

# Crew and Thermal Systems Strategic Communications Initiatives in Support of NASA's Strategic Goals

Heather L. Paul<sup>1</sup>

*NASA Johnson Space Center, Houston, Texas 77058*

NASA has defined strategic goals to invest in next-generation technologies and innovations, to inspire students to become the future leaders of space exploration, and to expand partnerships with industry and academia around the world. The Crew and Thermal Systems Division (CTSD) at the NASA Johnson Space Center actively supports these NASA initiatives. In July 2011, CTSD created a strategic communications team to communicate CTSD capabilities, technologies, and personnel to internal NASA and external technical audiences for business development and collaborative initiatives, and to students, educators, and the general public for education and public outreach efforts. This paper summarizes the CTSD Strategic Communications efforts and metrics through the first nine months of fiscal year 2012.

## Nomenclature

CTSD	=	Crew and Thermal Systems Division
EPO	=	education and public outreach
EVA	=	extravehicular activity
FY	=	Fiscal Year
JSC	=	Johnson Space Center
K	=	Kindergarten
PAO	=	Public Affairs Office
Q1	=	quarter 1
Q2	=	quarter 2
Q3	=	quarter 3
Q4	=	quarter 4
SME	=	subject matter expert
STEM	=	science, technology, engineering, and math

## I. Introduction

The Crew and Thermal Systems Division (CTSD) is part of the Engineering Directorate at the NASA Johnson Space Center (JSC). CTSD “is responsible for designing, testing, and developing technology for environmental control/life support systems and active thermal control systems for spacecraft and extravehicular crew members, as well as crew equipment and spacesuits for extravehicular activity (EVA) and other hazardous environments. The division provides test capability in both vacuum and thermal/vacuum environments including specialized human test facilities. In-house capability exists for softgoods fabrication, non-metallic materials development and testing, wet and gas chemical analysis, and EVA/payload mechanical equipment design.”<sup>1</sup>

In addition to these engineering and technology efforts, CTSD is pursuing strategic program partnerships and collaborations in alignment with the goals of the Engineering Directorate at JSC. CTSD created a strategic communications team in July 2011 for the purpose of communicating CTSD capabilities, technologies, and personnel to internal NASA and external technical audiences for business development and collaborative initiatives, and to students, educators, and the general public for education and public outreach efforts. The last quarter of Fiscal Year (FY) 2011, July through September 2011, focused on developing an implementation plan that would meet the division's communications needs, with the objective to fully implement the plan in FY12. This paper summarizes

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<sup>1</sup> Crew and Thermal Systems Division Strategic Communications Lead, Special Projects Branch, 2101 NASA Parkway, Houston, Texas 77058.

the CTSD Strategic Communications efforts and metrics for October 2011 through June 2012, quarter 1 (Q1), quarter 2 (Q2), and quarter 3 (Q3) of FY12.

## **II. Background**

The need for a strategic communications team for CTSD evolved from efforts to coordinate and support education and public outreach (EPO) events for one of the division's technical branches, the Crew Survival and Space Suit Systems Branch. Coordinating EPO events that targeted students, educators, and the general public, and compiling metrics for these events officially began in FY10 when the EVA Systems Project Office funded dedicated resources to support the effort. However, coordination and tracking of events had been conducted on a much smaller scale since FY05. In July 2011, CTSD initiated the planning for the first-ever dedicated resource to lead the strategic communications efforts for the entire division. Meetings were conducted with each of the technical branch management teams to introduce the concept of "strategic communications" and to gain an understanding of each branch's needs, requirements, and expectations. An implementation plan was generated and included the following task objectives:

- Set up and manage a Strategic Communications team including one full-time civil servant, one full-time contractor, and as-needed support from branch representatives and graphics personnel.
- Develop and maintain the list of hardware available for Strategic Communications events.
- Develop and maintain the list of facilities available for Strategic Communications events and tours.
- Develop, review, and/or update Strategic Communications presentation and collateral materials related to CTSD projects, technologies, and teams.
- Develop and implement a process for supporting EPO requests compliant with the Public Affairs Office (PAO) and Education requirements, including the use of online request forms for events, timing of advanced notice based on event location, and management approvals.
- Develop and implement a process for tour requests through CTSD facilities compliant with facility manager and CTSD management requirements.
- Compile and maintain division-level tracking of events, volunteers, and other pertinent information for metrics reporting deliverables.
- Develop and/or enhance CTSD collaboration with Strategic Communications groups including but not limited to:
  - o JSC Office of External Relations (includes PAO and Education)
  - o Space Center Houston
  - o Texas Space Grant Consortium
  - o International Space Station Education and Public Outreach
- Develop and implement a CTSD facebook fan page to be used to generate the timely dissemination of current, interesting, and useful CTSD information to the Strategic Communications audience.
- Coordinate photographic and/or video capture of projects, hardware, and engineering activities.
- Develop presentations and/or presentation materials on CTSD topics that can be used by division personnel.
- Represent CTSD at technical conferences, EPO events, and other events as requested by PAO, Education, CTSD, the Engineering Directorate, other JSC directorates, and other NASA centers.
- Support internal/EC meetings to communicate Strategic Communications at the branch and division levels.
- Support external meetings as needed with the Office of External Relations, including PAO and Education, to gain information on upcoming events and plan for CTSD support.

## **III. Aligning Crew and Thermal Systems Division Strategic Communications Goals with NASA and Education Initiatives**

The CTSD Strategic Communications implementation plan uses NASA's overarching strategic goals as the framework for CTSD communication strategies.<sup>2</sup>

- Investing in next-generation technologies and approaches to spur innovation.
  - o CTSD has multiple projects that push the bounds of technology for future exploration including space suit hardware, tools, and life support systems. The engineering processes involved with these technology investments are emphasized during all events.
- Inspiring students to be our future scientists, engineers, and explorers and educators through interactions with NASA's people, missions, research, and facilities.

- CTSD's outreach efforts are targeted to students, educators, and the general public, and include live, interactive presentations to emphasize the importance of science, technology, engineering, and math (STEM) and pursuing careers in the space industry.
- Expanding partnerships with international, intergovernmental, academic, and industrial and entrepreneurial communities.
  - CTSD pursues cooperative partnerships via technical interchange meetings, facility and lab tours, and conference presentations and displays.

The CTSD Strategic Communications initiatives also align with the NASA FY12 agency educational initiatives<sup>3</sup>:

- To increase NASA's impact on STEM education by supporting Kindergarten (K) - 12 educator professional development.
  - During the first three quarters of FY12, 11 educator workshop and professional development events were supported, resulting in 566 educators reached.
- Support an increased emphasis on providing experiential opportunities for high school and undergraduate students.
  - High school student interactions account for nearly 28% of the audience metrics collected for Q1-Q3 of FY12, including hands-on, interactive presentations with question/answer sessions, and mentoring activities. For undergraduate students, the emphasis has been on mentoring research projects that directly relate to current CTSD projects.
- Engage strategic partners with common objectives and complementary resources and approaches.
  - One of the primary task objectives for this fiscal year was to increase CTSD collaboration with other NASA communications groups including, but not limited to, the JSC Office of External Relations (including PAO and Education), Space Center Houston, the Texas Space Grant Consortium, and International Space Station Education and Public Outreach.
- Use NASA's unique missions, discoveries, and assets to inspire student achievement in STEM fields.
  - CTSD projects provide unique topics to introduce how STEM plays a key role in the space industry and in our everyday lives.

#### **IV. Fiscal Year 2012 Strategic Communications Metrics (quarters 1 through 3)**

Compiling metrics on Strategic Communications initiatives is an important way to determine whether the task objectives are being met, and to evaluate the efficacy of CTSD's in-reach, outreach, and commercialization efforts. As reporting requirements have evolved, so has the metrics collection process over the fiscal year. The following sections break down each focus area for FY12 Q1-Q3 metrics.

