

FY2014 Q1
Quarterly Report for the Period October 1st – December 31st, 2014
Center for the Advancement of Science in Space

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Section I: GENERAL STATUS REPORT

Board of Directors

The Board of Directors will complete the selection of new members enabling diversity per the Cooperative Agreement.

The Board engaged internal and external resources to generate a list of candidates to be considered for membership. Working with the Chief Scientist and Chief Economist, the Board down-selected the list and identified the top finalists. Five candidates were identified and considered ideal for bringing intellectual, philosophical, and cultural diversity to the Board. Two candidates were selected and interviews for three additional members were scheduled for the beginning of the calendar year.

Additionally, the Board conducted the scheduled quarterly meeting on October 27-28th, 2013 in Washington D.C. Once again, senior executives within NASA attended including William Gerstenmaier, Joel Montalbano, Sam Scemimi and Brad Carpenter. Mr. Gerstenmaier commented on the progress of CASIS indicating NASA felt CASIS was attracting new users to the ISS as a result of its efforts. There was encouragement to continue to develop relationships within the Executive and Legislative offices of the Government, and to continue to develop working relationships with other government agencies that have research initiatives that may be supported by ISS NL. Mr. Gerstenmaier encouraged the Board to continue to maintain communication with NASA and work together as a team to achieve utilization of ISS and extension beyond 2020.

The Board presented concerns within the Cooperative Agreement that limits CASIS ability to protect Intellectual Property of commercial entities and to generate revenue outside of NASA funding. The Board was tasked to develop a white paper addressing these issues. That action was completed and continues to be discussed with NASA colleagues.

The major accomplishments of this quarter included the finalization of the CASIS Strategic Plan with NASA concurrence and the development of tangible metrics to be utilized in the Annual Performance Plan as a measure of CASIS's performance related to the goals of the Cooperative Agreement. The Board also directed CASIS management to investigate other

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sources of subject matter expertise for proposal review in order to reduce the overall cost of evaluating projects. The Board continued to provide strategic guidance and oversight of the organization.

Business Development

Annual Update to Business Development Plan:

Please find the Business Development Plan attached in Appendix A.

The Business Development Department reviewed and updated its strategy that pivoted from a single ecosystem to a matrix-style approach which includes three main elements:

1. Focus on Key Ecosystems:

- Boston/Cambridge
- Houston
- Denver
- Silicon Valley
- Southern California/ San Diego

2. Focus on key pipeline feeders

- Mass Challenge
- TETF
- Houston MOA Frameworks

3. Identify and focus on key national accounts (which can be in any geographic location)

The attempt was to focus more on generating commercial projects with fortune 500 type organizations. Consequently, the BD focus is to do less with academics and other associations/conferences , etc. that are not focused on key commercial targets.

Quarterly Summary of Activities:

Business Development (BD) focused on the creation of a pipeline of projects that would result in the submission of proposals through the unsolicited proposal process. CASIS placed effort in key sectors and existing ecosystems, including Boston, Houston, Denver and Silicon Valley. As a result, CASIS created ten commercial projects for ISS research (a description of each project is found in the portfolio management section of this report): Emerald BIO, Protein BIO Solutions, Raja Systems, Quad Technologies, Neural Analytics, RAS Labs, Silverside Detectors, Benevolent Technologies, Enerleap, and Cobra Puma Golf. The BD department also created an academic–commercial collaboration with the Baylor College of Medicine, the Broad Institute, Berg Pharmaceuticals and CASIS to focus on an omics-based approach to microgravity research.

BD worked closely with Development and Fundraising in the creation of framework agreements and partnering strategies that committed matching funds for research. Three significant funnels were created including Houston Methodist Research Institute, Texas Emerging Technology Fund, and MD Anderson Cancer Center; and will be the focus of

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aggressive efforts to generate new flight projects from quality proposals.

The following BD-focused outreach activities were conducted throughout the quarter and supported the development of new project opportunities:

- The Mass Challenge awards ceremony which took place Oct 30 was the culmination of the 2013 business plan and accelerator competition. CASIS not only developed 8 flight projects but also leveraged the process to generate a major presence in front of 1500 top New England innovators and build buy-in with key business stakeholders.
- The Texas Commercial Space Workshop & CASIS Seminar, CASIS was a key player in the technical and policy working groups that were organized to help industry leaders and policymakers in Texas to determine a path forward for supporting the commercial space industry.
- During the launching of the Commercial Space Enterprises Workshop at the Silicon Valley Space Center, CASIS was able to organize and host a workshop presenting the value proposition and opportunities for new ventures through research on the ISS National Lab to the local entrepreneur community. During this event, CASIS kicked off discussions with both Deep Space Industries and the Shackleton Energy Company about potential flight projects for the ISS.
- CASIS participated in the Houston Technology Center (HTC)-JSC Advisory Board meeting to learn about their ongoing activities and identify potential opportunities for CASIS collaboration.
- As a founding member of the World Stem Cell Summit, CASIS was able to create speaking opportunities that highlighted ISS NL capabilities and also supported CASIS Board member, Leroy Hood as a keynote speaker.

CASIS also participated in a number of local ecosystem events including Texas A&M Aerospace Event, Houston Technology Center Innovation Day, Remote Sensing Conference, Partner's Healthcare Connected Health Symposium, NY Stem Cell Conference, and the Boston Material Research Society Conference.

Section II: DEPARTMENT REPORT

Operations

Quarterly Summary of Activities:

Payload Development, Integration, and Launch Updates:

The payload development and integration activities supporting investigations scheduled for launch during ARK-1/Increment 37/38 (Sept. 2013 – March 2014) and ARK-2/Increment 39/40 (March 2014 – Sept. 2014) continue on a nominal schedule to meet the requirements of the projected launch dates that fall within these increments. However, the rescheduled launch date for SpaceX-3, which is now March 1, has resulted in a delay of approximately 120 days to the CASIS sponsored investigations which were scheduled for this launch. The updated “in work” flight plan for the cargo resupply missions occurring during ARK-1 and 2 are as follows:

- Orbital Demonstration flight: December/2013 (completed)
- Orbital-1/Cygnus: January 9, 2014 (completed)

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- SpaceX-3/Dragon: March 1, 2014
- Orbital-2/Cygnus: May 1, 2014
- SpaceX-4/Dragon: July 15, 2014
- SpaceX-5/Dragon: September 5, 2014

The Orbital-1 Demonstration flight featured the successful launch of, and initiation of on-orbit operations for, the following payloads:

- CSI-6/Ants In Space (Education)
- Story Time From Space (Education)
- Nanoracks Cubesat Deployer (Technology)

New Payload Development Activities Initiated in Q1:

The operations department has initiated payload development and integration activities for the following projects:

- Stem cell flight projects resulting from CASIS's formal solicitation
 - Dr. Mary Kearns-Jonker (Loma Linda University)
 - Dr. Joseph Wu (Stanford University)
 - Dr. Abba Zubair (Mayo Clinic)
- Other flight projects resulting from unsolicited proposals
 - Neural Analytics
 - Raja Systems
 - Silverside Detectors
 - Benevolent Technologies for Health
 - EnerLeap
 - Quad Technologies
 - Ras Labs
 - Vecoy Nanomedicines
 - CASIS National Design Challenge-1
 - Novartis Rodent Research Mission-2
 - Dr. Rasha Hammamiah (Dept. of Defense), Rodent Research-2

Science & Technology Portfolio Management**Annual Update to Portfolio Management Plan:***2014 Solicitation/RFP Plan*

The following RFPs are planned for FY14 (release dates are estimates):

- Remote Sensing (re-release, Jan 2014)
- Enabling Technologies (late Feb 2014)
- Materials Science (late April 2014)
- The final FY14 RFP is planned for an August 2014 release, but topic is yet to be determined per the process below.

