide all services necessary for the operation and maintenance of the balloon facilities in Palestine, Texas, Fort Sumner, New Mexico, and as required at remote launch sites in support of the NASA Balloon Program. This shall include, but not be limited to the following:

a. Lease and maintain facilities and equipment;
b. Operation and maintenance of buildings and grounds;
c. Maintain and schedule the use of the environmental test chambers and equipment at the CSBF;
d. Perform facility modifications as needed and approved by NASA;
e. Provide repair and routine servicing of Government-owned and leased vehicles;
f. Provide janitorial, grounds keeping, and custodial services;
g. Provide shipping and receiving services;
h. Provide facility security;

i. Provide visitor and vehicular control;
j. Perform contracting and purchasing activities; and
k. Provide machine and welding shop services.

3.1.12 **Construction of Facilities** - The Contractor shall annually identify the need for construction of facilities projects at the CSBF or semi-permanent launch sites. The requirements shall be documented in the Construction of Facilities Plan to be submitted annually to NASA. Approved requirements will result in the issuance of IDIQ Task Orders by the CO.

The Contractor shall provide architect-engineering design and construction services as necessary to construct, modify, and/or improve NASA owned facilities at the CSBF or semi-permanent launch sites. The Contractor shall provide personnel, equipment, and materials onsite as necessary for minor or incidental improvements, modernization, and furnishings for NASA owned facilities located at CSBF or semi-permanent launch sites. If NASA funded, any such efforts shall be implemented under a specific IDIQ Task Order issued by the NASA CO. No new construction or permanent modifications or improvements to any NASA facilities shall be implemented by the Contractor without prior NASA approval.

Prior to responding to NASA with the Task Implementation Plan and Cost Estimate for any tasks involving facility improvement, modification, or construction activity for NASA owned facilities, the Contractor (through the CO and the COR) shall contact the Wallops Facilities Office, Wallops Environmental Office, and Wallops Safety Office and provide details specifying all NASA standards, policies, and procedural requirements (as required in the original IDIQ Task Order issued by NASA to the Contractor) and all state, local, and national standards (National Fire Protection Association (NFPA), American Society for Testing and Materials (ASTM), etc.) that will apply to the activity. The Contractor shall also include a description of any known hazards associated with the activity. The Wallops Environmental, Facilities, and Safety Offices will review the submittal for completeness and identify any additional requirements or applicable NASA standards, policies, procedural requirements, and national standards (NFPA, ASTM, etc.) that should be included as task requirements in the Contractor's Task Implementation Plan. Identification of state and local requirements and their conformances are the responsibility of the Contractor.

The BPO, Wallops Facilities Office, Wallops Environmental Office, and Wallops Safety Office, (unless the Contractor is formally notified otherwise) will participate in the design service process including acceptance of drawings and specifications, and concurrence with calculations and other design data. During the construction process, the Wallops Facilities, Environmental and Safety Offices reserve the right to hire and appoint independent contractor(s) or other Government organization(s) to serve as respective Wallops Office representatives with authority to perform site visits, inspect and monitor progress, and consult on and approve relevant construction matters such as fire safety, explosive safety, hazardous materials, fall protection, certificate of occupancy, etc. This authority does not relieve the Contractor of the responsibility to ensure that all tasks assigned under this provision of the Statement of Work are completed in accordance with all

applicable standards, policies, regulations, and procedural requirements as designated in the issued Task Order.

3.1.13 Agreements – The Contractor shall be responsible for ensuring that all International, Federal, State, and local permits, agreements, licenses, authorizations, Memorandums of Understanding (MOU), or other arrangements (formal or informal) required by the performance of the services and support under this contract are kept in effect. With the exception of those provided by NASA (e.g. financial agreements with scientific user groups, agreements with agencies of other governments, etc.), the Contractor shall be responsible for obtaining and maintaining the above mentioned formal or informal arrangements, and providing all coordination and liaison required by those arrangements. The Contractor shall obtain radio frequency authorizations for the United States (US) and US territories through the NASA Wallops Flight Facility Frequency Coordinator. The Contractor shall be responsible for obtaining all international radio frequency authorizations.

3.1.14 Investigations – The Contractor shall provide immediate notification to the COR and BPO Chief of all incidents involving safety, property damage, personal injury, or interest or coverage by the news media. The Contractor shall support all investigations unless directed by NASA.

