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Quarterly Report for the Period April 1st – June 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:	**19 August 2014**
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Section I: GENERAL STATUS REPORT

Fiscal year 2014 continued to show maturation of the organization and successful implementation of established strategic goals through the third quarter. At our current pace, CASIS is on track to provide a greater number of ISS research opportunities, increased seed funding for ISS utilization, and growth of our brand compared to last year.

This quarter CASIS launched payloads from our first RFP issued in 2012. Six CASIS sponsored protein crystallization experiments were delivered to ISS and three returned. Preliminary analysis is promising; these projects demonstrate a proposal-to-return process in under 2 years: far shorter than cycles of the past.

CASIS continued its focus on demonstrating ISS value in biomedical research with the initiation of partnership discussions among new foundations, NASA researchers and outside experts never before convened or initiated. The Cystic Fibrosis Foundation and the Flutie Foundation for Autism Awareness are examples of targets CASIS pursued in this quarter. Further, CASIS engaged its Board of Director's expertise in biomedical research to advance overall health and wellness of all humans on Earth. In conjunction with NASA's focused research on mitigating risk factors among the select astronaut population, CASIS board members engaged to discuss how partnered research could provide find synergy in both research aims.

CASIS also continued to diversify its efforts to attract commercial utilization of the ISS for research and technology development. In this quarter alone, CASIS successfully made entrée with over a dozen Fortune 500 businesses identified as key accounts for capturing their interests in ISS utilization. This business development focus has led to new opportunities in areas never before exploited, such as the textile and oil & gas industries.

CASIS made tremendous strides in its strategic partnership and fundraising efforts. For example, in this quarter alone CASIS partnered with the $100M Texas Emerging Technology Fund to leverage financial resources against vetted flight research projects. Similarly, CASIS partnered with the Houston Angel Network as a strategy to put science and technology research opportunities in front of investors with interests in supporting emerging business opportunities.

Finally, Project Good Earth, an exciting EO initiative, forges new ground in a partnership with the United Nation's entity responsible for space applications that directly benefit humanitarian needs. Through this partnership, CASIS will create opportunities for U.S. and other interests to design, build and manage a suite of remote sensing technologies that will support U.N. interests in humanitarian support without government funding.

Board of Directors

Quarterly Summary of Activities:
The open Chair position was filled, post unanimous vote, by General Abe Abrahamson. General Abrahamson accepted the nomination and assumed chairmanship at the quarterly board meeting in June.

The board reviewed and revised its committee structure combining the Development Committee with the Strategy and Budget Committee. The Board also added an Education & Outreach Advisory Committee that will be chaired by Dr. Ioannis Miaoulis. This new committee will be filled by outside advisors. Dr. Miaoulis will report recommendations from the advisory committee to the full Board for discussions and action.

The Board science and technology committee hosted a space research symposium at Columbia University in this quarter. Several renowned experts in various fields representing biomedical research; and assembled from academia, NASA, and other institutions joined to present and openly discuss opportunities for utilizing the ISS NL as a platform for discovering new and novel approaches to healthcare and human well-being. The symposium focused primarily on the notion of conducting a longitudinal health study, incorporating the unique cohort of Astronauts and their exposure to microgravity along with an established ground-based large population of human subjects. The study would utilize "omics"-based analysis to determine markers and predictors of health or disease that may inform an overall individual picture of human health. The board will continue to work with its NASA HRP and SLPS colleagues to further define the study and science design.

The full board conducted its quarterly meeting in Chicago just prior to the annual ISS R&D conference. The board received several NASA senior managers and conducted tactical discussions re: cooperative agreement language, operational interfaces, partnering opportunities and other synergistic activities in promotion of the ISS NL.

Section II: DEPARTMENT REPORT

Business Development

Quarterly Summary of Activities:
Ecosystem Development: Business Development continued its focused efforts on working the established ecosystems and development of relationships with important multipliers in attempt to create pipelines of new and non-traditional space flight projects:

- **Boston:** The 2014 Mass Challenge program was launched and during Q3, BD focused on overview presentations and one on one meetings with their 128 finalist companies.

