FY2014 Q4
Quarterly Report for the Period July 1st – September 30th, 2014
Center for the Advancement of Science in Space

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

Section I: GENERAL STATUS REPORT

Executive Summary

CASIS made significant progress toward its three strategic goals during Q4 FY2014. In regard to strategic goal one, "establishing innovation cycles," CASIS continued further discussions with leading pharmaceutical and technology companies, including Eli Lilly, Merck, Xerox PARC, IBM, and Qualcomm. CASIS anticipates some of these potential projects to come together under the "Good Health" campaign, which has received Board approval as a major initiative going forward. CASIS also secured a financial donation from the Massachusetts Life Science Center for $550K, which will help support flight projects and STEM programs. In addition, CASIS solidified a new partnership with the Houston Angel Network, another demonstration of the ability of CASIS to engage the investment community in ISS National Lab commercial opportunities. Finally, the launch and berthing of SpaceX-4 in September represented a major step forward in the delivery of first-class science, commercial opportunities, and new hardware to the ISS.

In regard to strategic goal two, to "utilize the ISS for developing new capabilities," Q4 represented a number of significant wins for CASIS and the ISS community. SpaceX-4 delivered new capabilities to the ISS, including the Bone Densitometer (TechShot) and an innovative 3D printer (Made in Space)—capabilities that will attract new users as well as expand possibilities for the existing user community. Looking toward the future, CASIS awarded funding for support of several new technologies that will also increase ISS National Lab capabilities. For example, the Terrestrial Return Vehicle from Intuitive Machines will address the need for priority small payload return, and a project awarded to JAMSS America will demonstrate the benefits of using the ISS National Lab as a reliable and maintainable platform to assist in maritime tracking. Further examples of projects supporting new ISS capabilities are included in the full Q4 FY2014 report. Lastly, in July, CASIS announced a collaboration with the United Nations Institute for Training and Research (UNITAR) that will seek to enable utilization of multiple next-generation imaging sensors onboard the ISS. This agreement is part of the campaign "Good Earth," which received Board approval to be a major area of focus over the next five years.

CASIS also made progress on its third strategic goal; outreach—"to promote the value of the ISS National Lab to the nation and establish the ISS as the leading laboratory and environment

for STEM education." Through collaborative partnerships with organizations including the United Nations, Texas Emerging Technology Fund, National Geographic Learning, and National Geographic Society, CASIS was able to generate media coverage of ISS research efforts. The SpaceX-4 flight also provided premium opportunities to promote research to key communities. CASIS developed and rolled out a series of videos that achieved broad exposure and educated audiences on the evolving capabilities onboard ISS. In addition, CASIS continued to partner with NASA on the Destination Station program and leveraged this opportunity for both awareness and business development efforts. Finally, CASIS-sponsored education programs, including Ants in Space and Zero Robotics, helped reach thousands of students during Q4 and engage them in what is possible on the ISS.

Board of Directors

Quarterly Summary of Activities:

The Chairman of the Board invested significant effort with the CASIS team in helping to formulate the business model of campaign Good Earth, including in-person meetings at NASA HQ, Teledyne Brown, the Swedish Roundtable and many others.

Members of the Science and Technology Committee met with representatives from Baylor College of Medicine to discuss their -omics grant from CASIS and incorporating this work into campaign Good Health. They are planning an in-person meeting for January 6, 2015.

The Chair of the Education and Outreach committee worked with the CASIS team to plan an in-person meeting to establish a committee of external members and a workshop to be held in Florida on January 8-9, 2015.

The Board approved the FY2015 CASIS operating budget, which was submitted to NASA on September 15, 2014.

The full Board met for a working retreat in Seattle, WA on Sunday, September 21, 2014. Retreat topics included: Key Elements and History of CASIS, Project Good Earth, CASIS/ISS National Lab R&D Portfolio: Status and Objectives, CASIS Business Model, Workable Model for Longitudinal Study, Longitudinal Study in Astronauts Operational Plan, and Deep Space Hard Radiation Protection.