Mishaps and Close Calls, as defined by NPR 8621.1, will be investigated by NASA in accordance with applicable NASA requirements. The Contractor shall support all mishaps and close calls, which shall include but are not limited to occupational injury to NASA personnel (including contractors); injury to non NASA personnel and/or damage to public or private property caused by NASA operations; destruction of NASA property. The Contractor shall provide support and membership to the onsite Interim Response Team as established by the Balloon Program.

Incidents that are considered accepted risks will be investigated by NASA under the Suborbital and Special Orbital Projects Directorate Research Carriers Program and NASA Balloon Program policies. The Contractor shall support all incidents and provide membership on the review panel unless directed otherwise by NASA. In accordance with baseline programmatic implementation and in agreement with its stakeholders, Balloon Program accepted risks include but are not limited to: launch abort; failure of the balloon during the launch, ascent, or float phases; failure of support equipment or instrumentation; failure of science equipment or instrumentation; recoverable damage to support or science equipment prior to or during the launch process; unrecoverable damage or destruction to support or science equipment provided minimum requirements have been met.

3.1.15 Historical Data – The Contractor shall provide, maintain and update pertinent historical data relative to balloons, meteorological data for the CSBF launch sites, and balloon flight operations information including but not limited to: flight designation; launch, flight, and termination statistics; float altitude; user information; balloon size; mission result; etc.

3.1.16 Government Property – The Contractor shall operate, maintain, and provide sustaining engineering and logistics support for government property furnished and utilized in performance of this contract. The Contractor shall develop and maintain a system to track government property. The Contractor shall provide property custodians to input and manage data in the tracking system.

The Contractor shall implement a maintenance program for government property under this contract. All required maintenance work shall be performed in accordance with the original manufacturer's specifications and in accordance with government safety and property management requirements and standards.

3.1.17 Applicable Standards and Policies Documents – To perform the work as delineated under this contract, Attachment O provides some relevant Applicable Standards and Policies for the NBOC. The Contractor shall be responsible in meeting and adhering to all applicable government policies, directives, standards, revisions and updates.

3.2 NASA Flight Program Operations

3.2.1 Annual Flight Candidate Program – The Contractor shall be responsible for the development of the Annual NASA Candidate Flight Plan. The flight plan shall comprise a two-year prospective manifest, at a minimum, and will include NASA sponsored users as well as any non-NASA Science Mission Directorate reimbursable users of CSBF support services. This plan along with a copy of the completed flight request packages shall be submitted to NASA. In the development of this plan, the Contractor shall:

a. Develop and distribute a flight request package to the scientific user community;
b. Collect all completed flight request packages;
c. For each candidate mission, the following information is required, at a minimum:
    i. Cost estimates: balloon, helium, campaign costs, batteries and miscellaneous;
    ii. Flight assessment: user requirements (altitude, duration, etc.);
    iii. Flight requirements (estimated suspended weight, balloon volume, etc.);
    iv. Flight Systems requirements (Solar Pointing System, Consolidated Instrumentation Package (CIP), Support Instrumentation Package (SIP), etc.);
    v. Summary of balloons required (inventory and new fabrications);
    vi. Potential problem areas (operational, user, or safety related);
    vii. Areas of future research and development improvements;
    viii. Schedule; and
    ix. Prospective candidates for out years.

3.2.2 Flight Support Equipment – The Contractor shall maintain, refurbish, fabricate, or procure the following flight support equipment as required to support the Annual Flight Candidate Plan:

a. Flight Hardware – Parachutes, ripstitches, flight trains, rigging, mechanical terminate fittings, ballast systems, helium valving systems, mechanical parachute separation device, etc.;

b. Flight Electronics – Universal Terminate Packages (UTP), Remote Firing Unit (RFU), Semi-Automatic Parachute Release (SAPR), Gondola Automatic Parachute Release (GAPR), Consolidated Instrument Packages (CIP), Support Instrumentation Packages (SIP), Miniature Support Instrumentation Packages (Mini-SIP), Miniature Instrumentation Package (MIP), Solar Pointing System (SPS);
c. Ground Support Equipment (GSE) – Launch vehicles, launch support vehicles, telemetry ground stations, test equipment, etc.;
d. Balloons – Scientific balloons and meteorological balloons;
e. Helium and other support and user expendables – to include the purchase, maintenance, storage, and disposal of these items when applicable; and
f. Spares – The Contractor shall provide spares for all critical systems including flight hardware, flight electronics, ground support equipment, balloons, and Helium excluding Launch Vehicle and Spool.