As a result of these meetings, BD is aiming to develop at least 15 viable projects that will be reviewed (and a smaller subset awarded) during Q4. Additionally, BD continued its relationships with CIC, Mass Bio Council, Mass Life Science Center, Lab Central, Innovation District Hall, MIT and other key multipliers. Many of these will be pivotal partners for the 2015 annual R&D conference.

- **Houston:** CASIS participated in the Rice Business Plan Competition, supporting judging efforts and ultimately seeking awardees for flight research. An oil and gas start up company was selected and is currently going through the review process. Additionally, CASIS further developed its relationship with the Houston Technology Center, the Greater Houston Partnership, the Rice Space Institute, and BIO Houston. CASIS also worked closely with NASA JSC on joint Business Development presentations and initiatives.
- **San Diego:** CASIS made great progress in penetrating the southern Californian market. A relationship with CONNECT resulted in 3 major industry presentations. Additionally, CASIS partnered with NASA to support a Destination Station event that targeted key accounts such as Qualcomm and Synthetic Genomics.
- **San Francisco:** CASIS initiated several opportunities to present its value proposition as part of the Space Angels network and as a result, generated 3 new user flight projects. CASIS also penetrated multiple key accounts and supported one on one brainstorming days.
- **Denver:** As part of NSS, CASIS BD developed multiple stakeholder relationships: (Space Foundation, Metro Denver Economic Agency, Governor's council on Space and Development) and also kicked off the technology demonstration / Aerospace strategy. Multiple relationships with key aerospace accounts were created and now being worked as key accounts.

Key Account Focus: As part of the continued effort established by the Key Account strategy formation, BD began execution and generation of a significant numbers of key accounts. These key accounts require complex customer management techniques and involve a broad range of CASIS departmental support. Current Key Accounts being addressed are:

- Eli Lilly
- Milliken
- Qualcomm
- Synthetic Genomics
- Scripps
- Honeywell
- IBM
- Dow Agro
- Atrium NA
- Intel Photonics
- Xerox
- UTC
- Kaiser Permanente

Unsolicited Project Management: The primary focus of the BD team is to identify, cultivate and manage projects outside of the targeted grants issued each quarter. This involves identifying targets, working on concept definition, formalizing this definition in a one page project

overview, presenting this concept at the internal CASIS Deals meeting, incorporating feedback into a formal proposal and interfacing with science and ops colleagues in support of a final proposal submission. The result of this activity for Q3 is 37 projects at various stages of approval:

- 3 Approved Projects
- 8 Projects in Review (Science, Ops, or Economic)
- 9 additional key accounts in Review
- 7 Projects have passed first gate and now in process of formalizing proposal

10 projects being converted to project overviews

Operations

Quarterly Summary of Activities:

SpaceX-3 Commercial Resupply Mission: The SpaceX-3 Commercial Resupply Mission was launched on April 18 and the Dragon capsule was berthed to the ISS on April 20. All CASIS sponsored and funded payloads which were manifested on this vehicle were successfully and safely delivered to the ISS to initiate on-orbit operations, with the first payloads being activated on April 21st. The CASIS sponsored and funded payloads manifested on this mission were:

- "Crystallization of Medically Relevant Proteins using Microgravity", PI Dr. Sergey Korolev
- "Exploiting On-Orbit Crystal Properties for Structural Studies of Medically and Economically Important Targets", PI Dr. Edward Snell
- "IPPase Crystal Growth in Microgravity", PI Dr. Joseph Ng
- "CARA-Petri Plants", PI Dr. Anna-Lisa Paul and Dr. Robert Ferl
- "Crystallization of Huntington Exon-1 Using Microgravity", PI Dr. Pamela Bjorkman
- "Crystallization of Human Membrane Proteins in Microgravity", PI Dr. Stephen Aller
- "Merck Monoclonal Antibodies", PI Paul Reichert

The CASIS Operations and Portfolio Management departments are now in receipt of 30 Day Post-flight Initial Findings Reports from Drs. Korolev, Snell, Ng, Ferl, and Reichert. Although all of the components of flight hardware, mission operations, and payload logistics were implemented successfully, we did experience some loss in science on the payloads flown by Korolev and Snell as a result of the three launch scrubs with SpaceX-3. As a result of the unplanned flight delays, several investigators realized additional costs to their research plans. The following is the cost impact data that we have collected from the CASIS funded PIs who's research flew on SpX-3:

1. Requested re-flights, 2 PIs effected: $188,000
2. Additional travel required, 6 PIs effected: $36,000
3. Extension of project time due to launch slips, 2 PIs effected: $64,000
4. Cost of additional samples, materials, 4 PIs effected: $24,000
5. Additional labor costs, 6 PIs effected: $11,000

Estimated total costs due to SpX-3 "launch delays": $323,000.00

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CASIS is working with its sponsored investigators, payload developers, NASA, and other members of the organization to development mitigation strategies that can be deployed in the future in order to minimize science loss and cost increases due to the logistics of space transportation.