Following the working retreat, the full Board conducted its quarterly meeting in Seattle, WA on Monday, September 22, 2014. CASIS management presented updates in the areas of Operations, Finance, Human Resources, and Portfolio Management. CASIS Bylaws were modified and approved to reflect a new Board size, revised committees, and a schedule for Board service rotation. Proposed changes to the Cooperative Agreement were approved, with acknowledgement that further work was required in the area of resource generation, Intellectual Property, and Data Rights. The charters for the Audit and Governance Committees were presented and approved. A resolution by the Board was adopted to commit significant effort and resources over the next five years to campaign Good Earth. Additionally, Good Health was identified as a campaign for future strategic thought and resources.

FY2014 Q4
Quarterly Report for the Period July 1st – September 30th, 2014
Center for the Advancement of Science in Space

Section II: DEPARTMENT REPORT

Business Development (BD)

Ecosystem Development: As in previous quarters, BD continued its focus on priority ecosystems and development of relationships with important multipliers in attempt to create pipelines of new and nontraditional spaceflight projects.

Boston:

- The 2014 MassChallenge program progressed considerably during Q4. CASIS and Boeing, as cosponsors of a $600K flight prize, narrowed the field of 128 finalists to 17 invitees for in-person pitch sessions, which resulted in selection of 7 semi-finalists. CASIS worked with these finalists to prepare final proposals, which were submitted for review.
- CASIS secured a donation from the Massachusetts Life Science Center (MLSC) for $550K for flight projects and STEM programs.

Houston:

- Further penetrated the energy sector by participating in the Rice Alliance Energy and Clean Technology Venture Forum, which generated four active projects.

San Diego:

- Continued to use multipliers to penetrate key accounts, progressing interest in super-computing from Silicon Graphics, Inc. and Intel Silicon Photonics Research.

San Francisco:

- Leveraging the Science and Technology Collaborative, progressed with brainstorming sessions with Johnson & Johnson (J&J) Innovation and Kaiser Permanente.
- Engaged Silicon Valley Leadership Group to penetrate the information technology market.

Denver:

- Engaged the Industrial Research Institute during a week-long conference in Denver, capitalizing on introductions to top-tier industrial CSO and CTO's. From this work, generated 17 new project leads, all of which are key accounts.

Key Accounts Focus: The Q3 Strategy focused on implementation of the Key Account strategy and this work continued throughout Q4. These key accounts require complex customer management techniques and involve a broad range of CASIS departmental support.

Examples of NEW Key Accounts are:

- Kaiser Permanente
- Merck (Follow-on projects)
- Procter & Gamble (Follow-on projects)
- J&J Innovation
- Nemak
- Dow
- Mars
- John Deere
- Cargill
- Phillips 66
- ADM
- Owens Corning
- Smuckers
- General Electric
- Air Products

- UTC
- Lockheed Martin
- Harris Corporation

Unsolicited Project Management: The result of the cumulative BD unsolicited project activity at the end of Q4 is a total of 34 projects that have been awarded or are in review:

- 21 approved (awarded) projects
- 13 proposals developed in collaboration with BD are in the CASIS review process

BD aggressively worked to promote company contribution and other funding sources to support flight projects. *The total company contribution for the 21 awarded projects was calculated at 87% of the total project cost.* This highlights the value our commercial customers are seeing in using the ISS National Lab as a research and technology delivery platform.

Brand Awareness, Education, and Development of New Flight Opportunities: The Q4 focus was primarily on large commercial company engagement and brainstorming sessions rather than conferences/events. BD organized several major brainstorming sessions that were typically one-or two-day meetings with plenaries and breakouts. CASIS subject matter experts (e.g., Science and Operations personnel) as well as Implementation Partners joined BD in these meetings to educate groups and brainstorm project ideas. These meetings resulted in flight project ideas that were then collaboratively developed into proposals (some project ideas are detailed further in the Science & Technology Portfolio Management department report). Q4 activity is listed below.