3.2.3 Flight Hardware Mechanical Certification – The Contractor shall ensure that all flight hardware to include all instrument attachments, gondola structure, flight rigging, mechanical attachments, parachutes, and flight train, are documented as flight worthy to ensure all components remain attached throughout the entire flight for all balloon flight environment conditions. The balloon is not required to be documented under this mechanical certification task as it is covered under a separate set of analyses, testing, and documentation.

3.2.4 Flight System Certification – The Contractor shall ensure that all flight systems undergo an end-to-end compatibility test to be certified and compatible with user systems and documented as flight ready prior to flight.

3.2.5 Ground Support Equipment – The Contractor shall ensure that all launch support vehicles are certified and all GSE are documented as flight ready prior to flight to include testing and certification prior to each campaign of the balloon launch vehicle, inflation spools, and any other equipment under load or critical to the inflation and launch process.

3.2.6 Handling of Radioactive Sources – The Contractor shall meet the requirements of NASA Procedures and Guidelines (NPG) 8715.3 with respect to all balloon flights that carry radioactive materials. The Contractor shall notify the BPO of the requirement for a Nuclear Launch Safety Authorization and provide notification of recovery of the sources following conduct of the mission. The Contractor shall maintain radiation storage licenses for the Palestine and Fort Sumner facilities and remote installations as required in accordance with all applicable government ordinances for licensing, accounting, handling, shipping, and storage.

3.2.7 Flight Operations Support – The Contractor shall provide the operations to conduct scientific balloon flights to meet specific scientific, technology development, balloon systems test, or educational outreach requirements. Operations include pre-launch preparations, launch, tracking, command and control of balloon flight systems, data acquisition, aircraft surveillance, termination, balloon and payload recovery, and flight management. The Contractor shall coordinate with appropriate US and foreign agencies as required. The Contractor shall provide

launch-site coordination and support services for NASA balloon users. The Contractor shall provide scheduling for flight operations conducted by CSBF personnel. The Contractor shall coordinate with the onsite NASA Mission Manager and NASA Range Safety Officer and other NASA Safety representatives with regard to safety and mission assurance. All operations shall be in compliance with the criteria established in the WFF Range Safety Manual, NASA Ground Safety Risk Analysis Report and other applicable ground and flight safety documents. Operational support shall include but is not limited to:

a. Assemble balloon flight-train systems, ballast systems and gondola/balloon flight-train interface rigging;
b. Provide mechanical structure and/or environmental tests, or otherwise perform analysis to document flight-qualification certifications for flight readiness of all Contractor provided flight system components for operation in the balloon environment, and to provide these same certifications of user-provided systems, as requested;
c. Provide onsite pre-integration and testing support at the CSBF for candidates of LDB, ULDB, and foreign campaigns;
d. Prepare, launch, and track radiosonde or GPS sondes, high altitude sounding balloons, or pilot balloons for data to support meteorological analysis as required for mission planning;
e. Forecast and actively monitor all meteorological conditions affecting balloon launch, flight, and termination operations;
f. Conduct pre-flight weather briefings;
g. Identify launch opportunities and establish launch priorities in concurrence with NASA;
h. Conduct all scientific balloon operations including inflation, launch, flight control, termination, and recovery in accordance with all ground and flight safety documentation;
i. Conduct all operations in accordance with the National Environmental Policy Act Balloon Program Programmatic Environmental Assessment;
j. Prior to and during flight operations, coordinate with Federal Aviation Administration (FAA) and/or other air traffic control authorities for clearances to launch and terminate flights, and provide required notifications and updates to the FAA and/or other air traffic control authorities as required;
k. During campaigns, provide NASA with informal reports as to the campaign status and schedule;
l. Provide formal status and schedule Situation Reports to NASA for all campaigns or as requested by NASA;
m. Provide video documentation of launch operations including but not limited to flight-line critical flight system integration operations, balloon inflation, spool release, collar release, and payload release;
n. Provide immediate notification to NASA of each launch;
o. Provide formal notification to NASA of each launch by issuing an Off-The-Pad Report following launch or entry into float;
p. Provide formal notification to NASA following conduct of the mission by issuing a Flight Summary Report;
q. Maintain, certify, and operate specialized launch equipment and vehicles;

r. Provide and operate aircraft for balloon flight operations support to meet mission, science, and safety requirements in accordance with Section 3.2.8, Aviation / Aircraft Support;
s. Conduct pre-flight integration, test, and evaluation of mechanical and electronic systems;
t. Provide and operate ground and downrange stations and data recording systems;
u. Provide user access to science data networks;
v. Monitor and record balloon positional information;
w. Select safe impact areas, provide aerial visual surveillance of the selected impact area, coordinate termination and descent trajectory, terminate flight and perform recovery operations; and
x. Coordinate recovery operations with local authorities or any affected landowner, obtain permission to enter private property, determine if any property damage occurred on impact or during recovery operations, and initiate damage claim/payment action.