Payload Integration Activities/Updates: The payload development and integration activities associated with payloads scheduled to fly to the ISS during the remainder of ARK-2/Increment 39/40 (March 2014 – Sept. 2014) 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 ARK-2 and ARK-3 (Sept. 2014 – March 2015) as follows:

- Orbital-2/Cygnus: 12 July 2014
- SpaceX-4/Dragon: 12 September 2014
- Orbital-3/Cygnus: 21 October 2014
- SpaceX-5/Dragon: 1 December 2014
- SpaceX-6/Dragon: 4 February 2014

Payload Integration Process Improvement*:* During Q3 the CASIS ops team planned and conducted the first CASIS Payload Developer's TIM (Technical Interchange Meeting), which was hosted at the University of Colorado-Boulder from May 27 – 30. Participants in the TIM were payload developers, implementation partners, and representatives from the NASA ISS Research Integration Management team. The objective of the TIM was to gather experienced payload developers in one place to discuss ways to improve the efficiency of payload planning, safety, integration and operations processes. As a group, we focused on three main areas of improvement:

1. In the near term, what changes can be implemented to the current processes to bring about improvement? Are there any quick or simple improvements that could be made right away?
2. In the longer term, what are the significant changes or "complete overhauls" that could be implemented to improve the processes for new and existing users?
3. From a payload developer or ISS user perspective, what should the payload processes "look like" and how can this be achieved?

The TIM produced information that was important to all three of our objectives, with several short term solutions that are already being implemented in the NASA payload integration process. In addition, the longer term recommendations for process improvement are currently undergoing further development and refinement and will be presented to NASA ISS management. The payload developers that participated in the TIM are already reporting some improvements.

New Payload Development Activities Initiated in Q3: The operations department has initiated payload development and integration activities for the following new projects awarded and selected during Q2:

- Dr. Daniel Batcheldor, Florida Institute of Technology, 90 days of exposure on the NanoRacks External Platform
- Dr. William Farrand, Space Science Institute, will utilize Hyperspectral Imager for the Coastal Ocean (HICO) installed on the ISS

- Dr. Karl Fred Huemmrich, University of Maryland, Baltimore County, will utilize Hyperspectral Imager for the Coastal Ocean (HICO) installed on the ISS
- Dr. Robert Shuchman, Michigan Technological University and Dr. Richard Becker from the University of Toledo, will utilize Hyperspectral Imager for the Coastal Ocean (HICO) installed on the ISS
- Dr. David Klaus, University of Colorado will perform analysis of samples recently returned on SpaceX Dragon (from an existing ISS National Lab payload)
- Drs. Alessandro Grattoni and Maura Ferrari, Houston Methodist Research Institute will begin a three-phase project for translation of their current National Lab payload/results into clinical application
- Dr. Glauco Souza from Nano3D Biosciences, Inc., will transition currently commercialized cell levitation technology into flight-certified hardware

Science & Technology Portfolio Management

Quarterly Summary of Activities:
Research Solicitations:
Remote Sensing RFP – awarded
Ongoing from last quarter, the Portfolio Management (PM) team continued the review of proposals submitted in response to CASIS Request for Proposals (RFP) "Remote Sensing From the International Space Station " (released January 13, 2014). On June 17, 2014, CASIS announced the following grant awardees:

- Dr. Daniel Batcheldor from the Florida Institute of Technology seeks to advance the development of a new type of charge injection device sensor for Earth and space imaging that will improve upon existing charge-coupled device technology. Testing will include monitoring how the space environment affects several aspects of the sensor's function over a period of 90 days of exposure on the NanoRacks External Platform. Future commercial use of this sensor could serve a range of purposes from Earth observation enterprises to astronomy initiatives, including environmental monitoring and defense interests.
- Dr. William Farrand of the Space Science Institute will evaluate whether the Hyperspectral Imager for the Coastal Ocean (HICO) installed on the ISS is an effective instrument for characterizing and mapping minerals associated with playas. Results of such studies could help mitigate public health issues stemming from dust storm impacts, enhance agricultural efforts to counter soil salinity problems, and improve use of playas for vehicular transport.
- Dr. Karl Fred Huemmrich from the University of Maryland, Baltimore County, will use HICO to monitor behavior (carbon fluxes and efficiency of light use) of terrestrial vegetation under varying environmental conditions. Results should improve understanding of ecosystem responses to environmental stress; for example, in the context of agriculture and forestry.
- Dr. Robert Shuchman of Michigan Technological University and Dr. Richard Becker from the University of Toledo will collaborate on a project using HICO data to develop algorithms for monitoring water quality and algal species in the Great Lakes—with Becker to focus specifically on Lake Erie. These results may influence the assessment

of the Great Lakes ecosystem and drinking/recreational water sources and also aid in determining the extent of algal blooms in this region that pose health risks.

Enabling Technologies RFP – in review
Ongoing from last quarter, the PM team is currently conducting the review of proposals submitted in response to CASIS Request for Proposals (RFP) "Enabling Technology To Support Science in Space For Life On Earth" (Released February 26, 2014). This RFP is the first released since CASIS implemented our new two-step proposal submission process (described in the FY14Q2 report). On May 2, 2014, CASIS invited 18 of 37 proposers to submit a step-2 proposal. Of those, 12 submitted full proposals to CASIS—5 from academic institutions and 7 from commercial entities. We anticipate award announcements for this solicitation in October 2014.

Materials Science RFP – released
On April 28, 2014, CASIS released an RFP titled "Materials Science in Space," seeking flight research investigations to develop new or to improve existing materials that will have direct terrestrial benefit. Specific target areas include microstructure study, crystallization, and other phase transitions. Both internal and external hardware platforms will be made available for use to further understand the synthesis and properties of new and existing materials. CASIS received 20 Step-1 proposals, and of those, 11 were invited to submit Step-2 proposals, which are due in August 2014. We anticipate award announcements for this solicitation in November 2014.

Awarded Projects (press releases pending):
Three projects received through our unsolicited proposal process were awarded in Q3.

- Dr. David Klaus from the University of Colorado will perform analysis of samples recently returned on SpaceX Dragon (from an existing ISS National Lab payload)—examining the molecular basis of microgravity-induced reductions in antibiotic efficacy.
- Drs. Alessandro Grattoni and Maura Ferrari from Houston Methodist Research Institute will begin a three-phase project for translation of their current National Lab payload/results into clinical application—using the microfluidics data to develop a remotely controlled drug delivery implant device for variable term, tunable delivery of bioactive molecules.
- Dr. Glauco Souza from Nano3D Biosciences, Inc., will transition currently commercialized cell levitation technology into flight-certified hardware—optimizing the magnetic levitation cell culture system for spaceflight and producing a users manual to support such experiments.

Science and Technology Advisory Panel:
During the quarterly meeting of the CASIS Science and Technology Advisory Panel (STAP), panel members discussed the top RFP topic areas ranked in the Q2 meeting—namely, Disease Models, Energy, and Biophysics. There was unanimous agreement that the next RFP should be energy themed. The solicitation and support of energy-related research on ISS can take many forms, focusing on topics such as energy capture, generation, storage, sustainability, or efficiency. These investigations may be fundamental in nature or applied technology development. Such research on ISS can be loosely separated into two categories:

- Energy applications involving remote sensing:

- Location planning for solar farms and wind farms
- Weather conditions such as wind, haze, and clouds
- Microclimates
- Water resources such as reservoir depletion and snow pack melting
- Industrial infrastructure
- Radar
- Ground sensing – gravity probes can be used to measure density to detect underground water and structures

- Energy areas/applications involving fundamental physics:
  - Cubesat-sized energy generation and storage
  - Combustion, reactions within flames, flame flows, fuel properties, and engines
  - Phase change and heat transfer
  - Condensation of steam for more efficient steam power generation
  - Surface boiling, surface studies, and thermodynamics
  - Refrigerants
  - High efficiency turbines

The panel felt that if these two categories were to be relapsed as separate RFPs, the former category (applications involving remote sensing) should be released first.