##### **A. Event Type**

A request for CTSD Strategic Communications support may encompass multiple activities, each with a separate audience. For this reason, CTSD Strategic Communications tracks each independent activity within a request as an "event." Five types of events are tracked:

- EPO Presentation: Live, interactive presentations conducted in classrooms, auditoriums, public events, or via the web.
- Subject Matter Expert (SME): Events where an EPO presentation is not requested but an SME is needed, including tours of CTSD facilities, science fair judging, career fairs, chat sessions, and review of communications materials relevant to CTSD projects as requested by the Office of External Relations.
- Media: Interviews, photography requests, video shoots and any other media-related activities.
- Mentoring: Mentoring students and educators via JSC-sponsored and external EPO programs.
- Tests/Analog Support: Support for communication of technical testing and/or analog tests.

The first through third quarters of FY12 span the months of October 2011 through June 2012. During this time, CTSD Strategic Communications completed a total of 531 events. The majority (328) were SME events, a large number due in part to the number of personal tours through CTSD facilities. One hundred sixty-one EPO presentations were completed at schools and educational events around the world. Twenty-two mentoring activities were supported including a Texas Space Grant Consortium project with Texas A&M Kingsville, reduced gravity projects with educators from the Einstein Fellows Educator team, reduced gravity projects with students from the University of Wisconsin at Madison, Georgia Tech, Oklahoma State University, and Washington University, and multiple robotics and solar car teams. Eighteen media events took place with media entities such as Space City Films, NASA TV for ISS Updates, Popular Mechanics, BBC Radio Scotland, and CNN chief medical correspondent

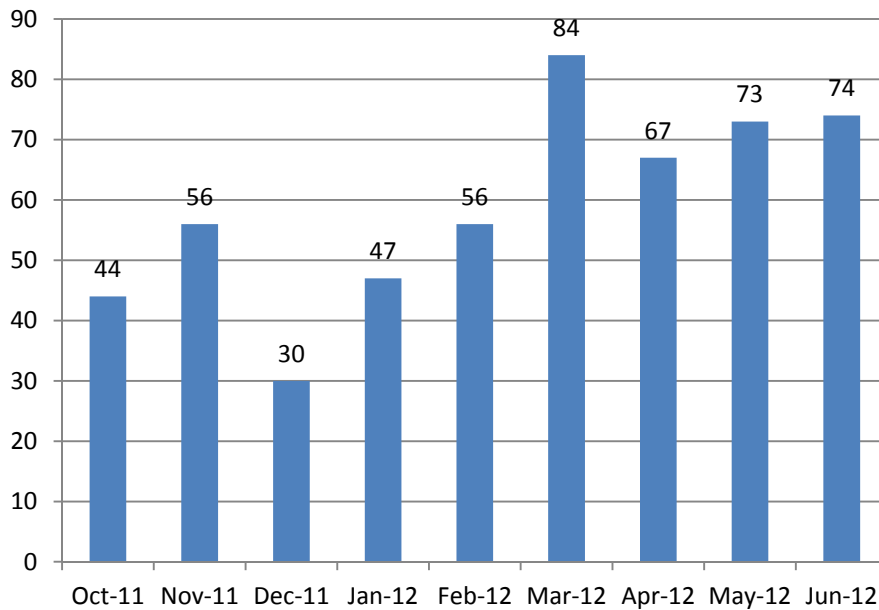
Dr. Sanjay Gupta. Two analog events were supported in conjunction with the NASA Extreme Environments Mission Operations 15 mission. Table 1 shows the breakdown of the events by type for Q1, Q2, and Q3 of the fiscal year.