3.2.8 Aviation / Aircraft Support – The Contractor shall provide and operate two (2) aircraft for tracking of balloons, balloon flight termination operations, recovery operations, and logistics support. Aircraft shall be capable of meeting mission requirements as noted below for all Continental United States (CONUS) missions. One (1) aircraft shall be ready to support each mission; a backup aircraft shall be required to support adjacent missions when the primary aircraft is downrange or unavailable. For Canadian termination/recovery operations, one (1) of the two (2) aircraft shall be used. Aircraft contracted for missions conducted outside CONUS and Canada may have fewer capabilities than those listed for CONUS operations as long as it can be shown to meet balloon mission requirements and comply with applicable policies and regulations.

All NBOC aircraft services contracts and agreements shall comply with NASA aircraft management policies established in NPD 7900.4, NASA Aircraft Operations Management, and NPR 7900.3, Aircraft Operations Management. CONUS Aircraft operations shall be conducted under Federal Aviation Regulations, Part 91.

Aircraft operations conducted by or for the NBOC in support of the mission model, or funded by the NBOC shall comply with the designation of "Program Support Aircraft" in "public use" status. One member of the aircrew shall assume the designation and responsibility of "Pilot in Command." All passengers onboard the aircraft who are not pilots shall meet the requirements of a "Qualified Non-Crewmember." The Contractor may conduct administrative passenger flights outside the normal mission model in compliance with applicable FAA regulations for civil use.

NASA has the responsibility for safety and airworthiness oversight of NBOC Program Support Aircraft missions. The Contractor shall comply with applicable requirements for evaluation and approval per 800-PG-1060.2.2, Airworthiness Review Process. The Contractor shall provide completed NASA/GSFC/WFF Code 830 Aircraft Office "Contract Aircraft Questionnaire," "Contract Aircraft Science Investigator Questionnaire," and "Contract Aircraft Experiment Installation Engineering Requirements" as applicable. NBOC aircraft services contracts expected to provide long-term, continuous support (greater than one year), shall be subject to the Inter-

Center Aircraft Operations Panel (IAOP) review process of their aviation program in the same manner as NASA Centers.

Both aircraft for normal CONUS operations shall be required to perform missions with the following minimum requirements under no wind conditions, at international standard atmosphere temperatures, at sea level airports:

a. Mission Requirements
    i. Transit 150 nautical miles (nm) to the termination area with full mission aircrew and mission loading;
    ii. Conduct tracking/termination operations for a minimum of 90 minutes, with final 30 minutes at altitudes below 10,000 feet above mean sea level (MSL);
    iii. Transit to an initial destination airfield 100 nm distant, conduct an instrument approach to a missed approach, then to a satisfactory alternate airfield 100 nm distance for mission termination with a minimum of 60 minutes fuel reserve; and
    iv. All aircraft operations shall be capable of being conducted under Instrument Flight Rules (IFR) with fuel reserves in accordance with Federal Aviation Regulations 91.167.

b. Aircraft Requirements

    i. Both aircraft shall be pressurized, turbine powered, multi-engine land, certified in the Normal or Utility Category in accordance with Federal Aviation Regulations 23.3 for day and night operations in instrument and visual meteorological conditions (IFR / Visual Flight Rules (VFR)), and in known icing conditions;
    ii. Both aircraft shall have functional dual controls and cockpit instrumentation sufficient to perform IFR flight from either the pilot's or copilot's seat(s);
    iii. Both aircraft shall have a service ceiling of 25,000 feet or greater;
    iv. Both aircraft shall have the capability for operating in a minimum mission configuration that includes two pilots (200 lbs each), two mission air crewmen (200 lbs each), miscellaneous items (200 lbs) and a unique Government Furnished Equipment (GFE) portable aircraft telemetry station (seat pack) (220 lbs); and
    v. Both aircraft shall accommodate a minimum of four (4) additional antenna installations to support L-Band & S-Band telemetry from the balloon, Ultra High Frequency (UHF) commanding to the balloon, and Very High Frequency (VHF) for air-to-ground communications.

