FY2013

Q4

Quarterly Report for the Period July 1st – Sep. 30th, 2013

Center for the Advancement of Science in Space

Cooperative Agreement Number:	**NNH11CD70A**
Name:	**Center for the Advancement of Science in Space, Inc.**
Date Submitted:	**2013**
Section I	**General Status Report**
Section II	**Performance Metrics**
Section III	**Business Status Report**

Section I: GENERAL STATUS REPORT

Board of Directors:
The Board will determine long-term goals and measures of success consistent with the CASIS Strategic Plan and the Cooperative Agreement and as appropriate for the 2013 and 2014 APP.

The Board continued weekly special meetings throughout the quarter and conducted focused discussions on the development of metrics that could be used to measure the near and long-term success of CASIS against its strategic plan and requirements within the cooperative agreement. With completion and on-time submission of the CASIS strategic plan to NASA, the Board engaged the support of senior management and expert consultation to develop the metrics, as required in the fourth quarter of the Annual Performance Plan, that could be applied to each of the goals identified in the strategic plan. The Board directed senior management to proactively coordinate with NASA on the planned metrics in order to ensure they would be applicable and consistent with the 2014 performance plan. The final set of metrics CASIS will use to measure its success against the stated mission is attached as Appendix A to this report. The metrics provide a quantitative and qualitative measure of CASIS' efforts to generate opportunities, utilize ISS NL, conduct awareness and outreach, generate novel financial resources, and streamline the process and rigor of accessing the National Laboratory.

Other highlights of the major activities performed by the Board during Q4 include:

- Final down-select and installment of Greg Johnson as the permanent Executive Director (ED)
- Successful transition of interim ED including official transfer of approval authority, 501.c.3 compliance within all 50 states, and official acceptance by NASA of the replacement of the ED per the terms of the cooperative agreement
- Closeout of KornFerry contract and assumption of responsibility for seeking additional board members. The Board is moving forward to fill the remaining 9 open seats in order to create a more diversified and comprehensive board that spans science, technology, finance and management.
- Issuance of a RFP for Legal Counsel to provide competitive rates for comprehensive services
- Board Science Committee participation in inaugural microgravity Omics workshop

- Governance Committee outlined terms, renewal and succession planning for BoD seats
- Board Compensation was finalized by the compensation committee and approved by the general Board

Business Development

Provide year-end assessment of commercial environment, including recommendations for forward planning:

An overall assessment for the commercial user sector indicates that our outreach approach and strategy to utilize our multiplier outreach with industry associations to help reach a broader market in a shorter period of time has taken shape. Our unsolicited pipeline for proposals indicates that we have touched a significant increase of non-traditional commercial users over the course of the past 6-9 months. The science opportunities range from biotech research to energy and materials evaluations.

The CASIS relationship with a variety of academic institutions has significantly increased with our relationship with the Houston Medical Center academic institutions and the Moore's Cancer Center at UCSD in La Jolla, CA. CASIS is beginning to see continued interface and potential project definitions with all these institutions.

Recommendations for the next quarter of activities are to focus our efforts in the Silicon Valley area with focus on high-technology based companies. The other area of focus will be the San Diego, CA. life science community focused on drug development and regenerative medicine research applications. The Ecosystem approach designed and implemented over the past 6-9 months has significantly increased our outreach and improved our ability to access additional new users.

Major Business Development actives this quarter focused on continuing to develop and mature our identified key relationships in the established ecosystems of Boston, Houston and Denver.

In the Boston ecosystem, staff continued final down select of new-to-space commercial users via the MassChallenge accelerator program. CASIS identied a potential of 11 new small commercial companies interested in using the ISS NL as a platform for technology readiness demonstration and product development life cycle enhancement. Significant effort was made to educate and mentor each of the candidates on the complexities of developing research opportunities on ISS. Final selection is targeted for October 30th and CASIS anticipates supporting all projects that meet the science and economic review requirements.

Additional efforts in the Boston ecosystem included further utilization of the MIT Industrial liaison project to gain entrée into the departments of engineering and technology. These efforts have led to the development of numerous project opportunities within remote sensing and materials testing, each of which have established fund sources and high-value partnerships in place. A formal research partnership with the Broad Institute was solidified this quarter and led to the participation of the Broad in CASIS' first space-based omics research workshop in Cocoa Beach, FL. It is anticipated that the Broad Institute will be instrumental in developing hardware and other technologies that will enable ideal collection and preservation of multi-organism tissues

and fluids for this research pathway. During this quarter, CASIS also finalized initial plans with the Museum of Science to develop a series of exhibits and associated education material to achieve our outreach mission goals. Next steps will involve securing significant sponsorship funds from a major partner in order to finance the build out of this exhibit across all ecosystems and other key regions.

Commercial partner Novartis Pharmaceuticals continued to participate in and provide proof of concept verification science on the initial rodent habitat flight on SpaceX-4. CASIS operations personnel have coordinated the validation plans for the hardware and crew time to include dissection and appropriate preservation of tissues for valuable muscle wasting research demonstration by the pharmaceutical company.