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The Portfolio Management team gathered information from CASIS staff, NASA research and publication archives, commercial assessments from McKinsey & Co., submissions from the CASIS Contest for Ideas RFI, and recommendations from experienced space researchers and the CASIS Science and Technology Advisory Panel (STAP, formerly the Science Advisory Board). From this, we generated a list of possible scientific topics/areas that could benefit from space-based R&D. Based on discussions regarding diversification of the National Lab research portfolio, commercial relevance of research topics, and potential interest level, we compiled a list of 10 suggested RFP titles that encompass promising research areas. Briefly, the topics currently include:

- Physical Sciences:
 - Microstructure Studies of Materials in Space
 - Reaction Chemistry in Space
 - Chemical Production in Space
 - Fluid Dynamics & Transport Phenomena in Space
 - Energy Capture, Generation, and Storage in Space
- Biosciences:
 - Disease Models in Microgravity
 - Space-based Drug and Vaccine Discovery and Development
 - Omics and Systems Biology in Space
 - Plant Science in Space
 - Biophysics in the Space Environment

We will also discuss the potential release of follow-on RFPs in the areas of protein crystallization, stem cell biology, materials science using external platforms, and remote sensing.

These potential RFP research areas will be presented to the STAP in January 2014, after which we will modify the titles (as necessary, perhaps dividing or combining topics) then prioritize them for release as future RFPs. After further researching the top priority RFP topics, they will be presented to the Science Committee of the CASIS Board of Directors for comment and/or approval. At that point, full RFPs will be drafted and released sequentially.

Generation of Unsolicited Proposals

The BD department will focus on the development of unsolicited proposals as a result of their efforts to identify and focus on commercial and non-traditional ISS users/researchers that are not accustomed to a formal RFP process. The approach toward generating unsolicited proposals can be found in the update to the BD strategic plan.

Review Cost Reduction and Efficiency Plan

The CASIS Board of Directors has asked for us to look into alternative sources for reviewers including USRA and Oakridge. After pursuing many potential reviewer sources, we have concluded that building our own database of reviewers organically is the best option so

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continues to be our focus. We are utilizing the networks of our team to set up a database to allow us to link contacts that have been vetted through our COI and NDA process to both solicited and unsolicited proposals within their stated areas of expertise. Currently our list is over 100 potential reviewer contacts. As this database grows, it will allow us to continue to drive the costs of our external reviews down. Strategies to grow this list include conference attendance and networking with potential and former PIs, soliciting contacts from our STAP, and soliciting contacts from our Board of Directors when appropriate. This strategy will take time to realize its full potential but the cost savings will be meaningful.

The Portfolio Management team is constantly evaluating the valuation framework by which CASIS operates. We plan to propose some changes to the framework over the next 3-4 months that will include lowering the number of external reviewers required for proposals that meet certain criteria while leaning more on our growing and highly capable science team. Additionally, a process change in our RFPs suggested by our STAP members will result in fewer full proposals reaching the final stage by introducing a two-step process meant to allow researchers interested in submitting research to save some time and get earlier feedback in the process before drafting a lengthy full proposal for submission.

Quarterly Summary of Activities:*Stem cell research in microgravity*

Ongoing from last quarter, the Portfolio Management (PM) team continued the review of proposals submitted in response to CASIS Request for Proposals (RFP) “The Impact of Microgravity on Fundamental Stem Cell Properties.” On October 15, 2013, CASIS announced the following grant awardees:

- Rapid-turnaround spaceflight projects to be performed on the National Lab.
 - Dr. Mary Kearns-Jonker (Loma Linda University): Study of aging of neonatal and adult cardiac stem cells, toward improving cardiac cell therapy.
 - Dr. Joseph Wu (Stanford University): Examination of cardiomyocyte maturation and aging, toward cardiovascular disease modeling, drug screening and cell replacement therapy.
 - Dr. Abba Zubair (Mayo Clinic): Growth of stem cells of sufficient quality and quantity to use in the treatment of patients with stroke, results from which may also have downstream applications in broad tissue engineering/regenerative medicine efforts.
- Ground-based projects that will facilitate future spaceflight experiments.
 - Dr. Carl Gregory (Texas A&M Health Science Center): Development of a system for co-culturing and analyzing stem cells mixed with bone tumor cells, toward identification of potential molecular targets for drugs specific to cancer that has metastasized to bone.
 - Dr. Joshua Hare (University of Miami Miller School of Medicine): Examination of the growth and differentiation of cardiac stem cells, toward the development of novel, less invasive and less expensive stem cell therapy for use in individuals with heart failure.

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- Dr. Robert Schwartz (University of Houston): Examination of two critical genes involved in reprogramming fibroblasts into cardiac progenitor cells, toward potential cell therapies.
- Dr. Chunhui Xu (Emory University School of Medicine): Development of small-scale tissue engineering technology for studying growth and differentiation of cardiac tissue—toward cardiac disease modeling, drug discovery/toxicity testing and ultimately cell replacement therapy.

Building on the success of this RFP, CASIS participated in the World Stem Cell Summit (WSCS13) in San Diego in early December. Of the 800 registered attendees, several hundred visited the CASIS booth in the exhibit hall, allowing the PM team to reach a substantial audience of leading international researchers, staff from philanthropic organizations and biotech companies, scientific journal editors and financiers. A noteworthy aspect of the conference was the participation of NASA personnel from Ames Research Center, Drs. Kevin Sato and Elizabeth Blaber, who helped staff the CASIS booth and brought a flight unit of the BIOS cell culture hardware that will be used on ISS in the coming year for verification testing. The hardware itself drew many passersby, but more importantly, it was invaluable to have the experience of a payload development scientist and a flight co-investigator in the booth to describe the unique research opportunities afforded by the National Lab.

The culmination of our efforts at the WSCS was the panel discussion, “The New Frontier: Stem Cell Development in Microgravity,” that included a plenary talk by CASIS Board of Directors member Dr. Leroy Hood, National Medal of Science recipient and a leader in the field of systems biology. The subsequent panel moderated by Dr. Hood included CASIS grant awardees Drs. Mary Kearns-Jonker and Roland Kaunas (co-PI to Dr. Gregory) and CASIS subject matter expert Dr. Clifford Folmes (Mayo Clinic). In addition to the panelists, another CASIS-sponsored flight investigator, Dr. Zubair, was also in attendance. Participation at events like the WSCS is likely to be of significant value to the growth of CASIS as a company, and the PM team will continue to identify and target well-attended conferences in specialized fields of interest.

Additional Awarded Projects

On October 30, 2013, CASIS announced selection of eight startup companies to conduct National Lab research, chosen as part of a partnership with the MassChallenge (MC) Startup Accelerator. MC orchestrates the world’s largest entrepreneurial accelerator, awarding one million dollars each year to startup companies for costs associated with their business or research. CASIS partnered with MC to bring funding to technical, out-of-the-box concepts leveraging research on the National Lab. In total, CASIS will award \$450,000 to assist these companies in using the ISS to advance their business applications and products. Awarded projects include:

- Neural Analytics seeks to use the National Lab as a controlled environment for improvement of a portable ultrasound device that measures intracranial pressure related to traumatic brain injury, toward refining data measurements and demonstrating the utility of this non-invasive device.

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- Raja Systems will use the National Lab as a test bed for improving efficiency of power systems used in ground locations without access to reliable grid electricity. The experiment will analyze ISS Electrical Power System data to improve software algorithms for micro grid operation and design.
- Silverside Detectors will use the radiation environment to improve detectors for identifying small, shielded amounts of nuclear material, toward improvement of algorithms used to distinguish true measurements from background readings in the identification and tracking of nuclear material.
- Benevolent Technologies for Health seeks to improve an adjustable and reconfigurable component for prosthetic sockets necessary to attach artificial limbs. The socket design exploits physical properties of granular materials, and reduced fluid movement in microgravity will allow measurement accuracy and sample preparation that may enable creation of lighter and stronger socket components.
- EnerLeap will test its improved lithium ion battery technology by exposing it to the high-energy radiation, atomic oxygen, vacuum, micrometeorites and extreme temperatures outside the ISS, toward technology validation that will improve traction of the battery in the commercial market.
- Quad Technologies seeks to improve a microbead-based technology for isolation of specific cell types from a mixed population. Studying synthesis of the microbeads in the reduced fluid movement of microgravity may enable optimization of the beads for sorting of viable cells.
- Ras Labs will examine how its synthetic muscle responds to the hostile radiation environment outside the ISS, toward improvement of durability and function of radiation-hardened and radiation-resistant synthetic muscle that may advance robotics, realistic prosthetics and human-like robotics.
- Vecoy Nanomedicines will evaluate virus-trap and virus-host interactions in microgravity, toward improved design of their nano-scale virus traps, a new generation nanotechnology-driven treatments for viral infections.