c. Aircrew Requirements

All termination operations shall employ a minimum operations aircrew of four persons consisting of a Pilot, a Copilot, a Senior Aircraft Observer (SAO), and an Aircraft Electronics Technician (AET). Recovery operations may be conducted with only a Pilot and Copilot. The Pilot and Copilot shall meet certification, experience, and physical requirements in accordance with NPR 7900.3.

    i. The Pilot and Copilot functions are as defined in applicable NASA policies and the Federal Aviation Regulations;

ii. The SAO functions as the "mission commander," directing the execution of the mission requirements, including coordination with the ground-based control facilities; and
iii. The AET operates the seat pack.

d. Avionics Requirements

Aircraft shall accommodate a NASA-approved GFE seat pack capable of being installed and removed as required in accordance with applicable NASA documents and the Federal Aviation Regulations.

For Canadian termination/recovery operations all minimum requirements listed above are required in addition to the following requirements:

i. Transit 350 nautical miles (nm) to the termination area with full mission aircrew and mission loading;
ii. Transit to an initial destination airfield 100 nm distant, conduct an instrument approach to a missed approach, then to a satisfactory alternate airfield 300 nm distance for mission termination with a minimum of 60 minutes fuel reserve; and
iii. Aircraft shall have a service ceiling of 31,000 feet or greater.

3.2.9 Operational Safety – The Contractor shall comply with NPR 8715.5, the WFF Range Safety Manual, Balloon Program Risk Analysis Report, and applicable Ground and Flight Safety plans and procedures. The Contractor shall provide NASA-certified OSS's to oversee all hazardous ground operations including launch operations as required by the WFF Safety Office or directed by the COR.

3.2.10 Flight Assessment – The Contractor shall perform pre-flight, real time and post-flight assessment of flight performance and environmental conditions, including analyses of wind and other forecast meteorological conditions, trajectory predictions, and descent vector determination for impact of the balloon and flight train components.

3.2.11 Balloon Flight Summary Document – The Contractor shall deliver a balloon flight summary document to NASA. The balloon flight summary document shall contain the following:

a. Flight Data Summary;
b. Predicted versus Actual Flight Path;
c. Ground Track Plot;
d. Altitude Profile;
e. Flight Summary;
f. Predicted versus Actual Descent Vector;
g. Pre-Flight Minimum Success Criteria;
h. Post-Flight Minimum Success Assessment;
i. Final Flight System Weight Sheet;
j. Balloon As Built Spec Sheet;
k. Balloon Load/Altitude Curve;
l. Final Inflation Computation; and
m. Gondola Certification.

3.3 Engineering Services

The Contractor shall provide engineering services required to support the operational flight program, maintain and enhance capabilities, monitor and verify balloon and material quality control, support NASA Balloon Research and Development activities, and support IDIQ Task Orders. To meet these requirements, the Contractor shall provide the following:

3.3.1 Flight Operations Engineering Support – Flight operations engineering support shall be provided at the CSBF and shall include, but not be limited to, the following:

a. Administer gondola certification programs for all flights and pressure vessel certification on all flights that include pressure vessels in accordance with CSBF Recommendations for Gondola Design to certify structural flight worthiness of the flight hardware. Provide review of user provided drawings and stress analyses, hardware inspection, testing as deemed necessary, and provide final written certification prior to flight approval. Document and make available to users the structural requirements for balloon gondolas. All data and records generated by the CSBF or provided by the user shall be maintained by the Contractor;

b. Provide engineering services to CSBF flight operations and approved users of the facility to implement the flight program. This includes support for conventional, LDB and ULDB flights and includes but is not limited to: mechanical engineering, electrical engineering, environmental testing, network support, software support, documentation, failure and anomaly or mishap reviews, etc.;

c. Perform continuing comprehensive thermal analyses and design of thermal controls for balloon flight subsystems and/or complete scientific test gondolas, including NASA/CSBF flight support systems; and

d. Provide thermal analysis of balloon systems and user payloads in support of LDB, ULDB and other balloon flight missions as directed by NASA.

3.3.2 Equipment and Enhancement Projects – The Contractor shall be responsible for the development of the Annual CSBF Engineering Plan. The plan shall document and define proposed projects with regard to rationale, cost, schedule, and priority. Engineering projects identified in the Engineering Plan and approved by the CO will be implemented under separate IDIQ Task Orders.