CASIS engaged in its partnership with the MassChallenge to roll out a similar program in the Houston area. As a member of the Advisory Board, CASIS is working in collaboration to identify key markets and industries that may provide the most value to this model in this region. The current plan will have CASIS and MassChallenge focusing on this project in the first quarter of 2014.

The Houston Ecocystem has focused on the medical research communities in the Houston Medical Center. The BD organization formalized partnerships in the Houston Medical Research Center with a particular focus on life science and biotech research projects. Partner organizations include the Methodist Hospital research Institute, MD Anderson Cancer Center, Baylor College of Medicine and BioHosuton Organization as well as the Houston Tech Council. A series of CASIS briefings were scheduled to familiarize investigators with the opportunities aboard the ISS and to work collaboratively with CASIS.

A focused dialogue was conducted with the Baylor College of Medicine to generate a proposed Omics Consortium that will include a number of the Medical Center researchers, NASA and other commercial interests in developing a high-throughput omics-based research model that will allow multiple investigators access to data and analyses that will ultimately be targeted toward developing personalized medicine decision tools.

Initial meetings have been held with the MD Anderson Cancer Center about opportunities on the ISS. MDACC's partnership with CASIS is anticipated to focus on flight opportunities in conjunction with the institutional funds to support Cancer related research focused at translational science research opportunities.

The Business Development (BD) team continued its work with the Boeing Company to discuss a CASIS/Boeing partnership focused on establishing a Texas innovation accelerator opportunity along with a funded solicitation that would be sponsored by the State of Texas budgeted Emerging Technology Funds. The primary focus is to create an innovative opportunity for businesses and research organizations to solicit research proposals and projects that would utilize the ISS National Lab for IP generation and perhaps product/application development targeted for terrestrial markets.

A potential partnership with the Rice Alliance for Technology and Entrepreneurship that would provide CASIS with access to the Alliance's huge network of companies; participation in business plan and start-up competitions that may include a CASIS-funded award for flight

projects was initiated by the Business Development team on the ISS.

The West Coast ecosystem activities have been focused on developing a partnership with the California Institute of Regenerative Medicine and partnerships with a key cancer research organization The Sanford Consortium for Regenerative Medicine in La Jolla, CA as well as the commercial flight project with PUMA COBRA Golf.

The early commercial partnership planning for a CASIS Workshop at the Silicon Valley Space Center planning is moving forward rapidly and the October 18-20, 2013 event agenda is continuing to be firmed up. This will provide CASIS availability to discuss with non-traditional users and commercial startups the opportunity to use the NL for discovery and early stage product development. Denver Colorado ecosystem activities have been targeted at academic institutions and potential donor foundations at life science and stem related activity.

Section II: PERFORMANCE METRICS

Operations

Provide a one and five-year outlook and utilization plan for CASIS sponsored payloads utilizing ISS:

One Year Outlook, September/2013 – September/2014
The next twelve-month period will consist of 2 increment pairs, 37/38(CASIS ARK-I) and 39/40(CASIS ARK-II). Table one in the Operations Appendix provides a detailed illustration of the utilization outlook and traffic model for these two increment pairs.

Five Year Outook, September/2013 – September 2018
The five year period from September, 2013 through September, 2018 will consist of 10 increment pairs. It is anticipated that the business development and fundraising/partnership development activities undertaken by CASIS will result in a higher percentage of private/commercial utilization as compared to other government agencies and academic institutions. Table two, found in the Operations Appendix, provides a high level overview of the projected five year traffic model of the CASIS sponsored payloads/projects. The table provides a projected year to year comparison and total of payloads/projects segregated by three customer types:

- Other Government Agencies (OGA's)
- Academic Institutions
- Commercial/Private

Payload Development and Integration Updates:
The payload development and integration activities supporting investigations scheduled for launch during Increments 37/38 (Sept. 2013 – March 2014) and 39/40 (March 2014 – Sept. 2014) continue on schedule. However, launch delays for SpaceX-3 and Orbital-1 are causing 60 – 90 day delays in our investigation launches and on-orbit operations. The present flight schedule calls for an

Orbital/Cygnus demonstration flight during September/2013, an Orbital-1/Cygnus commercial resupply mission in December/2013 and a SpaceX-3/Dragon commercial resupply mission in January/2014. There are no other delivery vehicles currently scheduled for launch during Increment 37/38.

Satisfactory Payload Verification Tests (PVT's) were completed for the CASIS PCG, Merck PCG and University of Florida Petri Plants investigations. The Interface Control Documents (ICD's) have been baselined for the Morse/Gumstix and Ready/Photovoltaic Cell payloads. The strategic payload development plans have been initiated for the Grattoni/Nanomaterials and Schall/CASIS PCG II investigations.