In addition to the MC projects, the following projects were awarded through the CASIS unsolicited proposal review process:

- Two companies, Emerald Bio and Protein BioSolutions, in collaboration with the Broad Institute, will explore the effects of microgravity on protein crystallization of two challenging therapeutic targets implicated in cancer and cardiovascular disease, toward structure-based drug discovery/design.
- Dr. Mahendra Jain (Kentucky Space, LLC) will examine the effects of the space environment on regeneration in planarians, toward regenerative medicine applications for neurodegenerative diseases, heart disease and limb loss.

Remote Sensing from the National Lab

On October 17, 2013, CASIS released an RFP in the field of remote sensing, seeking proposals focused on terrestrial benefit via Earth observations, atmospheric science, planetary science or remote sensing of space. Specifically, ideal projects would (1) use existing hardware or (2) develop and deploy new sensors or instrumentation for remote sensing on the National Lab.

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Release of an RFP in this area was based on feedback from industry experts that the space station is well suited to support remote sensing, which is a diverse and profitable field with top segments grossing into the billions. CASIS received considerable feedback and questions from the research community on the capabilities of the ISS as an Earth observation outpost. Based on this, CASIS temporarily suspended the original RFP in order to incorporate additional information for a more well-defined solicitation. Re-release of the RFP, which in its modified form will provide investigators with the materials needed to submit a quality proposal (while keeping a level playing field for all proposers), is planned for January 2014.

Science and Technology Advisory Panel

During the quarterly meeting of the CASIS Science and Technology Advisory Panel (STAP, formerly known as the Science Advisory Board), panel members discussed and voted on submissions from the CASIS Request for Information (RFI) “What Would You Send to the ISS?”, which closed last quarter. On October 14, 2013, CASIS announced winners of this crowdsourcing contest. Originally suggested by the STAP, the contest was designed to elicit novel ideas for research areas/pathways on which to focus future RFPs (not to be confused with NASA competitions designed to seek specific flight projects from the public, which are eventually flown). Awardees of the contest, chosen based on both public and STAP votes, included:

- Elizabeth MacDonald, who suggested using the ISS as an auroral imaging platform. Specifically, the entry suggested flying a geo-tagged video camera to capture the northern and southern lights in real time and display the images on an interactive website.
- Chun-Ti Chang, who suggested evaluating the atomic spectra of excited sessile drops. Specifically, the entry suggested using microgravity to better understand movement within fluid droplets as it relates to Earth-based 3-D printing, personalized medicine and microelectronic circuits for semiconductors.
- James Goodman, who suggested improvement of the small satellite capabilities of the National Lab (particularly for response to time-critical events) through on-orbit CubeSats manufacturing. Specifically, this entry described creation of a space-based CubeSat Laboratory using arduinos and 3D printing.
- Khalid Marhlaoui, who suggested sending metal-melting furnace hardware to the National Lab. Specifically, the entry described how analysis of existing functional materials and the discovery of new alloys for Earth applications could be augmented by such hardware.
- Jonathan Morris, who suggested evaluating microgravity effects on commensal microbiota and host responses. Specifically, the entry proposed that space-specific changes in gut microbial communities might inform understanding of human health and diseases like diabetes and Crohn’s disease.

In addition, during the STAP meeting, each panel member presented their own ideas for novel research areas onboard the National Lab, drawing from personal knowledge in their specialized field of science or technology and suggesting potential academic and industry targets for the

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suggested R&D areas. CASIS will add these suggestions to the growing body of ideas from our Board of Directors, the RFI Contest, NASA, external industry experts and various other sources.

Marketing & Communications

Submit the Strategic Communications Plan identifying near-term and 3-5 year strategies

Please find the Strategic Communications Plan attached in Appendix B.

Complete the hiring of Permanent Director of Marketing and Communications department

The Director of Marketing and Communications interview and final candidate selection process was performed and completed in the quarter. The selected candidate was submitted to the CASIS Board of Directors for approval and the offer of employment was submitted on January 14th. The permanent director will begin employment February 10th, 2014.

Quarterly Summary of Activities:

The CASIS Marketing & Communications Department (MarComm) was actively engaged in a variety of initiatives to promote the organization's mission and accomplishments to the public-at-large during the quarter. CASIS hired a Communication Specialist with expertise in social media, placing a heightened emphasis on development of a stronger virtual presence in coordination with development of new written materials, both aimed at broadening outreach to the general public and to stakeholders. Over the course of the quarter, CASIS completed multiple blogs on station research initiatives and CASIS-sponsored events and generated web content describing the National Laboratory as an ideal environment for out-of-the-box investigation.

After the first CASIS-funded payloads reached the ISS during its launch increment period, "Advancing Research Knowledge 1" (ARK-1), CASIS worked with and pitched multiple media members on the success of the organization and upcoming research initiatives destined for the National Laboratory. To provide researchers and the public an overview of ARK1, a microsite was created that outlined each payload delivered to the ISS during the launch increment. During the quarter, the MarComm Department filmed and finalized its first education video centered around research represented by its first series of sponsored payloads during ARK1, developed and distributed 8 news releases, and supported events in person or through development of collateral materials at the International Symposium for Personal and Commercial Spaceflight conference, the Silicon Valley Space Center, the World Stem Cell Conference and the MassChallenge Award Ceremony. The CASIS MarComm team was instrumental in the development of the World Stem Cell panel dedicated to discussing stem cell research opportunities on the ISS, hosted by Board of Director member Dr. Lee Hood.

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In order to monitor effectiveness of various media outreach activities and to develop a database that will eventually generate robust performance measures, MarComm contracted with MeltWater News services to provide social media metrics. MarComm will use insights developed with Meltwater and other feedback to develop a database of journalists for targeted media pitching opportunities and to promote CASIS-sponsored research. During this timeframe, MarComm developed and finalized the CASIS Annual Report, which will be available in print in early February 2014. The MarComm Department also worked with senior leadership on the finalization of the CASIS Strategic Plan, which outlines the goals and objectives of the organization over the next 3-5 years.

MarComm is continuing to support CASIS as it cultivates its relationship with Cobra Puma Golf for the possible development of the ARK2 mission patch and subsequent marketing of this design – to include use of the trademark “Space Is In It” seal. MarComm has taken the lead in the development of innovative marketing and promotion concepts that are currently in discussion between CASIS and Cobra Puma Golf. MarComm also began discussions with agents of Hollywood celebrities to gauge their interest level in possible spokesperson opportunities for the ISS National Laboratory.

Fundraising & Development**Quarterly Summary of Activities:**

Development and partnerships activity continued to accelerate robustly during Q1 2014. Following work to formalize 32 partnerships during FY 2013, work in FY 2014 has focused more exclusively on fund development, and in particular, the implementation of funding mechanisms that can bring dollars directly to CASIS.

Examples of the types of projects that moved forward during Q1 2014:

The Denver Foundation engaged with CASIS to fundraise in support of the National Design Challenge Denver Pilot Project now underway. The base cost of this program (three student flight projects in three separate schools) is funded by CASIS; The Denver Foundation is working to raise funds to add three additional flight projects plus up to 12 ground experiment units. If successful, this will allow the NDC Denver pilot to include as many as 18 area schools in 2014.

Celebrities for Charity CASIS is formalizing a partnership agreement with Celebrities for Charity through the organization’s Net Raffles.org to generate unrestricted funding to CASIS through a series of celebrity-endorsed national fundraising efforts starting in 2014.

In addition, CASIS plans to work with Celebrities for Charity for introductions to a series of national foundations. CASIS and Celebrities for Charity will then jointly seek funding from these foundations for general support for CASIS or for specific science flight projects or programs (stem cell, PCG, single disease focused research such as cystic fibrosis).

Implementation has started on a fundraising campaign through various crowdfunding sources,

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targeting support for specific research projects or STEM initiatives sponsored by CASIS.

Texas Emerging Technology Fund Discussions continued in Q1 2014 with the Texas Emerging Technology Fund regarding the creation of a matching grant program valued at a minimum of \$1 million. Verbal agreement on the partnership was reached in January 2014, and a MOA along with a draft matching grant process document was submitted to TETF for review. We expect closure of this agreement in Q2 2014. TETF informed CASIS that it intends to distribute \$100 million in grants to Texas-based projects in calendar year 2014.