**Table 1. Summary of Strategic Communications Events by Type for FY12 Q1-Q3**

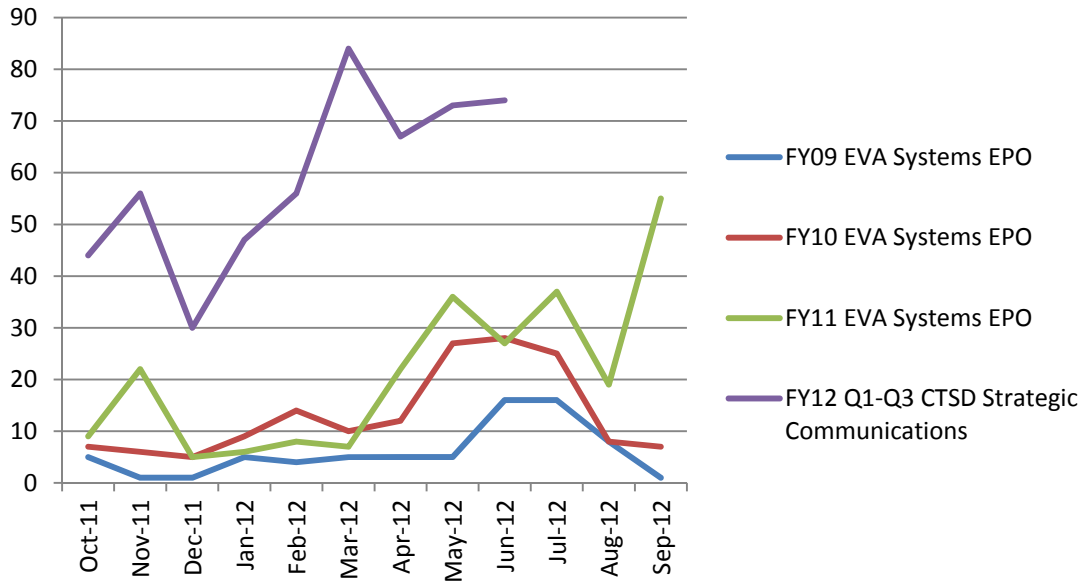
Event Type	Q1	Q2	Q3	Total Events by Type
<b>EPO Presentation</b>	33	51	77	<b>161</b>
<b>SME</b>	83	120	125	<b>328</b>
<b>Media</b>	3	9	6	<b>18</b>
<b>Mentoring</b>	9	7	6	<b>22</b>
<b>Tests/Analog Support</b>	2	0	0	<b>2</b>
<b>Total</b>				<b>531</b>

Metrics were collected for EVA Systems EPO in FY09, FY10, and FY11,<sup>4,5</sup> resulting in 72, 158, and 253 total events supported for each fiscal year, respectively. The fact that the number of events for the FY12 Q1-Q3 metrics far exceed previous year EPO efforts is to be expected as the metrics for FY12 relate to the entire division's communications efforts, rather than a single branch. It is important to recall that the metrics presented here account for only 75% of FY12. Projections for quarter 4 (Q4) metrics indicate that the total number of events will be well over 600 at fiscal year end.

Figure 1 shows the number of events for each month of Q1 through Q3 for FY12. It indicates that events increased and remained high for the third quarter of the fiscal year. This trend is comparable to that experienced in previous years of supporting EPO events (Fig. 2), as Q3 and the summer months typically include a higher incidence of requests to support events related to end-of-school-year activities, summer on-site NASA programs and facility tours, and summer off-site programs. It is anticipated that the number of events will remain high through Q4 of FY12.



**Figure 1. Strategic Communications events per month for FY12 Q1-Q3.**



**Figure 2. Comparison of CTSD Strategic Communications events per month to EVA Systems EPO events.**

**B. Event Purpose**

An event is further classified as one of the following:

- In-reach: The audience includes NASA and/or contractor personnel.
- Outreach: The audience includes students, educators, and/or general public.
- Commercialization: The audience includes international, intergovernmental, academic, and industrial and entrepreneurial personnel.

Table 2 shows the events by purpose for in-reach, outreach, and commercialization. The majority of events (470) are for outreach purposes, indicating the emphasis to reach out to students, educators, and the general public. Event purpose is a new metric this fiscal year, therefore it is not possible to compare to previous year metrics.