- Eli Lilly: 2-day meeting with Lilly scientists, NASA, and Zin Technologies
- Merck: 2-day meeting with three Merck research groups (spanning basic to applied R&D), Zin Technologies, and Bioserve.
- J&J Innovation Center: Brainstorming sessions with many of the start-ups J&J fosters.
- Xerox PARC: Half-day meeting with Xerox Engineers.
- IBM: Discussion with IBM engineers regarding the “internet of everything” strategy vis-à-vis ISS National Lab capability.
- Synthetic Genomics: Sessions with the CSO and his team regarding PCG and cell biology.
- Qualcomm: Full-day session with ~100 engineers, including a plenary overview and three breakout sessions.
- Scripps: Plenary session on drug design and delivery vehicles with 30 researchers .
- National Marine Mammal Foundation: Sessions on aging and osteoporosis—a follow-on to meetings at the BIO conference.

The BD team also supported several important events driving identification of flight targets:

- Industrial Research Institute
- Rice Alliance Energy Forum
- Dream Force

Operations

On-orbit Payload Operations Status Update: With the successful Commercial Resupply launch and berthing of SpaceX-4, the following on-orbit payload operations were initiated:

- CASIS Rodent Research Mission-1/Novartis
- CASIS PCG/HDPCG-2: PI Schall
- Bone Densitometer: TechShot, Inc.

- VA Clinic Drug Metabolism
- Cobra Puma Golf - Dissimilar Materials bonding
- The Broad Institute's Commercial PCG in CrystalCards

All payloads were successfully delivered to the ISS and on-orbit operations were all initiated on a nominal schedule. Results and initial findings will be reported during Q12015

Payload Integration Activities/Updates: The payload development and integration activities associated with payloads scheduled to fly to the ISS during ARK3/Increment 41/42 (September 2014 – March 2015) continue on a nominal schedule to meet the requirements of the projected launch dates. The updated "in work" flight plan for the remaining cargo resupply missions scheduled to occur during ARK3 are as follows:

- SpaceX-5/Dragon: 9 December, 2014*
- SpaceX-6/Dragon: 4 February, 2014*

*Adjustments to these launch schedules are expected, but no formal announcements have been made by NASA or the commercial resupply companies.

New Payload Development Activities Initiated in Q4: The operations department has initiated payload development and integration activities for the following new projects (described in the Science & Technology Portfolio Management department report) awarded and selected during Q4:

- Intuitive Machines/Stephen Altemus: Scheduled to fly during late 2015/early 2015.
- NovaWurks, Inc.: Scheduled to fly early 2016.
- Visidyne, Inc.
- Astrium North America: Scheduled for operations during late 2015/early 2016.
- Morehead State University in conjunction with Honeywell Aerospace: Scheduled to fly on the CASIS External Deployments Mission-1 during mid-2015.
- UCLA School of Medicine/ Dr. Chia Soo: Scheduled to fly on Commercial Rodent Research Mission 5 in mid- to late-2016.
- A-76 Technologies: Scheduled to fly on the CASIS External Deployments Mission-1 during mid-2015.
- JAMSS America, Inc.

Science & Technology Portfolio Management

Project Status Update: A variety of CASIS-sponsored projects have returned from ISS. Status reports from the Principal Investigators show steady progress toward obtaining meaningful data—though no results have yet been published or announced. Projects now in postflight analysis include the following.

- Protein Crystal Growth (PCG) experiments:
    - Merck PCG: Crystallization of a medically relevant monoclonal antibody currently undergoing clinical trials
    - GCF-2a: Crystallization of two proteins relevant to heart disease, hemorrhage, thrombosis, muscular dystrophy, Parkinson's disease, and diabetes
    - GCF-2b: Crystallization of four medically relevant proteins involved in neurodegenerative diseases, squamous cell carcinoma, and prion diseases
- AES-1: Molecular basis of microgravity-induced reductions in antibiotic efficacy
- CARA/Petri Plants: Identification of genes involved in Arabidopsis root morphology/adaptive physiology
- T-cell Activation in Aging (OGA Payload): Analysis of molecular mechanisms underlying

inhibition of immediate early genes in T-cell activation

Preflight experiments in various projects, especially within the suite of CASIS-sponsored stem cell investigations, are also showing preliminary data with promising implications. Moreover, one of the projects within the CASIS agreement with Baylor College of Medicine, The Role of SRC-2 in Maintenance of Circadian Rhythm, has produced initial preflight results that have been published: *Stashi et al., SRC-2 Is an Essential Coactivator for Orchestrating Metabolism and Circadian Rhythm, Cell Reports (2014).* CASIS funding is acknowledged in the publication.