Baylor College of Medicine Work continued toward the finalization of a grant agreement between CASIS and Baylor College of Medicine's Department of Molecular & Cellular Biology. BCM will continue work started under a previous CASIS seed grant toward the creation of a broad-based OMICS research platform, resulting in multiple flight projects over the next several years. Part of this grant agreement will require BCM to provide matching funds and institutional support totaling approximately \$1.5 million.

Angelus Funding and CASIS saw the first positive result from the partnership created in FY 2013. Angelus made its first investment in a young commercial space company (name of company and level of investment are confidential until investment is formalized; expected announcement in March or April 2014). Following this, CASIS development staff negotiated a verbal commitment (to be formalized and documented in Q2 2014) of a gift of cash to CASIS upon Angelus "exit" from this investment. Final value of this commitment/gift is still under discussion, but should be no less than 20% of the value of the investment + return to CASIS. Angelus and CASIS have agreed to follow this model of gift commitment in the future.

In addition, CASIS will use its social media presence (Twitter, Facebook, etc.) to drive potential donors to crowdfunding sites to make donations in support of these initiatives. We are placing our first two projects on the Indiegogo crowdfunding site in February. CASIS will engage as many as ten crowdfunding sites on a regular basis.

CASIS is implementing a program of grant proposal submissions to targeted foundations, requesting support for both CASIS' overall mission as well as specific RFP topic areas, flight projects/investigations, STEM and outreach projects, etc. We began interviews in Q1 with prospective consulting firms and contract writers to undertake this effort; we expect to have at least one firm engage in generating proposals beginning in Q2 2014. We are also investigating the possibility of creating a full-time grant writing position in development/partnerships.

Development/partnerships interviewed a number of prospective fundraising firms and consulting practices in Q1 2014, with an eye to engaging one or more of these on a low retainer/bonus-for-performance structure to fundraise for specific CASIS projects and in selected ecosystems. We expect to have at least two of these engaged in Q2 2014.

A MOA was recently formalized with M.D. Anderson Cancer Center that will allow for the establishment of a matching grant program between CASIS and MDACC. Discussions have focused on a minimum \$1 million match. Implementation of this grant agreement is expected in Q2 2014.

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National Design Challenge Pilot Project in Houston (NDC1): The six classrooms participating in the NDC1 finished ground testing and began integrating their experiments into the ArduLab flight hardware. Flight integration activities continued to run in parallel with NanoRacks to ensure the experiments are ready for the May 2014 flight.

National Design Challenge Pilot Project in Denver Area (NDC2): Planning for the second pilot project for the NDC continued during the first quarter of FY14. CASIS is collaborating with the Wings Over the Rockies Air and Space Museum in Denver to provide a venue for the kick off event and professional development. Other industry partners that will assist with experiment/engineering design, payload integration and technical support include: Infinity Aerospace, SparkFun Electronics and NanoRacks. NDC2 officially launched in January 2014 with the release of the RFA to schools in the Front Range.

CASIS Academy Live at KSC (including NASA Digital Learning Network interactive webinar): The first CASIS Academy Live program occurred in November of 2013 for a total of 92 students. CASIS Academy Live brings middle and high school students to the Space Life Sciences Lab (SLSL) and the Kennedy Space Center Visitor Complex (KSCVC) to experience a day interacting with researchers who has been awarded grants through CASIS. Students engage in a hands-on science activity related to the researcher's specific field of study such as life, material, or physical sciences, and then tour the SLSL and visit KSCVC. Additionally, the NASA Digital Learning Network provides a live, interactive webcast interview with the researcher to classrooms nationwide. There were 112 unique IP hits recorded for the first CASIS Academy Live NASA DLN webinar.

Student Spaceflight Experiments Program (SSEP): Students from participating SSEP communities across the country were selected to fly the following experiments to the ISS in December of 2013: Fibroblast Division, Eggshells and Vinegar, and Germination of Cabbage Seed. SSEP is a program of the National Center for Earth and Space Sciences Education that gives 300 to 1,000 students across a community the ability to design and propose real experiments to fly in low Earth orbit on the ISS. To date, CASIS has enabled 10,985 students in Missions 3, 4, and 5 of the SSEP program.

Story Time From Space: Five books authored by award-winning author, Dr. Jeffrey Bennett, and astronaut Alvin Drew, flew to the ISS on Orbital-1 in December 2013. The videotapes of astronauts reading the stories from the cupola of the ISS will be produced in January 2014. Other Q1 activities for STFS include fundraising for Phase 2. During Phase 2, science demonstration kits will be developed for astronauts to perform on the ISS that will complement the STEM content in the five books flown in Phase 1.

BioServe CSI-06: Dr. Deborah Gordon from Stanford University is leading the research that is studying foraging ant behavior as part of the Ants in Space experiment that flew to the ISS on

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Orbital-1 in December of 2013. The online, standards-based curriculum was developed through the Baylor College of Medicine in Q1 and will be published on BioEd Online to educators to utilize in the classroom. Students will be able to conduct ground-control experiments and compare their experiment results with those from the space-flight experiments.

CASIS Fellows: In Q1, two CASIS Fellows presented at professional educational organizations that included the New Jersey School Boards Association Workshop (50 teachers) and the 2013 NOW Annual Symposium in Ohio (20 teachers). CASIS Education Fellows communicate the excitement of the CASIS mission and information about recent research conducted onboard the International Space Station National Laboratory.

Brevard Space Week: CASIS staff spoke to 252 6th grade students and 26 educators during December of 2013 about the research on the ISS and CASIS. Brevard Space Week is an annual event at the Kennedy Space Center Visitor Complex for 6th grade students.

NSTA Regional Conference in Charlotte, NC: CASIS staff presented an education session about engineering design and the NDC Houston Pilot Project to 55 educators.

Space Station Academy: The prototype for the Space Station Academy Project was delivered to CASIS in December of 2013. The Space Station Academy is designed to be a 6-week, online program that will take students on a simulated mission to the ISS as “virtual” astronauts. As part of the mission, students will contribute to authentic research, helping to geo-reference and annotate photos of Earth taken by astronauts on the ISS.

CASIS Academy Website: CASIS Academy is an interactive learning website created to educate middle school students about the ISS and to pique their interest through multimedia videos and features. There is also an educator section that includes background information on ISS research and suggestions for using the CASIS Academy in the classroom.

National Geographic Learning: The MOA between CASIS and National Geographic Learning was executed in Q1 and an agreement is being developed. CASIS will provide content and resources for NGL’s new digital curriculum (grades K, 3 and 5). The project also could provide funding to CASIS based on the sales of the product.

Kentucky Space STEM CubeLab Project: The Education Team initiated a meeting with Kentucky Space in December of 2013 to explore how CASIS could collaborate on a proposal to the National Science Foundation. The proposed STEM CubeLab program would target 6-8 high schools in Kentucky and immerse students in a curriculum that would culminate in designing experiments to fly to the ISS. CASIS would be the subcontractor to Kentucky Space that would provide education and operation services. If awarded, the grant would provide funding to CASIS for 3 years.

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Administration

Quarterly budget and performance review with NASA

CASIS reviewed our Q1 2014 Financial Review and Grant Forecast with the NASA team on January 30, 2014.

Complete FY13 external financial audit by third party

CASIS' Independent Auditors, Carr, Riggs, Ingraham, LLC, issued their audit report for the year ended September 30, 2013 on November 22, 2013.