"Disease Models" is still the number one recommendation of the panel for the next life sciences RFP, to be released after the Energy RFP. The panel has advised that CASIS focus on modeling one or more chronic human diseases/conditions for which the onset/severity of the disease state is potentially accelerated in microgravity:

- Neurodegenerative diseases
- Musculoskeletal diseases
- Wound healing/tissue regeneration
- Immunosuppression
- Aging

There are two likely possibilities for how the RFP will be framed: A solicitation for research into a specific condition, using any model organism; or a solicitation for research using a specific model organism to model a chronic disease (no stated boundary on which disease can be modeled). To inform decisions about framing, CASIS will issue a series of RFIs in the Fall 2014 timeframe exploring availability of rodent disease models and interest in use of various other model organisms for the above conditions of interest.

Marketing & Communications

Quarterly Summary of Activities:
Outreach:
In the third quarter, the CASIS Marketing & Communications team conducted a series of outreach and awareness events that reached a range of key audiences including the following:

- On April 1-2, CASIS conducted an introductory meeting at Milliken Corporation, a Fortune 500, multi-billion dollar textile and chemicals company, in Spartanburg, SC. The purpose was to inform Milliken researchers about materials science opportunities aboard the ISS. Six subject matter experts also participated from various NASA

research centers to give presentations on physical science research in microgravity and to lead brainstorming sessions among the Milliken research staff. Several potential project ideas were discussed, and multiple research proposals are currently in development.

- On April 14-15, CASIS attended the NASA materialsLAB workshop in Washington, DC. CASIS presented a brief company overview and a summary of the upcoming Materials Science RFP, which was scheduled for release later in the month. Over 120 government, academic, and commercial people attended the workshop. CASIS also attended the breakout sessions of the workshop, where several ideas were discussed about new research opportunities in materials science using the ISS.
- On, April 22-24, CASIS attended the Annual Materials Research Society Spring Meeting in San Francisco, CA. This meeting was attended by over 5,000 people in the materials community. CASIS interacted with potential researchers in both the academic and commercial sectors to raise awareness about the Materials Science RFP, which was released shortly after the meeting.
- On May 1-2, CASIS conducted Business Development meetings with technical and management representatives of the Eli Lilly & Company and Dow AgroSciences in Indianapolis as part of a NASA Destination Station event (which supports STEM events, astronaut presentations, and networking opportunities to engage the local research community). Investigators from Eli Lilly and Dow AgroSciences are now engaged with CASIS to develop multiple commercially funded research and technology development projects for the ISS National Lab. These flagship commercial accounts have generated six highly innovative potential projects ranging from preclinical testing of drugs in microgravity to combat muscle-wasting diseases and accelerate bone healing to physical sciences experiments related to drug stabilization and delivery systems.
- On May 15-16, , CASIS participated in the 2nd Annual Space, Cancer & Personalized Medicine Conference at the Gibbs Cancer Research Center. This meeting allowed CASIS investigators the opportunity to describe their spaceflight research designs and serve on a Q&A panel to address new user interests.
- On May 28, CASIS's Board of Directors hosted a unique event focused on Biomedical Research aboard the ISS NL. This meeting was attended by several academic experts in their respective field and was also supported by SLPS, NSBRI, and the HRP program. The discussion focused on ways in which data from multi-organism models exposed to microgravity may be utilized in better understanding human health on Earth.
- On June 16-19, CASIS co-hosted the ISS R&D Conference in Chicago, alongside various other CASIS representatives. The ISS R&D Conference serves as the only "one-stop shop" for new and repeat users of the ISS to understand the full capabilities of, and the process of accessing, the ISS. The audience and participants are a mix of space research principal investigators, engineers, facility and hardware managers, NASA Program and Center representatives, and fundamental and commercial researchers considering space-based research for the first time. The panels and technical sessions are aimed at presenting recent results of research and/or upcoming capabilities to host new research. CASIS objectives at the conference included interfacing directly with NASA organizations and centers as well as relationship development and management of researchers.