Research Planning:
One of our top priorities during Q4 has been to mitigate the effects of the launch delays for our PI's, as well as our projected traffic model, by shifting certain CASIS sponsored payloads to other vehicles that may be more in line with the original baselined project schedule. However, the impact of this strategy is relatively minimal as a result of payload transportation requirements that must be satisfied via the relatively limited transport capabilities of the Cygnus capsule as compared to the Dragon capsule. We will continue to execute a launch targeting strategy, within the parameters of the NASA provided flight schedule, that is aimed at minimizing the "payload development to launch" time line for all CASIS sponsored PI's.

During Q4 we have begun developing and characterizing the manifest placeholders that will be required to support CASIS' projected traffic model demands resulting from our planned "Remote Sensing/Earth Observations" and "Industrial Research and Development/Tech Demo" RFP's as well as customers generated through business development efforts (unsolicited proposal submissions). We will report these placeholders to the ISS Program via updates to our Increment 41/42 payload candidate list and in our first draft of an Increment 43/44 payload candidate list.

NASA Update:
ISS Program management has acknowledged that implementation partner/payload integration costs and inefficient NASA payload integration processes are a significant barrier to commercial utilization of the ISS National Laboratory. As a result, the ISS Program managers, in collaboration with CASIS and the Implementation Partner community, are now analyzing the current payload integration processes to determine where the inefficiencies and unnecessary cost drivers exist. The goal of this collaborative analysis is to develop a much more time efficient and less costly payload integration process for National Lab PI's. In the near term, the Program is also considering absorbing the Implementation Partner costs, or performing the tasks, that are tied to NASA required integration activities. This is a critical issue that has a direct impact on CASIS and our mission. This collaborative exercise will continue into FY2014 with a goal of realizing preliminary results during 2014Q1.

Forecasted needs/challenges:
During Q4, the most significant risks and challenges to CASIS operations are the launch delays of our transport vehicles to the ISS. It is not yet known what the results and potential impacts of the Orbital/Cygnus demonstration flight will be on planned future Orbital/Cygnus missions, but it is anticipated that anomalies identified during the demonstration flight could delay the Orbital-1 resupply mission. Since CASIS has no effect on developing strategies to prevent these delays,

our challenge is to maintain our customer's confidence in utilizing the ISS National Laboratory as a viable platform to conduct their research.

Science & Technology Portfolio Management

Portfolio Management:
Continuing from the end of last quarter, the top priority of the Portfolio Management ("PM") department remained the CASIS Request For Proposals ("RFP") titled "The Impact of Microgravity on Fundamental Stem Cell Properties: A Call for Spaceflight and Ground-Based Experiments." This RFP is seeking to identify projects studying the effects of microgravity on non-embryonic mammalian stem cells for one of two research emphasis areas: (1) rapid turn-around spaceflight experiments to be performed on the National Lab or (2) ground-based research that facilitate future spaceflight experiments. CASIS will support selected projects through grant funding, facilitation of service provider partnerships, and flight coordination to and from the ISS.

As reported last quarter, a detailed execution plan was laid out by the PM team to draft an effective RFP and improve outreach resulting in increased participation by researchers. At that point, we reported a record-breaking response as measured in letters of intent—we received more than 3x the previous RFP and 4x as many as the RFP prior to the last one. Full proposals were due in late July, and we received 49 submissions, again a CASIS record representing approximately 2.5x the previous high.

Out of the 49 proposals submitted, 44 passed CASIS Operations review. The scientific external panel review took place on August 27th and was successful in reviewing and ranking the top proposals. CASIS hosted 22 external reviewers from across the country with valuable stem cell-related backgrounds/education/experience. After this scientific review, 13 proposals were passed to the economic review stage and prioritized based on potential tangible and intangible value as well as CASIS portfolio diversification strategy. These remaining 13 proposals have relevance to several areas of research.

- Heart disease (the #1 cause of morbidity and mortality in the U.S.): tissue engineering, cell replacement therapy, reprogramming of other adult cell types, and drug screening—with cardiac cell therapy results likely to progress rapidly into the clinic.
- Bone cancer (which eventually affects 35–50% of all cancer patients): cancer therapeutics.
- Bone loss/formation (40+ million people in the U.S. have osteoporosis): therapies for disuse-induced degenerative conditions, and improved orthopedic tissue engineering.
- Technology enhancement: the ability to study cells on station without astronaut intervention.

CASIS anticipates announcing winners of the RFP in early October. We have currently budgeted at least $1.8 million to support a minimum of six projects.

Other key updates to note from the last quarter include the following:
The PM team released CASIS's first Crowdsourcing Contest titled "What Would You Send to the ISS?" with cash and other prizes for the top five submissions. The contest closed on September 16th and received 82 submissions. This contest was a suggestion by the CASIS Science and

Technology Advisory Board ("SAB). The SAB believed a crowdsourcing initiative focused on generating innovative ideas from the public for utilizing the unique environment of the ISS National Laboratory for the improvement of life on Earth could result in new and novel research pathway ideas that they could help further develop. The SAB will play the primary role of reviewers for these these shortform contest submissions. The public will also have a small voting percentage in the eventual awardees. CASIS plans to announce winners in October.