Awarded Projects: Nine projects received as unsolicited proposals were awarded in Q4.

- A project fully funded by Milliken & Company (Spartanburg, SC), Jeff Strahan will evaluate flame retardant and/or resistant (FR) textiles as a mode of personal protection from fire-related hazards. Studying FR behavior of different materials in microgravity will aid in better designs for future FR textiles and benefit those who wear FR protective apparel, such as military personnel and civilian workers in the electrical/energy industries.
- Stephen Altemus of Intuitive Machines (Houston, TX) will test a Terrestrial Return Vehicle (TRV) that addresses the need for priority small payload return from ISS. With approximately 30 liters of downmass capability per return flight, this technology should attract increased utilization of the ISS as an on-orbit laboratory and improve the commercialization of on-orbit experiments for terrestrial benefit.
- Talbot Jaeger from NovaWurks, Inc. (Los Alamitos, CA) has developed a Hyper-Integrated Satellite named HISat that provides complete satellite functionality in a nanosatellite scale package. This project will design and demonstrate a technology for on-orbit assembly and deployment of the HISat system from ISS that should substantially reduce costs associated with satellite system development for space-based R&D.
- Dr. Paul Joss from Visidyne, Inc. (Burlington, MA) will develop new technology that will enable the measurement of maximum wind speeds within mature tropical cyclones from the ISS—a platform technology that will have great interest for coastal regions at high risk for tropical cyclone landfalls.
- Dr. Mark Kinnersley of Astrium North America will use internal ISS facilities to test a net capture system for asteroid or other orbital debris in the 7-10 meter diameter class. Astrium is specifically taking a variant of its proprietary net capture system ROGER (Removal of Geostationary Satellites)—originally intended to provide a commercial service to capture, process, and move end-of-life geostationary satellites—and applying it to asteroid capture.
- Drs. John Samson, Jr. and Benjamin Malphrus from Morehead State University (Morehead, KY) in conjunction with Honeywell Aerospace (Clearwater, FL) will build and test a small, low-power, high-performance Dependable Multiprocessor (DM) Payload Processor on ISS. Such DM Payload processors are applicable to a wide variety of commercial applications including space-based machine-to-machine network communications, global tracking, and remote sensing.
- Dr. Chia Soo from UCLA School of Medicine will test a drug that is both an anabolic and anti-osteoclastic agent (based on a protein, NELL-1) in mice onboard ISS, taking advantage of the accelerated bone loss that occurs in animals during spaceflight. In general, current therapies for osteoporosis patients work in similar ways—by preventing bone loss. Since osteoporosis affects more than 200 million people worldwide, there is a need for innovative treatments—including drugs like these that promote bone formation.
- Lauren Thompson from A-76 Technologies (Houston, TX), the first CASIS awardee from the oil and gas industry, plans to test in the harsh environment of space a line of new corrosion inhibitors and lubricants. The unique challenges of exposure to the space

environment will demonstrate performance under extreme conditions that accelerate material degradation. Metals coated with A-76 products (planned for future use in preventing corrosion in oil and gas lines on Earth) will be exposed to space using the ISS NanoRacks external platform.

- Martin Tschirschwitz of JAMSS America, Inc. (JAI) will demonstrate the benefits of using the ISS National Lab as a reliable and maintainable platform to acquire and rebroadcast extended-range Automatic Identification System (AIS) signals related to maritime tracking. JAI's project, named Global AIS on Space Station (GLASS), is in collaboration with the University of Hawaii, the Greater Houston Port Bureau, Mare Liberum Consulting L.P., and Shine Micro, Inc.

Outreach Initiatives: In support of ongoing and future RFPs, as well as ISS National Lab capabilities in general, PM has participated in various outreach activities and attended several conferences during Q4 (many as part of CASIS BD "Brand Awareness" initiatives).