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- On June 20-21, CASIS attended the second annual SPACE 2014 Conference in Orlando, FL. The meeting was hosted by the Scientific Preparatory Academy for Cosmic Explorers. The conferenced focused on space exploration, space resources, and psychology, sociology, and art as it relates to space exploration and discovery.
- On June 22-26, CASIS attended the 2014 BIO International Convention at the San Diego Convention Center. This year's event boasted a record number of partnering meetings—in which CASIS participated (30-minute sessions throughout the day). Hosted by the Biotechnology Industry Organization (BIO), the event drew 15,667 industry leaders, including nearly 2,500 CEO's, from 50 states and 70 countries. CASIS discussed ISS research opportunities with potential users and investors.
- On June 25-26, CASIS supported the meeting of the geneLAB Steering Committee in Washington, D.C. CASIS presented an overview of the CASIS mission and potential roles in enabling, sharing, and supporting the geneLAB science campaign in development by the NASA Space Life and Physical Sciences office under the Human Exploration and Operations Mission Directorate.

Public Relations:

From a public relations perspective, CASIS continued to generate strong attention in both local and national media outlets. In April, Greg Johnson was featured on a nationally televised Bloomberg TV program to discuss CASIS' mission and the SpaceX April 18 launch. CASIS was also featured prominently in major news publications including the Washington Post, Forbes, and R&D Magazine. In total, CASIS distributed 6 press releases and generated 1,841 media hits. This represents at 243% growth in media reach over the previous quarter. In addition, CASIS collaborated closely on the May NASA media event titled Destination Station: ISS Science Forum. This talk-show style discussion featured CASIS and NASA executives discussing the exciting opportunities and progress onboard the ISS. Lastly, CASIS was featured prominently in three local television news programs during May – June 2014. These included STEM features on Fox News (Colorado) and ABC News (Houston) discussing local area student involvement in the National Design Challenge pilot programs. Local television penetration also included an appearance by Greg Johnson on WGN-TV (Chicago) to promote CASIS, the latest remote sensing awardees and the ISS R&D Conference.

Social Media:

In addition, CASIS continued to expand and mature its social media efforts during Q3 2014. During the quarter, CASIS introduced a revitalized social media marketing plan and led a company-wide internal training program. The social media plan's tenets are based upon expanding the reach of social media programs through new platforms and partnerships, enhancing CASIS' credibility through meaningful/timely content and creating an internal digital-savvy culture. As an indication of early success of CASIS' social media efforts, the ISS National Lab twitter grew to 45,500, adding more than 3,500 followers and continuing the strong growth trend. Overall, the quarter demonstrated positive momentum on many fronts for CASIS marketing and communications efforts.

Education

Quarterly Summary of Activities:

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NDC Pilot Project in Houston: Educators finished final designs and optimization of their experiments that will undergo a system check at NanoRacks in August. Experiment turnover to NanoRacks will be in mid-September, with launch schedule for 10/12/2014 on Orbital-3.

NDC Pilot Project in Denver: A weeklong professional development workshop was held at Wings Over the Rockies Air and Space Museum the week of July 21 -25. Topics included the Engineering Design Process, Prototype Build Procedures, Programming the NESI+ Hardware, and Sensors and Actuators. Educator teams and groups of students participated. Industry mentors attended.

CASIS Academy Live events:

- At KSC on 5/19/2014, a total of 5 educators and 45 8th grade students from Storm Grove Middle School in Indian River County, FL were involved in the first event. Dr. Mike Roberts presented *Microbes in Space*. This program focused on life sciences, specifically microbiology, and the students conducted a DNA extraction lab activity.
- At KSC on 6/19/2014, a total of 6 educators/chaperones and 32, 4-7th grade students from St. Lucie County Adventure Camp were involved with this event. Dr. Jamie Foster presented about Astrobiology. The students also participated in the Thrust Structures activity.
- At KSC on 6/20/14 (including NASA DLN webinar), a total of 8 educators/chaperones and 23, 4-7th grade students from St. Lucie County STEM Golf Camp and other camps were involved with this event. Mike Yagley from COBRA PUMA Golf presented his research about designing better golf clubs by studying material science on the ISS. The students also participated in the Thrust Structures activity. A total of 40 students from 2 summer camps (Jr. Golf camp and Gifford Youth Center in IR County, FL) participated in the NASA DLN webinar with Mike Yagley. There were 22 unique IP connections to the live chat.