As a result of the HICO request for information, CASIS invited two principal investigators to submit a full proposal for use of the underutilized on-orbit instrument and selected both proposals for awards. Ruhul Amin of the U.S. Naval Research Laboratory will receive $250,000 to use remotely-sensed hyperspectral optical measurements from the ISS and co-incident in-situ measurements to develop early harmful algal bloom detection, quantification, and classification algorithms in the Gulf of Mexico. James Goodman of HySpeed Computing will receive $150,000 to develop an enterprise architecture for image processing that leverages existing investments in Earth observation data acquisition and enables the remote sensing community to more effectively transform research ideas into functional software applications.

CASIS has selected an unsolicited proposal by Mike Yagley of Cobra Puma Golf to conduct an electrodeposition experiment. With NanoRacks, Cobra Puma Golf will utilize the microgravity environment of the ISS NL to test different metals and determine if beneficial alloys can be created that will enhance existing products and processes. Finding a better bonding process, or having the ability to create stronger and lighter alloys for commercial use, could present major breakthroughs in advancing materials science and U.S. competitiveness while generating profits in consumer products here on Earth.
CASIS has selected a fully-funded unsolicited proposal by Mahendra Jain of Kentucky Space to examine the role of gravity and the geomagnetic field in flatworm regeneration. The experiment will expose planarian flatworms to the microgravity environment to understand what part gravity plays in their healing abilities and to understand rebuilding their body organs and nervous systems after damage.

CASIS has selected an unsolicited proposal by Dr. Clifford Dasco of Baylor University to conduct a longitudinal assessment of intracranial pressure during prolonged spaceflight. With an award of approximately $200,000, Dr. Dasco will develop a basic science-founded approach to the detection of increased intracranial pressure and papilledema consequent to prolonged spaceflight as seen in astronauts and cosmonauts returning to Earth from space. Importantly, this technology has potential for use on Earth as well in assessing changes in the eye caused by type II diabetes and prevalanet eye disorders, such as age-related macular degeneration.

CASIS has selected a fully-funded unsolicited proposal by Brian Penn of the National Ecological Observation Network (NEON) to utilize the HICO instrument on ISS. As part of the effort to collect ecological data of key regions, NEON will use three airborne imaging spectrometers of their own as well as the HICO Visible Near InfraRed (VNIR) hyperspectral imagery from the ISS.

CASIS has selected a fully-funded unsolicited proposal by Novartis Institute for Biomedical Research to conduct rodent research. Drs. David Glass and Sam Cadena will explore the molecular basis of muscle atrophy caused by extended microgravity exposure from spaceflight by examining a transgenic mouse model deficient in the Muscle RING Finger-1 (MuRF-1) gene. Ten

mice (five MuRF-1 KO and five wild-type controls) will be flown on board the SpaceX-4 mission to the ISS where they will be housed for approximately 3 weeks.

Marketing & Communications

Begin preparations for CASIS second Annual Report for FY '13:
The CASIS MarComm Department began compiling information from departments throughout the organization outlining their highlights and accomplishments over the past fiscal year. The Communications team will then construct the content portion of the annual report and issue a Request for Proposals on the creative development to ensure a first class representation of CASIS to stakeholders.

Finalize press strategy for CASIS Increment 37/38 participation and begin promotion campaign using videos and outlets to create excitement of the milestone event:
A press strategy has been developed that will outline outreach to local and national press on the research scheduled to launch to the ISS during 37/38. In anticipation of scheduled payloads launching in December and January, CASIS will strategically begin product placement and advertising concepts (both grassroot and paid advertisements) indicating that "the ARK is leaving" (CASIS has renamed increment periods to Advancing Research Knowledge, coinciding with National Lab/CASIS expeditions). As we move closer to the initial launch of CASIS payloads on Orbital Sciences' scheduled flight in December, an ARK1 marketing video will begin to emerge on outlets and be utilized in marketing pitches with national news outlets such as 60 Minutes, CNN, FoxNews, etc.

Conduct KPI (Key Performance Indicators) assessment of Communications initiatives:
A delay in the acceptance of the overall strategic plan for CASIS caused the anticipated roll out of the strategic communications plan to be pushed rightward approximately two months. As a result, an assessment of the identified KPI's was not possible by the end of the fourth quarter; however, CASIS intends to collect data from the last month of the fourth quarter and roll it into data to be collected from the first quarter for 2014 so that a preliminary report on the strategic communication intitiatives can be provided. CASIS intends to use the preliminary analysis to conduct any necessary mid-course corrections as we continue to mature our communications and outreach strategies.

Additional efforts within the MarComm department included the following:
The CASIS continued in its efforts to promote the highlights and press worthy initiatives of the organization, while also looking to the future to promote ARK1 opportunities. Through marketing strategies incurred during Q3 at the onset of the Stem Cell RFP, CASIS continued into Q4 promoting the process with overwhelming success. Through partnerships with entities like Cell Journal, Science.com and other science online outlets, the MarComm department created a baseline for how other RFP's will be approached in the future.