Submit annual inventory report

CASIS submitted the annual inventory report to NASA on October 31, 2013

Section III: BUSINESS STATUS REPORT

December 31st, 2013

	Actuals Q1 2014	Budget Q1 2014	Variance	Actual YTD 2014	Budget YTD 2014	Variance YTD 2014
Direct Labor	1,143,092	1,343,085	(199,993)	-	-	
Grants to be Awarded	1,080,037	1,135,000	(54,963)	-	-	
Equipment: Permanent > \$5k	38,905	137,500	(98,595)	-	-	
Equipment: Expendable & Supplies	44,882	41,835	3,047	-	-	
Other Direct Costs	267,605	355,968	(88,363)	-	-	
Subcontract Costs	517,766	969,345	(451,579)	-	-	
Travel	204,045	240,422	(36,377)	-	-	

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Section IV: Performance Metrics			
Metrics	Science	Technology	Education & Outreach
<u>Business & Portfolio Development</u>			
Grants issued per research pathway	0	0	0
Proposals meeting evaluation criteria ¹	0	0	0
Unsolicited proposals ²	5	3	0
All proposals from multi-disciplinary team ³	75%		
Grants awarded ⁴	7	0	4
Unsolicited awards ⁴	8	4	1
<u>Operations</u>			
Flight projects total	35	9	16
Percent of flight projects from grants	29	22	0
Percent of flight projects from non-grants ⁵	71	78	100
<u>Financial Performance</u>	Grants	Direct	Indirect
Cooperative Agreement Funding	1,080,037	1,434,518	803,144
Non-Cooperative Agreement Funding ⁶	0	0	0

1 Metric provided is per grant issued

2 Proposals meeting evaluation criteria

3 Combined metric for grants and unsolicited proposals

4 Indicates number of awards and funding provided by CASIS

5 Manifested projects from unsolicited proposals or OGA's when indicated

6 Funding received outside of NASA funding and includes OGA funding when indicated

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Appendix A. Business Development Plan Update for FY '14

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BUSINESS DEVELOPMENT STRATEGIC PLAN

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Mission Statement

The CASIS Vision is to fully realize the unique scientific, technological, and educational potential of the ISS NL by focusing both outwardly – toward exposing the scientific, technological and educational communities to the benefits that can come from research and operations in space, and inwardly - toward improving humankind’s wellbeing on Earth. The outward- and inward-looking aspects of the CASIS Vision are intertwined and will require close collaboration with NASA, other government agencies, research and educational institutions, industry partners, and commercial entities committed to exploring the intellectual, technological and economic opportunities offered by space. An important focus of the CASIS mission is to engage and connect to new stakeholders who have not been traditionally involved with NASA, or with space research.

The CASIS Mission is to enable and increase the use of the ISS NL as a unique dynamic platform for scientific discovery, technology development, and education for the benefit of life on Earth.

Value Proposition

CASIS is the manager of the ISS National Laboratory and serves as the entry point and sponsor for all U.S. interests. Authorized by Congress, CASIS has access to no less than 50% of the resources necessary to ensure research success. Those resources are fully subsidized by the Federal government. CASIS provides a full service organization and experienced partners to efficiently provide access to the ISS National Laboratory. The following summarizes the organization’s value proposition:

- Reduced cost to conduct R&D in Low Earth Orbit
- Reduced burden by partnering experienced payload integration expertise with research investigators
- Availability of resources including subject matter expertise, facilities, and ground assets to CASIS customers
- Coordination with NASA for transportation and on-orbit logistics
- Access to Funding Opportunities

Business Development Process and Organizational Interactions

The Business Development Director reports directly to the Chief Operating Officer and works closely with Development, Portfolio Management, and Operations in the pursuit of commercial flight projects.

Strategy: Matrixed Approach

The Business Development team works in a matrix approach, focused on three dimensions:

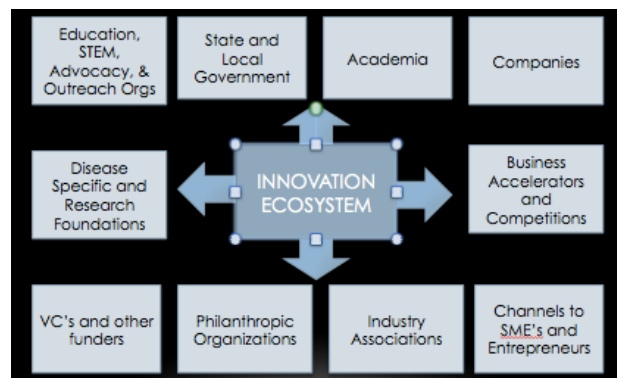
1. Key Innovation Ecosystems
2. National Accounts
3. Multiplier Relationships

Ecosystems:

As a continuation from last year, the BD team focuses on major ecosystems, including:

- Boston/Cambridge
- Houston
- Denver
- Silicon Valley
- Southern California/ San Diego
-

The goal of working ecosystems is to penetrate markets that have a synergy with the ISS NL offering and allows a small amount of resources to leverage existing stakeholders. Working with an existing innovation ecosystem provides integration with an existing infrastructure that can jumpstart the CASIS marketplace and provides a number of supply and demand stakeholders that will fill out key roles. Within each ecosystem, CASIS BD staff has established relationships with key players that act as pipeline for new deal flow. The following chart illustrates the ecosystem stakeholder relationships that have been developed;



As a shift from last year, the BD team has focused in an even more targeted way in defining priority sectors in which to focus. These focus areas best represent the overlap between the underlying ecosystem capability and the ISS NL offering:

- Boston/Cambridge = Life Science
- Houston = Energy
- Denver = Aerospace and Advanced Materials
- California = Clean Tech, Life Science and Info Tech

National Accounts

CASIS has recognized the importance of attracting commercial users to the ISS NL and specifically the importance of generating Fortune 500 usage. Bringing big commercial users to the ISS NL will build brand awareness and serve as defining flagship anchors that will ultimately aid in generating additional commercial users.

Consequently, in each of the sector areas, between 5 and 10 national accounts have been identified. Customized sales plans are being developed and will serve as a vehicle to elicit cross-organizational involvement. National Accounts will be managed by a single customer relationship manager and will also have a support team that includes colleagues from our Science, Development and Operations' organizations. Additionally, we will elicit the help from our Board of Directors in managing the account optimally.

Multiplier Relationships

Again, in a way to leverage a small number of resources, the CASIS BD team has developed a number of relationships that serve as a feeder for new commercial projects. For example, one key multiplier relationship, Mass Challenge, allowed CASIS to identify 8 new commercial flight projects that will fly for an average of \$56K, a cost significantly lower than the seed money provided to academic projects awarded as part of solicitations. Additional multiplier relationships include Houston Methodist Research Institute, The Rice Alliance and the Texas Emerging Technology Fund.

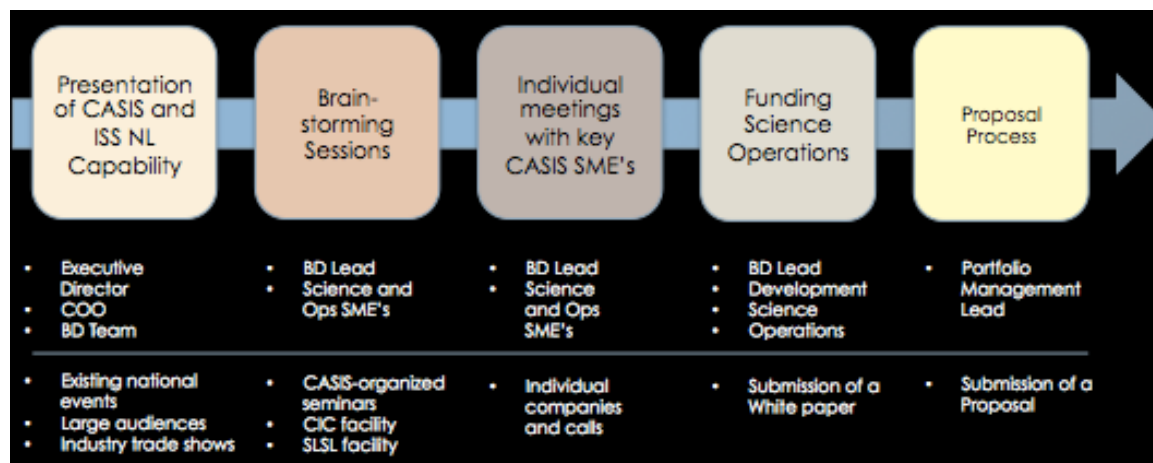
BD Process: Collaboration Early On

The BD team is working proactively with targeted commercial organizations on generating unsolicited projects (approximately \$2M in seed money available for unsolicited process.) As a general rule, BD will not steer commercial proposal to CASIS solicitations but instead will work with the submitting organization on the development of a strong stand alone project. Early on in the process, BD will reach out to a CASIS Science, Development and Operations colleagues with a project white paper to determine science, economic and operational viability. Once BD receives positive feedback from internal CASIS POC's, they will shepherd the project through

the proposal process and submit as an unsolicited proposal that will then go through the formal CASIS science and economic review. Ultimately, this process aims to develop only the most promising proposals and avoid spending money on external reviews that will clearly result in a failed science or economic review.