- In July, CASIS held an on-site meeting with Eli Lilly at the NASA-Glenn Research Center and Zin Technologies (Cleveland, OH). CASIS discussed project experiment designs for two physical science proposals from Eli Lilly related to hard to wet solids and lyophilization for drug formulation. Implementation partners were present to help, and the group visited NASA personnel at GRC to see FIR and CIR hardware (important racks for physical science experimentation). In addition, the group saw and discussed BASS-2 hardware, which is being used for Milliken Vertical Burn Experiment, with Zin Technologies.
- In July, CASIS supported NASA Destination Station events in San Diego/La Jolla, CA and held on-site meetings with senior scientists for future business development at research institutions and Fortune 500 companies including the Scripps Research Institute, the National Marine Mammal Foundation (NMMF), Synthetic Genomes Inc, and QualComm. In total, ~100 attendees from multiple divisions of QualComm attended the CASIS 101 sessions. The CASIS BD Team continues to work with staff from the Scripps Research Institute, Synthetic Genomes Inc., and QualComm to develop potential projects for the ISS National Lab. The NMMF is actively developing an unsolicited proposal in collaboration with several researchers in the area of stem cell research for translational medicine.
- In September, CASIS held an on-site meeting with Merck & Company scientists (approximately 50-75 contacts) in Newark, NJ. CASIS led Merck researchers in a brainstorming session to discuss potential flight projects, giving a physical and life sciences overview as it related to Merck's potential research goals. The meeting generated eight potential project ideas for the ISS National Lab.
- On September 10 and 11, CASIS attended the 12th International Bone Fluid Flow Workshop in Houston, TX and presented to the attendees regarding opportunities on ISS for such research. Among the approximately 100 attendees were experts in the Musculoskeletal Alterations field from throughout the U.S. as well as representatives from NSBRI and ASGSR.
- In September, CASIS was invited to support a Clinical Research Workshop in San Diego, CA sponsored by the US Navy and the National Marine Mammal Foundation. Among the approximately 50 attendees were internationally-recognized experts in translational medicine working on the prevention, detection, and treatment of metabolic and infectious diseases that may serve as disease models for ISS National Lab research.
- On several occasions in Q4, PM accompanied CASIS BD to meetings with potential proposers within the MassChallenge Business Accelerator Competition. During these meetings, CASIS led brainstorming sessions and provided expertise. 17 projects

ideas/white papers were generated from these meetings.

Science and Technology Advisory Panel: During the quarterly meeting of the CASIS Science and Technology Advisory Panel (STAP), panel members discussed draft solicitations:

- Earth Observation to Benefit Energy Technology (RFP)
- Disease Modeling Onboard the ISS (RFI, followed by an RFP informed by RFI responses)

The STAP provided in-depth feedback for revisions to both documents as well as advice for marketing the two solicitations after release.

Discussions regarding topics for future solicitations specifically identified a potential Fluid Mechanics RFP as a promising target. The panel felt that this future RFP should be focused on specific applications (e.g., bioengineering) as opposed to general fluid dynamics. Further discussion on future solicitation topics will continue in the next STAP meeting.

A segment of the STAP meeting this quarter focused on educating the panel members about current science communications efforts within CASIS—and soliciting their feedback to inform CASIS go-forward strategies. The STAP provided extensive feedback/suggestions regarding web resources, digital media, advertising of opportunities, and market research approaches. They also provided feedback regarding perceived roadblocks to scientific interest in CASIS.

Non-traditional Collaborations for Research Advancement: In Q4, two collaborations were announced as part of the CASIS research campaign Good Earth—an initiative to broaden and strengthen the use of ISS as a platform for Earth observation, with the ultimate goal of supporting a breadth of projects that have the potential for truly impactful results for humanity.