In August, CASIS launched the crowdsourcing contest, "What Would You Send to the ISS?" To promote this contest, CASIS created a wide-spread media campaign covering high-tech websites like Engadget, New Scientist and Popular Science. The organization also partnered with Make Magazine to develop a campaign for their readers which included blog posts and social media blasts. Because of these efforts, CASIS was able to achieve over 5,000 unique visitors to the

contest's landing page and garnered television, print and radio exposure. Additionally, upon the conclusion of the contest, CASIS opened up public voting for their favorite ideas that came through. This has resulted in thousands of votes that will help identify the grand prize winner for the contest.

CASIS continues in its strong efforts to engage key media partners. Over the past months, CASIS has secured time and print space with Air & Space, Aviation Week, New Scientist and Space News. These interviews have been focused on the overall maturation of CASIS and the recent selection of Col. Gregory H. Johnson as Executive Director.

For the announcement of Col. Gregory H. Johnson as CASIS Executive Director, a coordinated media announcement was planned with NASA PAO on simultaneous news releases, capitalizing on media exposure. The release outling Col. Johnson's announcement as Executive Director was picked up by over 1,000 media outlets throughout the country after it was distributed to over 450 members of the media community.

Fundraising & Development

Progress with fundraising/development and funding partnerships continued robustly in this quarter. As noted in earlier updates, CASIS moved away from a membership model during Q2, and redirected efforts toward major gift fundraising, development of matching funding for flight and STEM projects, and exploration of additional innovative methods for driving outside funding in support of ISS U.S. National Laboratory opportunities.

Fundraising/development continued to build a closer working relationship with business development, acknowledging that the adoption of a model that centers on the creation of robust partnerships between CASIS and other institutions involves some overlapping work, and offers opportunities for the two groups to support and strengthen each other's efforts. While CASIS business development focuses primarily on identifying and encouraging flight opportunities from commercial entities, CASIS fundraising development/partnerships focus more on organizations that can provide funding for CASIS flight projects either through CASIS or through partner institutions. In this regard, development/partnerships focuses primarily on non-commercial institutions (academic higher education; academic medicine; research consortia; foundations; educational institutions; museums and nonprofits; philanthropically-minded major donors).

In the Houston ecosystem funding partnerships are under development with many of the same institutions being worked by business development. Among the achievements for Q4:
Baylor College of Medicine: CASIS made a seed grant to the Department of Molecular & Cellular Biology in Q3, supporting development of an omics research platform. Successes to date include significant in-kind contributions (currently in excess of $100,000) against the CASIS grant; continued growth of a research consortium centered around the CASIS funded research topic (consortium members currently include faculty from Baylor College of Medicine, Rice University, and the University of Houston); in-kind donation of time by BCM researchers outside the scope of the CASIS grant assisting with dialogue about and discernment of requirements for rodent research capabilities on Station.

Rice University: Discussions began with the Rice Alliance for Technology and Entrepreneurship regarding a partnership that would provide CASIS with access to the Alliance's huge network of

companies; participation in business plan and start-up competitions that may include a CASIS-funded award for innovative flight projects; and use of the Alliance's position on campus to provide CASIS with better access to science and engineering faculty who have ideas for investigations on ISS. Also, conversations started with the Rice University development office and the senior advisor to the president's office regarding possible joint fundraising.

The Methodist Hospital Research Institute: Discussions are underway regarding the potential for TMHRI to provide matching funds for their stem cell proposal (selected among the top 13 proposals in the CASIS RFP); matching funds in support of future flight projects to be submitted for review through the CASIS unsolicited pipeline; and beginning dialogue with The Methodist Hospital Foundation regarding the possibility of joint fundraising.
Awty International School: The Awty board of trustees authorized a gift to CASIS of $30,000 to secure a second year's participation in the NDC/ArduLab pilot project in Houston, featuring student flight experiments grades 3-8.

Discussions continue with implementation partner *NanoRacks* regarding future in-kind contributions (e.g. reduction in implementation costs) and possible philanthropic support of CASIS.

Greater Houston Community Foundation: CASIS formalized a partnership with GHCF to implement a matching grant program that will ultimately make available $1 million of funding for CASIS-approved flight/science and STEM education projects in the Houston ecosystem. Implementation of this program is now underway; selection of the first set of projects for possible funding has started.

Similar progress was made in the Colorado ecosystem:
The Denver Foundation: Similar to GHCF in the Houston ecosystem, CASIS formalized a matching grant partnership with The Denver Foundation that will ultimately make available $1 million of funding for CASIS-approved flight/science and STEM education projects in the Colorado ecosystem. Implementation of this program is now underway; an initial set of four projects was recently provided to The Denver Foundation staff to "test case" methods for solicitation of the foundation's donor base. In addition, The Denver Foundation has proposed approaching other large Colorado foundations for support of these projects.

Snell & Wilmer: Jim Mulligan, senior partner of Denver-based law firm Snell & Wilmer, has offered to host an event for the new CASIS executive director providing introductions to key Colorado business and political leaders.