Go to Market Strategy

Developing commercial proposals takes time, multiple meetings and interaction with a variety of science, economic and operational experts. The CASIS customer relationship manager manages this process, which is typically the BD lead.



Business Development Tools

BD as well as the entire CASIS organization has migrated to Salesforce as the primary support tool. BD is responsible for inputting leads that are then qualified as opportunities. BD's focus is on developing an opportunity to the point a proposal is submitted. Once the proposal is submitted, a project is created and the formal evaluation process begins. Salesforce is used to generate weekly reports that are used to discuss what more can be done to cultivate each opportunity and then used at the weekly pipeline meeting to discuss what the Portfolio Management team should expect for incoming proposals.

BD Goals & Objectives

The ultimate goal of BD is to generate flight projects. They carry this out through a variety of ways including the proactive Business Development process described above. Reaching this goal is also achieved by creating market awareness, attending and speaking at tradeshow, sponsoring industry associations and tapping into existing multiplier programs (e.g. Mass Challenge.)

Goal: *Generate Commercial Flight Projects*

Objective: *Each BD team member will generate at least 20 opportunities expecting a proposal and convert at least 5 to projects of which 3 are accepted. Of these 75% will be commercial.*

Goal: *Generate National Sales Account Plans*

Objective: *Each BD team member will identify a list of target national accounts and develop customized sales plans for each. These sales plans will be shared with key account team members and be the tool used to manage the account.*

Goal: *Create Multiplier Relationships*

Objective: *Each BD team member will identify and forge a relationship with at least one key multiplier relationship that will be a pipeline feeder of new projects.*

Goal: *Create Market Awareness*

Objective: *Each BD team member will attend at least 1 National Tradeshow, participate in at least 10 industry association meetings and speak at a minimum of 5 events.*

Goal: *Use Salesforce infrastructure to manage flight project pipeline*

Objective: *Each BD team member will update Salesforce weekly with appropriate information to be used by other departments in the management of projects. The BD team will discuss this data weekly at the pipeline meeting.*

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Appendix B. Marketing and Communications Strategic Plan

Center for the Advancement of Science in Space *Strategic Communications Plan*

NASA awarded a Cooperative Agreement to the Center for the Advancement of Science in Space (CASIS) for the management of research and business development opportunities aboard the International Space Station U.S. National Laboratory (ISS NL) in July 2011. Marketing and public relations will be used to stimulate user, public and member engagement in the CASIS vision and mission. This strategic marketing and communications plan multidisciplinary scientific and educational activities and commercial initiatives capitalizing on National Lab opportunities and achievements, as well as CASIS brand recognition as the “gateway” to the ISS NL.

Through a strategic combination of traditional public and media relations, website marketing, social media, events/scientific meeting marketing, and targeted collateral and advertising, CASIS will broaden its brand and increase awareness and inquiries regarding utilization of the ISS National Laboratory.

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Overview

The CASIS Strategic Communications Plan (SCP) describes the CASIS approach to raising awareness and interest in ISS NL value and accessibility, as well as efforts to keep employees and stakeholders (internal and external) informed and engaged. The plan aligns with the NASA/CASIS Cooperative Agreement, the CASIS Strategic Plan, and the CASIS Strategic Communications Framework (see Appendix A), and will be implemented in close coordination with CASIS Business Development. The SCP complements NASA's communication goals for the International Space Station (ISS), and provides the basis for implementation and tactical plans concerning CASIS marketing and communications (MarComm).

CASIS Mission

Per the CASIS Strategic Plan, the CASIS Mission is to *"enable and increase the use of the ISS U.S. National Laboratory as a unique dynamic platform for scientific discovery, technology development and education for the benefit of life on Earth"*. The Strategic Plan establishes the following goals for CASIS strategic communications:

- Undertake a strong public outreach promoting the value of the ISS National Laboratory (ISS NL) to the nation, and
- Establish the ISS NL as a leading laboratory and environment for science, technology, engineering and mathematics (STEM) education.

CASIS marketing and communications (MarComm) goals are consequently:

- Increase awareness of the National Lab, its features, and its capability to produce results that will improve the health of and quality of life for the U.S. taxpayer
- Create and leverage external partnerships to promote the ISS NL to engage and interact with current and potential users and user communities
- Increase dialogue with and inquiry from user communities regarding National Lab utilization

By promoting the value of the National Lab, CASIS will increase the number of inquiries for utilization opportunities of the National Lab for research, technology development, commercial use, and education

Relationship with NASA's ISS Communications Efforts

The CASIS MarComm team will leverage alignment with NASA's ISS communications efforts while differentiating CASIS as appropriate. NASA ISS Research Strategic Communications is based on two messaging platforms, shown below. CASIS will align with, but not duplicate, appropriate related messaging.

NASA's messaging platforms:

Value of the ISS Platform for (a) engineering achievement, (b) international achievement, and (c) research achievement. *CASIS will leverage (a) and (c) as appropriate.*

Benefits and Applications of Research and Technology for (a) scientific discovery, (b) on Earth, and (c) space exploration. *CASIS will leverage (a) and (b) as appropriate.*

Similarly, it is desired that NASA will leverage but not duplicate CASIS's strategic communications efforts. CASIS MarComm will facilitate ongoing exchange of information with NASA communications and science staff regarding areas where communications efforts are likely to intersect.

Strategic Communications Lifecycle

Development of the CASIS Strategic Communications Plan progresses through several stages, each informing the next, as presented below. Once deployed, events, products, tools or services can be evaluated, and the results of those evaluations used to strengthen the focus and cohesion of MarComm activities.



Duration and Scope

This CASIS Strategic Communication Plan is intended to cover a 3-year planning horizon, and to provide guidance for the activities of the CASIS MarComm Team. Additional information, including specific details for implementation of the objectives detailed herein will be developed in tactical plans. Results will be fed back into the next Strategic Communications Planning cycle.

II. Planning Process

The CASIS SCP was developed collaboratively by the MarComm team, through two phases: (1) The development of a Strategic Communication Framework that identified those elements of the CASIS Strategic Plan directly relevant to MarComm activities, and mapped them to audiences, objectives, desired outcomes, and performance measures, and (2) the development of the Plan itself, extending the Framework in order to provide guidance for implementation - including further segmentation of target audiences, development of a messaging platform, identification of key (governing) concepts, and creation of high level measures and Key Performance Indicators – the latter of which represent forward work as the Plan is implemented and results are obtained and analyzed.

The final version of the SCP was reviewed by the MarComm team and approved by Duane Ratliff, CASIS Chief Operating Officer.

III. Outcomes, Objectives, and Target Audiences

The MarComm team will focus its activities and efforts toward realizing three primary outcomes that have been determined to be in accord with the CASIS Strategic Plan, the CASIS/NASA Cooperative Agreement, and the 2010 NASA Authorization Act that established direction for a non-government entity to manage the ISS National Lab. These outcomes advance the CASIS Mission. Each outcome, in turn, will be supported by interrelated activities and resource deployment aimed at specific objectives and “calls to action”. [Table 1](#) maps objectives to each of the above outcomes, together with an anticipated timeframe for meeting each objective. Desired outcomes are as follows:

Outcome 1: Increased public and user/stakeholder communities’ awareness and knowledge of the ISS National Laboratory’s existence, value, and accessibility

Outcome 2: New opportunities for users and stakeholders to interact and engage with CASIS in an ongoing manner promoting National Lab utilization

Outcome 3: Increased number of credible inquiries about and national participation in utilization of the ISS National Lab