The Contractor shall provide engineering services for special projects that replace, enhance or improve balloon support equipment and/or capabilities. This support may include, but is not limited to, the following:

a. Implement engineering projects in support of improvements to CSBF facilities, launch techniques, and balloon flight and ground hardware and software systems;

b. Provide special diagnostic instrumentation payloads designated by NASA.

3.3.3 Reliability and Quality Assurance Engineering Support – Engineering support of the R&QA Program shall include monitoring, verifying, certifying, and enforcement of compliance with specifications for balloons, balloon films, mission critical hardware and software, and mission critical procedures. Support also includes recommending and developing new specifications, procedures and criteria for enhanced reliability. Support shall include, but not be limited to, the following:

a. Ensure documentation and maintenance of, and compliance with, written fabrication, inspection, maintenance, refurbishment, assembly, test, and operating procedures for all mission critical systems per the Quality Manual;
b. Ensure documentation and maintenance of, and compliance with, mission and safety critical operational procedures;
c. Implement the R&QA Program for balloon and balloon film engineering including:
    i. Verifying manufacturer's compliance with design, testing, fabrication, procedures, and specifications for all purchased balloons;
    ii. Providing in-plant balloon and film quality assurance in accordance with the annual R&QA Plan.
d. Maintain and operate a quality assurance laboratory at the CSBF for the purpose of selected testing to verify manufacturer's film and fabrication quality control. The Contractor shall be required to maintain and operate existing laboratory equipment and to perform material testing (e.g., uniaxial tensile testing at room and lower temperatures, cold brittleness testing, and impact testing);
e. Maintain at the CSBF, historical data and records of balloon specifications, balloon and balloon film fabrication, quality control, material testing, and flight performance.

3.3.4 WFF Balloon Engineering Support – The Contractor shall provide continuing engineering support located at WFF in support of the NASA Balloon Program. The engineering support includes, but is not limited to, the following:

a. Provide recommendations and planning inputs for advanced projects as a part of the NASA Balloon Program Research & Development activity;
b. Provide continuing engineering support of new or improved balloon flight vehicle systems, analytical models of conventional balloon flight systems, new and/or improved balloon materials, and characterization and development of procedures and specifications of balloon and balloon film manufacturing processes. This support includes, but is not limited to, the following:
    i. Development of flight performance and analysis models;
    ii. Developing engineering project plans, schedules, and cost estimates;
    iii. Developing and conducting tests at the WFF balloon materials laboratory and providing analysis of the results; and
    iv. Providing engineering field support by monitoring ground and flight tests.

4.0 Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders

The Contractor shall provide support as defined in performance-based task orders. Complex tasks, long lead time development or procurement efforts, or long-term support functions may be required. In such instances, the respective project team may be comprised of civil servant and Contractor personnel. This work is highly variable and covers a wide spectrum of requirements. Requirements and standards of performance for IDIQ task orders will be determined on an individual basis and included in each task as assigned. IDIQ task work orders include but are not limited to design and analysis, fabrication, integration, testing, operations field support, and the acquisition and provision of hardware or services. Individual IDIQ Task Orders will be approved by the CO.

4.1 Routine IDIQ Summary

Within Sections 3.1, and 3.3 there are specific requirements identified as IDIQ. The following is a summary of those requirements:

a. Construction of Facilities (Ref. 3.1.12): Any approved facility project; and

b. Equipment and Enhancement Projects (Ref. 3.3.2): Any approved engineering project.

4.2 Special IDIQ

The Contractor shall provide technical expertise, equipment, and facilities that may be required in support of the special tasks for the NASA Balloon Program, including work for other NASA Centers and the Jet Propulsion Laboratory (JPL). These projects may vary from development of balloon electrical/electronic and mechanical subsystems to payload integration and/or development of complete scientific/test gondola systems. In accordance with any task order issued to support these projects, the Contractor shall, as described in such task orders:

a. Provide electrical/electronic engineering design, fabrication and acceptance testing for the development of instrumentation subsystems and components required for flights;

b. Provide mechanical engineering support for the design and fabrication of balloon structural systems and unique mechanisms or equipment required for engineering test or scientific balloon flights;

c. Develop and fabricate new gondola systems for flights;

d. Integrate scientific or engineering test payloads into gondola systems or subsystem;

e. Provide technical services required to develop drawings, test and operational procedures, and documentation in support of the above electrical/electronic and mechanical systems; and

f. Provide technical and operational field support for the above systems (or other systems required by NASA) during preparation, checkout, and/or flight at various field sites, including WFF.

End of SOW