Nagel Foundation: Discussions ensued in Q4 regarding the foundation's interest in funding a STEM education project to be carried out in partnership with CASIS.

University of Colorado: Discussions started regarding partnering with CU in fundraising to support BioServe Space Technologies, a center based within the Aeronautical Engineering Department at CU that also is a key implementation partner for CASIS. These discussions also include exploration of a new and more robust business model for BioServe.

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Wings Over the Rockies Air & Space Museum: Progress toward completion of a jointly sponsored ISS exhibit at the museum is both on time and on budget. Formal opening of this unique exhibit is scheduled for November 1, 2013. Phase 2 planning and fundraising is currently under discussion to support growth and updating of the exhibit's focus on ISS National Laboratory benefits well into the future.

Finally, in Florida, efforts began in Q4 to implement a "mini-ecosystem" within the Space Coast communities.
A partnership is nearly formalized with *Florida Institute of Technology* to encourage FIT faculty to submit proposals for flight projects. Discussions are beginning about joint fundraising in support of these projects.

Discussions have also started with *Embry-Riddle Aeronautical University* and the *University of Central Florida* to conceptualize partnerships with CASIS.

STEM Education

The CASIS National Design Challenge (NDC) Pilot Program in Houston was successfully kicked off in early August. Three Houston area schools are participating in the pilot and they will be developing and building a total of six educational Infinity Ardulabs for flight to the ISS in the spring of 2014. The program will conclude with the flight experiments and the return of the Ardulabs to their respective schools in late spring or early summer of 2014. We are working to develop sponsorship collaborations in Denver, CO for the next NDC program which is scheduled to kick-off in the late spring or early summer of 2014.

The CASIS sponsored Zero Robotics summer middle school program concluded on August 13, with 5 states participating in this year's program. CASIS also sponsored the event finals in Florida at Kennedy Space Center. The teams participating in this year's summer program represented Massachussetts, Georgia, Florida, Idaho, and California. The winning team of this year's program was from St. Lucie County, FL and they will be acknowledged at this year's ASGSR conference in Orlando, FL.

Our planning for the CASIS Classroom Connection will continue through Q4 with our first planned event to take place in FY2014Q1. The planned educational focus for CASIS Classroom Connection will feature content from CASIS sponsored payloads. The first planned program will center around our "Petri Plants/CARA" payload and will offer education lessons in plant biology as it relates to investigations that are being conducted on the ISS.

Administration

The CASIS Board of Directors will define the long-term goals and appropriate measures of success:

Quarterly budget and performance review with NASA:

The quarterly budget and performance review was conducted.

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Center for the Advancement of Science in Space

Prepare and submit FY 2014 budget:

The preliminary budget was submitted to NASA on September 16, 2013. Once the FY12 is closed, CASIS will submit the final budget with the exact carryforward funds.

Annual compliance audit by independent organization:

CASIS management has engaged Carr, Riggs & Ingram, CPA to complete agreed upon procedures in fulfillment of the compliance audit requirement as part of the FY13 financial audit. The audit is being conducted in November 2013 and we anticipate a final report by December 2013.

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Section III: BUSINESS STATUS REPORT June 30, 2013						
	Budget Q4 2013	**Actuals Q4 2013**	**Variance**	**Budget YTD 2013**	**Actual YTD 2013**	**Variance YTD 2013**
Direct Labor	$1,483,919	$1,276,552	($207,367)	$5,801,232	$4,430,209	($1,371,023)
Grants to be Awarded	$1,200,000	$1,775,470	$575,470	$6,705,619	$4,918,451	($1,787,168)
Equipment: Permanent > $5k	$50,000	($45,678)	($95,678)	$191,200	$51,785	($139,415)
Equipment: Expendable & Supplies	$28,620	$60,900	$32,280	$102,280	$195,473	$93,193
Other Direct Costs	$173,577	$169,061	($4,516)	$875,791	$678,054	($197,737)
Subcontract Costs	$1,310,247	$994,412	($315,835)	$6,870,441	$4,329,971	($2,540,470)
Travel	$211,082	$276,305	$65,223	$847,834	$709,266	($138,568)

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Appendix A – CASIS Metrics
Goals and Measures for the 2014 APP and Strategic Plan

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Center for the Advancement of Science in Space