Table 1: Strategic Communications Outcomes, Objectives, and Timeframes

Outcome	Objective	Timeframe
1 Increased public and user/stakeholder communities' awareness and knowledge of the ISS National Laboratory's existence, value, and accessibility	<p>1.1 Baseline awareness in the public and among users through analysis of existing research, and via user workshops and questionnaires</p> <p>1.2 Utilizing a variety of approaches, disseminate information designed to increase awareness/knowledge about the ISS NL in targeted audience segments</p>	<p>1.1.1 Complete by 2nd qtr., 2014</p> <p>1.2.1 Complete target audience definition by 1st qtr. 2014. Information distribution is ongoing.</p>
2 New opportunities for users and stakeholders to interact and engage with CASIS in an ongoing manner promoting National Lab utilization	<p>2.1 Create opportunities for authentic personal experiences, interaction and participation in ISS NL utilization</p> <p>2.2 Identify and remove barriers to engagement and participation through the use of media, tools, products and services familiar to target audiences</p> <p>2.3 Establish specific key performance indicators (KPIs) for participation, interaction and engagement with CASIS and the ISS NL</p>	<p>2.1.1 Ongoing</p> <p>2.2.1 Initial identification and plan to remove barriers documented in MCIP by end of 1st qtr. 2014</p> <p>2.3.1 KPIs documented by end of 1st qtr. 2014</p>
3 Increased number of credible inquiries about and national participation in utilization of the ISS National Lab	<p>3.1 Strategically partner with external organizations and individuals to create new ideas, leverage resources, and bring CASIS MarComm products and services into alignment with user communities' interest and goals</p> <p>3.2 Coordinate with CASIS Business Development to better understand user interests and goals, target "gaps" in user communities' understanding and awareness, and promote recruitment of users</p> <p>3.3 Exhibit at events attracting nontraditional audiences; create other opportunities promoting engagement with target audiences</p>	<p>3.1.1 Ongoing</p> <p>3.2.1 Complete baseline by 2nd qtr. 2015</p> <p>3.3.1 Ongoing</p>

Target Audiences (by Priority)

CASIS has a variety of audiences. Primary among these are user groups, and communities (some of them unknown) from which “nontraditional” users may emerge. However, other individuals, groups, and communities have strategic value to CASIS, and their understanding, awareness, and advocacy are critical to CASIS success. [Table 2](#) presents three “clusters” of target audiences, listed in order of priority and categorized as “developing” or “sustaining”. Developing audiences are those requiring long-term cultivation including focused research and development efforts in order to better characterize them. Messages and message platforms for these audiences are relatively immature. Sustaining audiences, on the other hand, are already represented in the CASIS communications portfolio, with messaging and platforms that are better developed.

Audiences are accorded “priority” based on immediacy and strategic imperative, not on the basis of value to CASIS or its mission. Audiences designated “Priority 1” are those whose awareness, support, interaction with CASIS, and advocacy of the organization and its mission are of critical and ongoing impact to CASIS and its ability to achieve its mission. “Priority 2” audiences are defined user communities (including other government agencies and research institutions), implementation partners, and the media, who collectively for the primary constituents of CASIS and the means to engage with them. “Priority 3” audiences are those whose participation in the ISS NL and ongoing interest in and awareness of CASIS activities and ISS NL opportunities will be cultivated over time.

Table 2: Target Audiences, Characteristics, and Priority

Target Audience	Audience Characteristics	Priority and Type
Federal legislators & staff, key NASA interfaces	Decision-makers, appropriators, monitors and primary partners of CASIS	Priority 1/Sustaining
Identified User Communities (per CASIS Cooperative Agreement and CASIS development efforts)	Commercial interests, OGAs, CASIS implementation partners, OGAs, R&D ecosystems (including universities)	Priority 1/Sustaining
CASIS employees (management and staff)	Stakeholders, advocates, and predictors of CASIS success	Priority 1/Sustaining
Partners	Implementation partners, philanthropic organizations (education, medical, science, social, individual, institutional), NGOs, NPOs	Priority 2/Developing
Innovation Communities	Participants in online and distributed communities organized around outlets and organizations such as Engadget, TechCrunch, TED, MakerFaire, etc. Likely to include members with non-traditional approaches and projects	Priority 2/Developing
Media	Media outlets frequented by target audiences	Priority 2/Developing
Educators & Academia	Educators and educator/practitioners (STEM)	Priority 3/Developing
General Public	Segmented by demographics including age, gender, educational level, socio-economic status, ethnic background, and geographic region	Priority 3/Sustaining

iv. Messaging and Outreach

Key Concepts: Messaging

In order to form high-value partnerships critical to the success of CASIS and to recruit a broad variety of users, CASIS must continue to build its brand as manager of the ISS National Lab synonymous with space innovation and research. At the same time, CASIS must promote the Lab itself, emphasizing accessibility, transparency and ease of process together with the potential of research and development onboard the facility.

Communications campaigns will tailor messages to target audiences on priority and opportunistic bases, according to tactical decisions made at “ground level” in light of audience needs, goals, objectives, and interest. In general the CASIS MarComm team will draw on and elaborate the following key messages:

- CASIS’ mission is to expand the use of the ISS National Laboratory to develop groundbreaking new products, research, and technology for the benefit of humankind.
- The unique research environment of the National Lab has produced compelling and relevant findings, expanding our understanding of... [virulence, aging, cancer, materials science, Earth’s oceans....]
- CASIS opens the ISS National Lab to innovation and commercialization.
- CASIS is a non-profit organization working hand-in-hand with NASA, while also communicating, fundraising, and partnering in new ways that NASA can’t.
- CASIS is a novel resource for program development and brand affiliation with the ISS.
- CASIS streamlines access to the National Lab, enabling you to focus on what you want to do there, rather than on how to get there.
- Investment in CASIS will benefit your organization through innovation and the unique capability of the National Lab to accelerate scientific discovery and capital gain.
- CASIS supports investigators in ISS research planning and development processes, working collaboratively with flight implementation partners and NASA
- The ISS National Lab holds the key to discovery, innovation, and the betterment of life on Earth.
- Join with CASIS in a journey of discovery onboard the ISS National Lab.
- The ISS National Lab is a national asset providing an unparalleled platform for advancing science, technology, education and economic development for the United States and its citizens.

Call to action messaging:

This is a rare opportunity to learn and communicate about a dynamic community of science, engineering and technology pacesetters that are creating discoveries that profit America and the world.

Get involved with the next generation of R&D pioneers by participating in CASIS, your gateway to the events and discoveries onboard the National Lab.

Be a part of the pioneering spirit that made America a great nation.

Have fun exploring the universe of science in space.

Informational messaging:

Over 50 years of space-based research has repeatedly demonstrated a benefit to life on Earth, advancing medicine and commercial products. CASIS is enabling the next generation of this research aboard the nation's only on-orbit laboratory.

CASIS has identified priority research areas that have the most potential to bring the benefits of space science home to Earth.

As a nonprofit manager of a National Lab, CASIS is in a unique position to market, brand and advocate the powerful capabilities of the ISS to the nation, bringing in new users and exciting a new generation of students and citizens about space-science opportunities.

We are entering a new era of space exploration, and CASIS is one of the leading pioneers in exploiting space for innovation. In this new era, CASIS partners with commercial entities for transport of payloads and improvement of space science capabilities.

About CASIS: The Center for the Advancement of Science in Space (CASIS) was selected by NASA in July 2011 to maximize use of the International Space Station (ISS) U.S. National Laboratory through 2020. CASIS is dedicated to supporting and accelerating innovations and new discoveries that will enhance the health and wellbeing of people and our planet. The CASIS goal is to bring the magic of space down to earth. For more information, visit www.iss-casis.org.

About the ISS National Laboratory: In 2005, Congress designated the U.S. portion of the International Space Station as the nation's newest national laboratory to maximize its use for improving life on Earth, promoting collaboration among diverse users and advancing STEM education. This unique laboratory environment is available for use by other U.S. government agencies and by academic and private institutions, providing access to the permanent microgravity setting, vantage point in low earth orbit and varied environments of space. The ISS National Laboratory Office at NASA's Johnson Space Center currently facilitates research initiatives on board the station's National Lab, but management of America's only in-orbit laboratory is transitioning to CASIS

Key Concepts: Media and Outreach

Best practices in marketing and communications are undergoing rapid change. The traditional approach focused on a one-way monologue to inform and educate target audiences and the public. Today, however, monologue is not enough. Audiences require dialogue and a communications approach that is strategic, customized, and focused on building communities and ambassadors in addition to educating and persuading.

The Traditional Approach: Building an Audience through “Push Communications”

Reporters working for newspapers, trade publications, radio and TV stations, and even online news sites often require special attention and handling. Congressional staff, always pressed for time, also need easy access to information and ongoing “care and feeding”. This type of “push” communications follows a standard model and methodology. Target audiences are selected and analyzed, messages are developed and tested, distribution mechanisms and channels are defined to get the content out, and responses are monitored and evaluated in order to inform the organization about the effectiveness of the effort.