- In July, CASIS announced a collaboration with the United Nations Institute for Training and Research (UNITAR). The collaboration will seek to initially enable use and improvement of high-resolution, multi-band hyperspectral imaging onboard ISS. Such imaging can support a variety of applications, including water and forest management, humanitarian relief, recovery after disaster, disaster risk reduction, disaster prevention, and in-country planning and development. From this collaboration, CASIS and UNITAR will allow portions of the data stream to be made available to academic institutions, the United Nations, other government agencies, and not-for-profit organizations to develop new hyperspectral applications. CASIS will coordinate efforts to potentially design, launch, and operate new hyperspectral sensors onboard the ISS as well as promote use of existing and COTS hardware/facilities, soliciting innovative proposals from both the academic/not-for-profit sectors as well as the commercial market. UNOSAT will serve as the lead capacity development and applications and training entity for imaging systems, working in close collaboration with implementation partners and beneficiaries.
- In September, CASIS announced a partnership with the National Geographic Society to utilize Earth observation data produced onboard the ISS as part of the collaboration with UNOSAT. Based on discussions with potential customers including National Geographic, CASIS may expand the use of Good Earth imaging to include multiple next-generation sensors, such as hyperspectral, light detection and radar, synthetic aperture radar, and high-resolution panchromatic. Ultimately, these enhanced capabilities will utilize data-fusion techniques to improve the value of any image obtained on the ISS. The primary intent of these imagers will be to utilize the unique vantage point of the ISS for prototype technology development and advanced technology imagery for images relative to humanitarian relief, disaster recovery and prevention, and in-country planning and

development as well as other commercial applications.

Marketing & Communications

The Marketing and Communications department (MarComm) continued in its effort to support other CASIS departments through outreach and promotion of recent successes. MarComm worked with outside partnering organizations to develop a series of press announcements highlighting research opportunities onboard the ISS National Lab. Through collaborative partnerships with organizations like the United Nations, Texas Emerging Technology Fund, and National Geographic Learning/National Geographic Society, MarComm hit a variety of worldwide reporters on ISS research endeavors. In coordination with the Boston Red Sox Foundation, CASIS promoted STEM awareness and funds dedicated toward a potential baseball/space STEM camp in 2015. Additionally, CASIS leveraged this partnership into a media opportunity wherein Executive Director Gregory H. Johnson traveled to Fenway Park to commemorate the Apollo 11 moon landing in front of 37,000 fans, including multiple television and radio interviews.

In Q4, SpaceX-4 took flight to the ISS, and with it came an abundance of opportunities to promote the research onboard the Dragon capsule. CASIS developed a series of videos intent on educating the research community and the public on CASIS-sponsored initiatives; highlighting the very non-traditional research partner COBRA PUMA Golf USA as well as the CASIS hardware partner, TechShot, who developed the first rodent bone densitometer to reside on ISS. Additionally, CASIS developed its most successful video to date (from a viewership perspective) when it partnered with Made In Space and NASA Marshall to develop content dedicated toward 3D printing in space. Lastly, CASIS and NASA HQ came to an agreement that due to the large volume of CASIS-sponsored investigations on SpaceX-4, it would be appropriate for the organization to have its own hour long science briefing on L-2.

MarComm also continued its heavy emphasis on social media during Q4 and passed a significant milestone of over 50,000 twitter followers. To signify this historic moment, CASIS developed a series of giveaways to say “thank you” and also increase additional followers and viewers. To coincide with social media, MarComm presence was instrumental at events including Destination San Diego and on Capitol Hill to promote ISS awareness. In July, MarComm joined with NASA PAO center counterparts at the ISS Campaign Communication Summit in Houston. CASIS viewed the latter as instrumental in the continued evolution and development of CASIS and its role in utilizing the ISS; CASIS sat alongside PAO counterparts to ensure that both the ISS National Lab message and NASA message are streamlined to cultivate a vast viewership who understands that the ISS is a platform for not only exploration-related research but also research capable of benefitting life on Earth.

Education

Project/Program Activities

- *NDC Pilot Project in Houston:* Six educators and 220 students completed their experiments planned for flight to the ISS on the ISS Commercial Resupply Services Mission Orb-3.
- *NDC Pilot Project in Denver:* Three educators are working with their students on experiment design and prototype development.105 students from 3 schools are participating in the program (56 8th-grade and 49 high-school students). In September, CASIS made school visits for a preliminary design review of their experiment prototypes.
- *CASIS Academy Live*: CASIS Academy Live dates have been scheduled for the spring

semester of 2015. They are Jan 16, Feb 23, Apr 24; Mar and June (TBD). The Jan 16 CAL event will showcase Earth Observation, and PI Dan Barstow will give a presentation to middle school students.