Metrics	Science	Technology	Education/Outreach	CASIS Management, Marketing & Communications	Map to Strategic Plan (Goals)	Notes
Business and Portfolio Development						
Description of BD plan to proactively generate interest and market opportunities as well as stimulate unsolicited proposals				Y	#1, #2	Annual BD plan
# and description of research pathways identified by CASIS that will be targeted via grants and BD	Report initial key areas, then report changes when they occur	Report initial key areas, then report changes when they occur		Y	#1, #2	Summary report on annual plan for portfolio management
# of grants issued by CASIS, by research pathway				Q	All	Demonstrate that CASIS is working to plan
# of responsive proposals meeting evaluation criteria, per grant	Q	Q	Q		#1, #2	Measure of interest in research call, can also tie back to BD efforts
# of unsolicited proposals received by CASIS, by research pathway and meeting evaluation criteria	Q	Q	Q		All	Measure of interest in research outside of grant award period
# of unsolicited proposals received by CASIS, meeting evaluation criteria, and not within targeted research pathways	Q	Q	Q		#1, #2	Measure of research interests not considered by CASIS
Summary report of disciplines responding, by grant and unsolicited proposal submission	Q	Q	Q		All	Demographics of respondents to grants and those submitting unsolicited proposals for ISS utilization
% of all proposals from single and multi-disciplinary teams	Q	Q	Q		All	In addition to strategic plan objective measure, this is also a National initiative that aims to increase the probability of breakthrough science
# of proposers, by solicited/unsolicited, and by BD activity				Q	#3	Measure of how effective BD activities (i.e. conferences, networking, exhibits, etc.) are to generate proposals for ISS utilization
# of proposals from new partnerships (formed to engage with CASIS/ISS)				Q	#3	Measure of effectiveness of BD efforts to generate interest in ISS utilization
Report new initiatives to solicit interest in/engagement with CASIS toward broader utilization of the ISS				Q	#3	Quarterly BD report that identifies efforts in addtion to annual plan and the effectiveness of those efforts

BD
Portfolio Management
Development
Ops
Finance

Y = Annual
Q = Quarterly

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Metrics	Science	Technology	Education/Outreach	CASIS Management, Marketing & Communications	Map to Strategic Plan (Goals)	Notes
Awards/Investments						
# of awards given to solicited proposals in each research pathway	Q	Q	Q		#1, #2	
$ amount of awards given to solicited proposals in each research pathway	Q	Q	Q		#1, #2	
# of awards given to unsolicited proposals	Q	Q	Q		All	Each metric will begin to identify most promising areas of ISS utilization, supporting future direction of focus
$ amount given to unsolicited proposals	Q	Q	Q		#1, #2	
# and $ amount of awards by type of responding organization (OGA, academic, individual, commercial, other)	Q	Q	Q		All	
$ amount contributed to projects by non-CASIS sources, and their origins (includes targeted giving, commercial entities, private investment)				Q	All	Will provide demonstration of interest in ISS utilization and financial contribution outside of CASIS
$ amount and description of flight projects provided by OGAs				Q	#1	Need to track this in anticipation of policy changes from OSTP/OMB mandating expanded use of ISS by OGAS (see OSTP "Fast Track Report" issued September 2013)

BD
Portfolio Management
Development
Ops
Finance

Y = Annual
Q = Quarterly

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Metrics	Science	Technology	Education/Outreach	CASIS Management, Marketing & Communications	Map to Strategic Plan (Goals)	Notes
ISS Utilization						
# of flight projects manifested	Q	Q	Q		All	Independent of flight logistics outside of CASIS control. This metric describes CASIS role in prioritizing NL projects
% of total flight projects manifested as a result of solicited proposals or investments	Q	Q	Q		All	Metric describes synergy between CASIS driven research intiatives and NL capacity on ISS
% of total flight projects manifested as a result of unsolicited proposals or investments	Q	Q	Q		All	Metric may identify lags in award to flight based on HW availability or other factors
Describe intended impacts/outcomes of ISS NL research and development to life on earth				Q	All	Summary report on payloads flying per quarter and intended outcomes
Financial Performance						
$ amount of NASA funding allocated to grants vs. direct vs. indirect costs				Q	All	
$ amount of non-NASA funding allocated to grants				Q	All	
Breakdown of direct, indirect, grants				Q	All	Distribution based on total revenues
Total amount of gov't vs. non-gov't funding comprising CASIS budget/financial posture				Q	All	Description of total revenues
Actual vs. projected expenditures				Q	All	Measure of budget to actual performance

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Portfolio Management

Development

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Outcome Reporting						
Describe actual impacts of ISS NL research and development to life on earth (specific examples, as they occur)				As they occur	All	Report significant impacts of ISS NL utilization positively affecting quality of life, health, economy, business, technology, etc.
# of projects resutling in publication or application, as they occur	Q	Q	Q		All	
# of publications from projects related to CASIS activities, in all areas				Y	All	
# of patents from projects related to CASIS activities, in all areas				Y	#1, #2	
# of products or technologies currently in development on gov't funding, related to CASIS activities ("pipeline")	Q	Q	Q		#1, #2	
# of products or technologies in development on non-gov't funding, related to CASIS activities	Q	Q	Q		#1, #2	
Report # and market value (if available) of products brought to market related to CASIS activities				Y	All	
Report economic impacts from use of the ISS National Lab, if available				Y	All	