Successful deployment of this approach depends in large upon research and analytics. In other words, the audiences for whom messages are intended should be well understood. What are their interests? Is the value proposition being presented relevant to those interests? Where do the audiences tend to go for information – what media do they consume? With this knowledge and a well-thought-out plan for building constituencies among target audiences, “pushcomm” is a valuable approach.

Specific tactics will depend upon the messages, target audiences, and communications objectives at hand. As examples, CASIS will employ the following techniques:

Press releases

- Commercial\research deals closed and strategic partnerships agreements formed
- Scientific review panel findings and top-level appointments
- Formal calls (solicitations) for research proposals
- Decisions and awards to project proposals and researchers
- R&D accomplishments, development, ideas, applications, and findings
- New leadership hires

Press conferences and media briefings

- CASIS will develop a variety of venues for regional and national announcements
- Make use of webcasting and Skype to reach wider audiences, and to bring executive and subject matter experts to the media
- Use targeted video and multimedia products to illustrate and form news conference attendees about the news and its significance

Collateral (background documentation)

- One-pagers on specific research areas of interest
- Success stories
- Increment-specific handouts (e.g., ARK1 research)
- Implementation partner directories
- Media press kits
- One-pagers/brochures highlighting CASIS Education and the CASIS Academy student website (also collateral materials, such as bookmarks)

The New Approach: Building Communities and Advocates through Social Media

The “new approach” to communications is really the oldest of approaches – dialogue – now enabled by and hosted within the digital domain. With the increased use of mobile devices to obtain and transmit information, a variety of applications designed to engage people interactively have emerged. This ever-expanding collection of capabilities has transformed audiences into busy outreach communities and provides organizations with the tools to create a larger community invested and willing to promote CASIS and the ISS National Lab as it helps “spread the word”. This audience, self-organized as a collection of networked individuals and organizations, should be thought of as advocates for and an extension of the CASIS MarComm effort and engaged appropriately.

Strategic development and use of this “CASIS Social Networking Community” thus become a “force multiplier” for CASIS. Members of the CASIS MarComm team who are actively helping to build communities, advocates and partners, engaging them with information about CASIS’s mission, activities, and related events and opportunities for personal interaction, will remain in the loop on an ongoing basis. In this way, communities continue to grow and influencers begin to make information originally provided by CASIS available to an expanding network of contacts.

Social Media

Social media outlets enable organizations to address the public, supporters and interested parties directly. CASIS will continue to work with major social media platforms to get its brand and message out, to engage in dialogue with advocates, influencers, and larger communities, and to make high quality, ISS NL-relevant content available through social networking. This includes the following platforms and approaches:

- Facebook
- Twitter
- LinkedIn
- YouTube (dedicated CASIS Channel)

Branding

CASIS will continue to push brand now that it is established (additional videos, internet ads, giveaways). The goal of establishing CASIS is brand is to provide a highly visible and responsive “face” for users and communities interested in the ISS NL.

Seek placement of ISS NL branded material (e.g., apparel, coffee mugs, posters) in target media

Example: Pop Culture Brand Placement. Brand recognition in pop culture can be pursued, including brand placement on popular TV shows such as:

Mission patch design (perhaps by pop culture icons, as with the debut ARK1 patch designed by artist Shepard Fairey)

Appropriate use of banners, logos, and “giveaway” promotions at exhibits, events, on the website, and in public speaking venues

Website Maintenance and Updates

The main public face of CASIS is an informative, vibrant, user-friendly website that addresses the questions and needs of various users. The website launched last year reaches wide audiences and provides visitors with the basics of the organization through text, multi-media and video offerings. Also recently launched is the education microsite, CASIS Academy.

Updates and improvements to come:

Launch of “Space Is In It” microsite, corresponding to products and services (including educational projects) developed via ISS NL utilization

Video production illustrating science content corresponding to payloads, the science portfolio or research pathway priorities (to be posted on the web and used at events and meetings)

General updates of material as appropriate

Individual pages devoted to increments and associated research

Launch of CASIS Fellows microsite, in which educators will collaborate and share ideas and lesson plans

Various multimedia and educational additions to attract additional viewers

Launch of a page aimed at a scientific or educated lay audience with web stories, written “journal clubs,” and definitions of space terms, highlighting current and past space research

Events/Trade Show Marketing

CASIS will continue expansion of contacts with each association tied to target CASIS industries. Speaking opportunities and exhibitor floor space of strategic interest to CASIS will showcase CASIS multi-media and video products, emphasizing key messages regarding access to and value of the ISS NL.

Other Communication and Marketing Targets and Approaches

CASIS will seek deals for promotion and Public Service Announcements (PSA)-type spots with cable networks, websites and channels (e.g., SyFy, Discovery, National Geographic, Smithsonian), promoting the ISS NL

CASIS will engage Hollywood Think Tanks such as Applied Minds and I.D.E.A.S. to identify new ways to use the ISS as well examine film and TV opportunities that could feature the ISS and the National Lab

Quarterly Electronic Newsletter: The newsletter will continue to be distributed to key stakeholders and potential customer audiences, reflecting recent CASIS achievements. This newsletter is a key piece of material that will update the stakeholders and assure them that CASIS is moving forward.

Paid Advertising: Given sufficient budget or the opportunities provided by strategic partnering, the MarComm team will work with CASIS leadership to determine appropriate paid advertising opportunities to target key stakeholder audiences (e.g., CASIS as an underwriter for NPR Science Friday). Speakers Bureau: Internal and third party speakers/endorsers will be identified, and opportunities will be determined to address target audiences in relation to:

Investigate development an online course on space science and the National Lab

Pitch and support development of museum exhibits highlighting the National Lab and associated research. Current efforts with the Boston Museum of Science should pave the way for future initiatives.

v. Evaluation

Evaluation is a critical component of the CASIS Strategic Communications Framework. The outcomes are designed with measurement in mind. Measurement ensures assessment of the effectiveness of a communications plan in changing attitudes, knowledge or behavior. When pooled, measures form Key Performance Indicators (KPIs) providing the basis for development of a continuous quality improvement approach across MarComm activities.

Measures

“Measurement” is the process or result of determining the magnitude or quantity of something. When this determination is done relative to a unit of measure (inches, pounds, distances) it is called “quantitative” - that is, a numerical value for a specific unit of measure. The other major type of measurement is called “qualitative” and is used to convey information about the magnitude of the non-numerical variable. An example would be a rating scale, where numbers represent steps associated with intensity of emotion, or change in attitude. Both types of measurement will be used to assess MarComm efforts

Measures must be designed at the same time that a tactic is being planned. It must be decided in advance whether the tactic lends itself to qualitative or quantitative measurement, what that measurement is to be, how will be obtained, what methods will be used to analyze the data

once it is collected, and how the measure relates back to overall strategic communications goals for CASIS MarComm. Examples of the types of tools that CASIS may use are below.

Exhibits and Events

Conduct pre-and post-surveys at the point of interaction for selected major traveling exhibits. Focus on attitudinal shifts and gain in knowledge.

Traditional Communications

Track total distribution and general popularity of print products

Track total downloads for web-based items

Track website page views

Track visibility and frequency of appearance of content in traditional print and broadcast

Social Media

Track social media performance indicators such as subscribers, friends, followers, check ins, follower growth, frequency of community posts, retweets, likes, influencer\advocate retweets and likes, views, and general observation of tone in communities.

Key Performance Indicators

Measures by themselves do not provide information about an overall communications effort. Key Performance Indicators (KPIs), which may be made up of a single measure, or of many, provide valuable benchmarks for assessing the impact of communications efforts. At the same time they provide roadmaps for improving future performance. In other words, KPIs provide information about how well an organization is doing in meeting objectives in achieving outcomes. KPIs must be measurable, specific, achievable, results-oriented, and time-bounded - meaning they must occasionally be refreshed. In general, a team trying to achieve a given outcome should adopt no more than 3 to 5 KPIs.

A key concept in the development of KPI's is to establish a baseline, and to define what is meant by improvement - then to develop measures for it. These must be statistically robust, valid, and repeatable over time. Key Performance Indicators for CASIS MarComm include the following:

Improvement in awareness and interest in the ISS NL - among the public, users, and stakeholders

Increase in the number of inquiries about utilization of the ISS National Lab

Increase in the number of contacts and inquiries with/from non-traditional users