- *SSEP (Student Spaceflight Experiments Program):* CASIS presented on ISS research to approximately 400 students and parents who attended the SSEP National Conference in Washington DC on July 2/3. Students who participate in the program presented on their experiment designs, and those teams that flew experiments reported preliminary results.
- *Zero Robotics:* There were 550 students and 110 teachers representing the Florida teams participated in the Zero Robotics Field Day at KSC on July 15.
- *BioServe CSI-06 – Ants in Space:* A total of 8,814 students have participated in Ants in Space as of September 2014. There are 32 participating states including: AL, AZ, CA, CO, FL, GA, IA, ID, IL, IN, LA, MA, MD, MO, MS, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, SD, TN, TX, VA, VT, WA, WI.
- *Story Time From Space:* Fundraising activities are under development for Phase 2 of STFS. Phase 2 includes sending a kit of demonstration items to the ISS to complement the science content in the five books that have returned from the ISS. CASIS submitted a letter of inquiry to the Morgridge Foundation. The video for the STFS IndieGoGo campaign is being completed. T2 has been asked to provide a proposal for Phase 3 that would include project developments to date and the next books that will be sent to ISS. T2 has been in discussions with Random House, Dr. Seuss Enterprises, and Reading Rainbow.
- *NASA HUNCH:* CASIS is sponsoring the Extreme Science Experiment titled *Omega Hydrofuge Plant Growth Chamber* that was awarded for research on the ISS. The experiment is designed to be an efficient method of growing plants in a microgravity environment within the parameters of a 10cm x 10cm x 15cm NanoLab using a combination of hydroponics with a centrifuge spin. Total cost is $30,000.
- *Space Station Academy:* A total of 25 students and 25 educators participated in the 4-week-long prototype version of the Space Station Academy in July.

Outreach Activities

- *CASIS Fellows:* Kaci Heins presented on the ISS and the SSEP experiment her class is sending the ISS to 200 people at the Air Force Association Air and Space Conference on September 14th. Leah LaCrosse conducted three technology training sessions in Los Angeles, Detroit, and Lavonia, OH for 100 educators that included the ISS and CASIS.
- CASIS Staff conducted an interactive Skype session about the ISS and space research for 100 K-8 students at Camp Challenger put on by the Challenger Learning Center in Tallahassee, FL.
- *Frontiers of Flight Museum in Dallas, Moon Day*: 250 bookmarks for attendee goodie bags.

Metrics (as of September 2, 2014):

- CASIS Academy website
  - CASIS Academy: Total Page views: 7,679; Average Monthly: 2,559
  - Educator's Page: 811 Total Views; Average Monthly: 270
- CASIS Website Educator's page
  - Total page views: 10,164 (Server Logs) - This includes our "Ants" page and teachers guide page
  - Registered users: 207
  - Total downloads from users: 207
  - Estimated student participation: 8,814

- Number of participating states: 32
- Participating Countries: Australia, Canada, Germany, Greece, Indonesia, Iran, Mexico, Philippines, Romania, Spain, United Kingdom, United States

- Video plays of ant clips: 794
- Ants in Space Work Hard to Move in Microgravity: 13,751 views
- Space Station Live: Science Aboard Cygnus: 5,147