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Metrics	Science	Technology	Education/Outreach	CASIS Management, Marketing & Communications	Map to Strategic Plan (Goals)	Notes
Report scientific or technological breakthroughs related to use of the ISS NL				As they occur	All	
Report transformational/translational science				As it occurs	#1, #3	
government contributions to CASIS, including like-kind, philanthropic giving, commercial investment, institutional investment, funded partnerships, etc.				Q	#3	non-flight project specific
Report change (improvements) in awareness among key stakeholder groups				Y	#3	
Report change (improvements) in requests for information from CASIS from responsible parties				Y	#3	
Report projects or activities contributing to national scientific, educational or technology initiatives				As they occur	#3	

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	Strategic Goal	Objective
#1	CASIS will establish a robust "innovation cycle" where first-class science drives the development of technologies, new intellectual property and commercial opportunities, which in turn drive new ideas and novel first-class science	Identify key R&D areas, generate solicitations, make awards, track investments, progress and results, manifest flights, establish "innovation cycle", balance R&D portfolio, increase diversity in R&D community over time, develop strong research program with demonstrable impacts to life on earth.
#2	Utilize the ISS for developing new capabilities based on existing proof-of-concept technologies, while allowing time for longer-term scientific and commercial initiatives to develop.	Demonstrate utilization of ISS as a technology development and testbed, attract commercial and applied interests, identify near-term technology candidates and pursue near-term flight opportunities, develop partnerships and programs leveraging ISS and contributing to national technology initiatives
#3	Undertake a strong public outreach promoting the value of the ISS NL to the nation, and establish the ISS NL as a leading laboratory and environment for science, technology, engineering and mathematics (STEM) education.	Develop new partnerships in STEM, create opportunities for STEM utilizing ISS and leveraging a variety of methods and settings, cultivate existing research ecosystems to develop flight opportuities with associated STEM content, assess (benchmark) awareness of CASIS and the ISS NL among key stakeholders, develop communications, marketing, business development, outreach and public awareness effort to raise awareness over time, increase number of contacts with CASIS, increase utilization of the ISS NL

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Appendix B - Operations Outlook and Utilization Plan

Table 1. CASIS Operations One-Year Outlook for ISS NL Utilization, September/2013 – September/2014

Investigation Name	Category	Increment
AMS-02	Other government	37/38
Low Gravity Phase Kinetics	Commercial Utilization	37/38
PCG CASIS-Snell	Commercial Utilization	37/38
PCG CASIS - Ng	Commercial Utilization	37/38
PCG CASIS-Bjorkman	Commercial Utilization	37/38
PCG CASIS - Aller	Commercial Utilization	37/38
PCG CASIS - Korolev	Commercial Utilization	37/38
CPCG-HM	Commercial Utilization	37/38
CPCG-HM-Merck	Commercial Utilization	37/38
NanoRacks OLGA	Commercial Utilization	37/38
NanoRacks Cubesat Deployer	Commercial Utilization	37/38
NanoRacks Module - 9	Commercial Utilization	37/38
NanoRacks - 23	Commercial Utilization	37/38
NanoRacks - 26	Commercial Utilization	37/38
NanoRacks - 27	Commercial Utilization	37/38
NanoRacks - 38	Commercial Utilization	37/38
NanoRacks - 39	Commercial Utilization	37/38
Nanoracks Platform 1 & 2 Resupply	Commercial Utilization	37/38
T-cell activation in Aging	Commercial Utilization	37/38
SPHERES Interact	Commercial Utilization	37/38
SPHERES Zero Robotics	Education	37/38
Story Time From Space	Education	37/38
Windows on Earth	Commercial Utilization	37/38
Petri Plants (CARA)	Commercial Utilization	37/38

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CSI-06	Education	37/38
NLP-Vaccine-21	Commercial Utilization	37/38
ISERV	Other government	37/38
Hyperspectral Imaging	Commercial Utilization	37/38
CASIS Stem Cell - 1	Commercial Utilization	39/40
CASIS Stem Cell - 2	Commercial Utilization	39/40
CASIS Stem Cell - 3	Commercial Utilization	39/40
CASIS PCG - 2 - Schall	Commercial Utilization	39/40
CASIS Dev-1, NanoMaterials	Commercial Utilization	39/40
T-cell activation in Aging - 2	Commercial Utilization	39/40
NanoRacks EP	Commercial Utilization	39/40
Gumstix	Commercial Utilization	39/40
Photovoltaic Cells	Commercial Utilization	39/40
Windows on Earth	Commercial Utilization	39/40
AMS-02	Other government	39/40
Story Time From Space-2	Education	39/40
Zero Robotics	Education	39/40
ISERV	Other government	39/40
Rodent Habitat 2	Commercial Utilization	39/40
Bone Densitometer	Commercial Utilization	39/40
VA Clinic	Other government	39/40

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Table 2. CASIS Operations Five-Year Outlook for ISS NL Utilization, September/2013 – September/2018

Period	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	TOTALS
ISS Increments	Inc. 37 - 40	Inc. 41 – 44	Inc. 45 – 48	Inc. 49 – 52	Inc. 53 - 56	
Customer						
OGA	6	6	8	10	10	40
Academic	12	14	18	24	24	92
Commercial	26	32	40	50	50	198
TOTAL	**44**	**52**	**66**	**84**	**84**	**330**