USA Science and Engineering Festival: CASIS had a significant presence in the USA Science & Engineering Festival in Washington DC. This event attracted hundreds of thousands of DC-area students and educators and was an unprecedented opportunity for CASIS to showcase many of its supported STEM programs, including the Student Spaceflight Experiments Program, Storytime from Space, CASIS Academy, and CASIS Academy Live. CASIS gave a presentation to 100 students and parents at the CASIS session and CASIS staff interacted with well over 2,000 students at the CASIS interactive booth display.

STEM Outreach Activities:

Greg Johnson visited the following schools in Florida on 4/10/14:

- Lake Wales HS – approx. 800 students – 1 hour (40 min presentation and 20 min Q and A)
- Vanguard Middle and HS – behavior challenged and handicapped kids – 300 students – same 1 hour event as above
- BoK Academy – Rocket Day – 1000 middle school kids, Charter school, 20 min presentation with 15 min Q and A

Greg Johnson visited the following schools in Houston:

- Awty International School on 4/29: Approx. 50 fifth-graders, 150 4th graders, 50 8th graders (200 total)

- Cristo Rey Jesuit on 5/6: 380 students
- Duchesne Academy on 5/9: 50 8th grade students; 200 5th-8th grade students (250 total)

Greg Johnson visited Avalon Middle School in FL on 5/14: two talks, 75 7th graders and 75 6th graders (150 total)

NASA Robotic Mining Competition: KSC student groups on 5/22: 120 4th graders and 15 middle school students; received CASIS Academy flyers and learned about CASIS through a brief overview (135 total)

Future Problem Solving Program International (FPSPI) on 6/14 at Iowa State University: 1,342 students ranging from 4th through the 12th grade attended the presentation, as well as interactions before and after participated. Greg presented on CASIS overview and mission information, talked generally about some current/future challenges that our nation and world hope to solve in space (related to their annual theme), and shared his experiences as an astronaut. There were 11 countries represented: Australia, Hong Kong, India, Korea, Malaysia, New Zealand, Portugal, Singapore, Turkey, United Kingdom, United States (34 states)
Coaches/Teachers - 225
Student participants ranged from 4th grade to 12th grade – 1,342:
Global Issues Problem Solving Participants - 996
Community Problem Solving Participants - 346
Scenario Writers - 86
Pre-registered observers - 256
Evaluator volunteers - 70
Volunteers - 28
Translators for competition work - 8
Affiliate Directors - 44
International Conference Staff - 8
FPSPI Staff – 6

CASIS Fellows:

- Kaci Heins presented a Story time from Space reading event for 2 kindergarten classes in Arizona. 51 students total. After reading Max goes to the moon, they made straw rockets.
- Kaci Heins presented at an after school stem club conference sponsored by the Science Foundation Arizona on 6/5/14 in Phoenix, AZ for 11 K-12 educators. She presented on high altitude ballooning and also highlighted CASIS and the website/resources for teachers.

Fundraising & Development

Quarterly Summary of Activities:
The Development & Partnerships team closed a number of significant partnerships and funding opportunities for CASIS in the third quarter of 2014. Highlights of these achievements include:

Fund Development:

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- CASIS entered into a pilot agreement with a private firm that markets and builds relationships with high-profile athlete's and celebrity's charitable foundations. The goal was to engage significant funding and branding opportunities for targeted areas of research that aligned with the foundation's interests. In just the third quarter of 2014, our work has resulted in initial relationships with research funding and STEM charitable foundations including the Cystic Fibrosis Foundation, the Doug Flutie Foundation for Autism, the Behrakis Foundation, the Boston Red Sox Foundation, Boomer Esiason Foundation and more. This partnership has proved to be one of the best and most productive relationships to date for CASIS. Moving forward, CASIS intends to enter into a full-time, comprehensive relationship in order to continue dialogue and relationship building with noted foundations and adding additional partnerships such as Autism Speaks and the Michael J. Fox Foundation.
- CASIS engaged with Celebrities for Charities to conduct a pilot fundraising raffle in support of CASIS STEM initiatives. The first of these pilots was completed in June, in partnership with the Boston Red Sox Foundation, resulting in $35,000 in funding to support a STEM education camp in Boston next summer in conjunction with the ISS R&D Conference.
- A unique collaborative partnership was closed in June with the Texas Emerging Technology Fund. The TETF is a $100 million state supported fund for encouraging innovative business start ups in Texas. TETF has a keen interest in seeing Texas based commercial space companies grow, and through its new collaboration with CASIS, will make funding potentially available for start up investments in enterprises CASIS vets and presents to TETF. It is estimated that the value of this collaboration to CASIS commercial projects in the first year alone could be more than $2 million. A press release recently went out announcing this collaboration, and featured comments by Texas Governor Rick Perry endorsing the partnership.
- Through it's partnership with the Houston Methodist Research Institute, CASIS was able in Q3 to close a matching funding commitment of $877,867, supporting a five year CASIS grant of $750,000, for nanoscale drug research on ISS.
- Following a year and a half of dialogue and negotiation, CASIS formalized a contract with National Geographic Learning and Cengage to create a next generation digital science learning tool for lower school students in the US. CASIS will share financially in the success of this product over a 6 to 8 year period. More significantly, it is estimated that this product will reach hundreds of thousands of students throughout the US, teaching basic science concepts through examples provided by ISS utilization.
- Houston Angel Network (HAN). During Q3, CASIS started a dialogue with the Houston Angel Network, a large group of angel funders, about a partnership that will expose CASIS commercial projects for investment funding. Much like the partnership with TETF, CASIS will work to vet and present the best opportunities for investment, with likely 6-8 commercial space companies giving pitches arranged by CASIS each year. The partnership is close to being formalized, and part of the dialogue includes opportunities for CASIS to benefit philanthropically through investor/company agreements.

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- CASIS's unique, multi-year partnership with Baylor College of Medicine's Department of Molecular and Cellular Biology continues to build strength. Out of this partnership came the recent IEEE Pulse journal issue devoted entirely to ISS research and STEM activities.

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 (FY 2013 through Q3 FY 2014) stands at $10,203,558. Of this total, $2,883,017 was confirmed in Q3 2014 (CFC Red Sox raffle total noted above closed in July, though project started in June; number will be reflected in Q4 totals).

Partnerships:

New partnerships were formalized in Q3 with Texas Emerging Technology Fund and National Geographic Learning. Total number of formal partnerships now stands at 36, with several more in the pipeline for closure in the next few months.

FY2014

Q3

Quarterly Report for the Period April 1st – June 30th, 2014

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Section III: BUSINESS STATUS REPORT

June 30th, 2014

	Actuals Q3 2014	Budget Q3 2014	Variance	Actual YTD 2014	Budget YTD 2014	Variance YTD 2014
Direct Labor	$1,238,884	$1,561,827	($322,943)	$3,577,301	$4,392,856	($815,555)
Grants to be Awarded	$533,729	$1,785,299	($1,251,570)	$1,780,097	$4,154,249	($2,374,152)
Equipment: Permanent > $5k	$19,081	$22,500	($3,419)	$65,624	$182,500	($116,876)
Equipment: Expendable & Supplies	$26,891	$42,665	($15,774)	$130,226	$135,935	($5,709)
Other Direct Costs	$407,007	$455,388	($48,381)	$941,165	$1,194,662	($253,497)
Subcontract Costs	$736,219	$844,263	($108,044)	$2,054,397	$2,672,972	($618,575)
Travel	$259,752	$259,412	$340	$622,753	$748,792	($126,039)

FY2014

Q3

Quarterly Report for the Period April 1st – June 30th, 2014

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Section IV: Performance Metrics			
Metrics	**Science**	**Technology**	**Education & Outreach**
Business & Portfolio Development			
Grants issued per research pathway	1	0	
Proposals from grants meeting evaluation criteria	20	37	
Unsolicited proposals[1]	3	5	
All proposals from multi-disciplinary team[2]	10 of 65; 15%		
Solicited grants awarded[3]	4	1	
Unsolicited awards[3]	1	2	
Operations			
Flight projects total	5	1	4
Percent of flight projects from grants	80%	100%	75%
Percent of flight projects from non-grants[4]	20%	0	25%
Financial Performance	**Grants**	**Direct**	**Indirect**
Cooperative Agreement Funding YTD	$1,780,097	$4,970,014	$2,539,671

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