Fundraising & Development

Fund Development

- Working with the executive director and the Chair of the CASIS Board, we initiated a formal solicitation of our CASIS Board members for philanthropic support of the organization. Demonstrating support from our Board members is critical to increasing our opportunities to secure foundation and other philanthropic gifts. This campaign continues into Q1 2015; to date, 45% of CASIS Board members have made commitments.
- Working with the Baylor College of Medicine -omics Collaborative (five-year project partially funded through a matching grant with CASIS), we helped secure two gifts to the BCM consortium supporting ISS-based -omics research:
  - From the Institute for Collaboration in Health and Morris Gelb, a $25,000 gift to support continued focus on an -omics/autism research project. *Confirmed.*
  - From Mrs. Philip Carroll, a 10-year, $750K commitment for a unique term faculty professorship in translational medicine. During the next five years, the Philip Carroll Professorship in Translational Medicine will be held by a faculty member in the Department of Molecular and Cellular Biology, and will support -omics research efforts on the ISS. This is the first instance of a named professorship in a U.S. academic medical institution being dedicated to ISS life sciences research. CASIS was instrumental in partnering with BCM to secure this commitment. *Confirmed, but BCM holding announcement until December 2014.*
- A funding partnership with the Houston Angel Network (HAN), under discussion in Q3, was formalized and implemented in Q4. This partnership will allow CASIS to present commercial companies using the ISS to a wide network of angel investors for possible financial support. Together with a similar arrangement with Space Angels Network (another angel fund network), CASIS now has funding partnerships with six separate organizations, constituting the core of a growing marketplace of potential investor and venture philanthropy funders that CASIS commercial startups can access. These are listed below. Our focus in Q1 2015 will now turn to better integrating CASIS BD, PM, and MarComm teams into these relationships.
  - Houston Angel Network
  - Space Angels Network
  - Angelus Funding
  - The Denver Foundation (potential venture philanthropy)
  - Greater Houston Community Foundation (potential venture philanthropy)
  - Texas Emerging Technology Fund
- Working with PM, the CASIS development group began planning for a series of grant proposal submissions to support a program of RFPs in life science/disease model research on ISS. In conjunction with a recently issued RFI on animal models and cell-based models for human disease investigations, a proposal letter of inquiry was developed soliciting support for funding a full RFP in ALS research. This proposal was submitted to the ALS Association, which is currently working to make approximately $90 million worth of

research grants over the next year. CASIS is requesting $2 million to fund an ALS RFP. The same proposal will be used during Q1 2015 with a number of other foundations that support ALS and neurodegenerative disease research.

Total confirmed, finalized funding commitments (cash and pledges direct to CASIS; institutional and matching funds and pledges supporting CASIS projects and grants; in-kind commitments) generated by CASIS efforts in support of CASIS-sponsored projects to date (FY2013 through Q4 FY2014) stands at $10,228,558.

Partnerships:
One new partnership was formalized in Q4, with the Houston Angel Network. Several others are in discussion and should be formalized by the end of Q1 or Q2 2015. Total number of formal partnerships now stands at 37.

Section III: BUSINESS STATUS REPORT
September 30th, 2014 (Unaudited)

	Actuals Q3 2014	Budget Q3 2014	Variance	Actual YTD 2014	Budget YTD 2014	Variance YTD 2014
Direct Labor	$1,353,628	$1,573,800	($220,172)	$4,930,929	$5,966,656	($1,035,727)
Grants to be Awarded	$4,079,217	$1,506,100	$2,573,117	$5,859,314	$5,660,349	$198,965
Equipment: Permanent > $5k	$12,565	$22,500	($9,935)	$78,189	$205,000	($126,811)
Equipment: Expendable & Supplies	$36,294	$94,210	($57,916)	$166,520	$230,145	($63,625)
Other Direct Costs	$449,059	$342,067	$106,992	$1,390,142	$1,536,729	($146,587)
Subcontract Costs	($112,803)*	$898,513	($1,011,316)	$1,941,554	$3,571,486	($1,629,932)
Travel	$287,079	$245,438	$41,641	$906,987	$994,230	($87,243)

*Reclassification of Mission Related Subcontract costs to Grants category.

FY2014 Q4
Quarterly Report for the Period July 1st – September 30th, 2014
Center for the Advancement of Science in Space

Section IV: Performance Metrics			
Metrics	**Science**	**Technology**	**Education & Outreach**
Business & Portfolio Development			
Grants issued per research pathway	0	0	1
Proposals from grants meeting evaluation criteria	0	0	3
Unsolicited proposals[1]	8	3	4
All proposals from multi-disciplinary team[2]	2 of 11; 18%		
Solicited grants awarded[3]	0	0	0
Unsolicited awards[3]	3	6	1
Operations			
Flight projects total	5	7	0
Percent of flight projects from grants	100%	100%	0%
Percent of flight projects from non-grants[4]	0%	0%	0%
Financial Performance	**Grants**	**Direct**	**Indirect**
Cooperative Agreement Funding YTD	$5,859,314	$6,051,714	$3,538,639

1 Proposals meeting evaluation criteria
2 Combined metric for grants and unsolicited proposals
3 Indicates number of awards
4 Manifested projects from unsolicited proposals or OGA's when indicated