**Table 2. Summary of Strategic Communications Events by Purpose for FY12 Q1-Q3**

Event Purpose	Q1 Events	Q2 Events	Q3 Events	Total Event Purpose
<b>In-reach</b>	9	15	16	<b>40</b>
<b>Outreach</b>	116	161	193	<b>470</b>
<b>Commercialization</b>	5	11	5	<b>21</b>
<b>Total</b>				<b>531</b>

**C. Event Location**

The location of an event typically dictates whether the costs to support are funded by NASA, or by the event requestor. If the event is at or within 50 miles of JSC, the event is free to the event requestor. If the event is beyond 50 miles of JSC, all travel costs are funded by the event requestor. Tracking events by location provides insight into what geographical areas we are reaching with our activities. Strategic Communications tracks five types of event locations:

- On-site CTSD facilities at JSC
- Less than 50 miles from JSC
- More than 50 miles from JSC, but within Texas

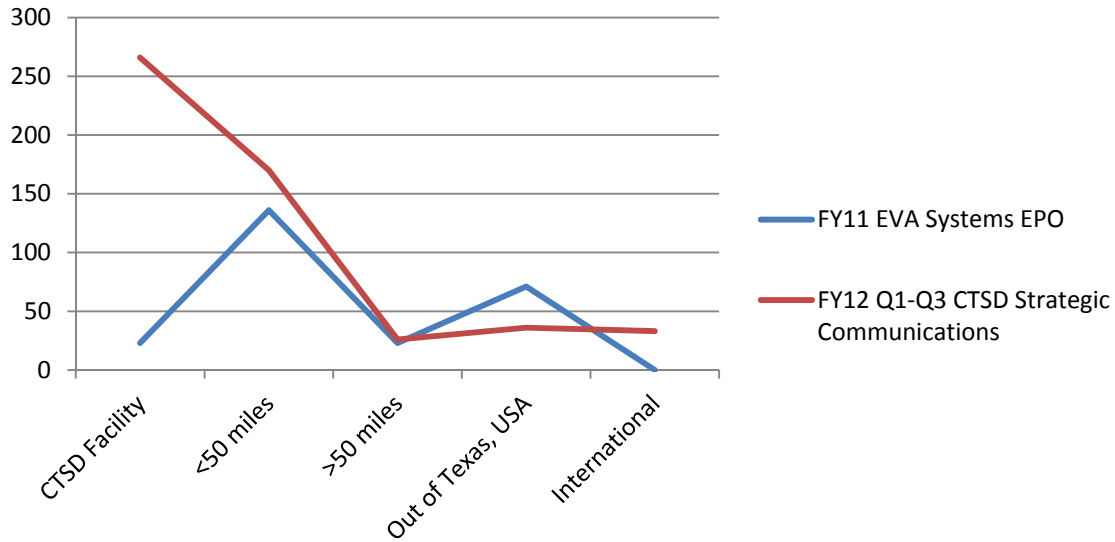
- Exceeding Texas, but within the United States
- International

Table 3 shows the summary of events by location. The majority of events (266) occurred on-site at JSC in CTSD facilities. This can be attributed to the fact that, this fiscal year, personal tours of CTSD facilities are tracked in addition to official and commercialization tours and in-CTSD-facility presentations. One hundred-seventy events were within 50 miles of JSC, and twenty-six events were supported outside of Houston, but within Texas. Thirty-six events were beyond Texas but within the United States and thirty-three events were supported internationally. These metrics indicate the CTSD Strategic Communications efforts surpass the nearby community and extend throughout Texas, the United States, and the world.

**Table 3. Summary of Strategic Communications Events by Location for FY12 Q1-Q3**

<b>Location</b>	<b>Q1 Events</b>	<b>Q2 Events</b>	<b>Q3 Events</b>	<b>Total Events by Location</b>
<b>CTSD Facility</b>	71	97	98	<b>266</b>
<b>&lt;50 miles</b>	46	59	65	<b>170</b>
<b>&gt;50 miles</b>	9	2	15	<b>26</b>
<b>Outside of Texas but within USA</b>	4	19	13	<b>36</b>
<b>International</b>	0	10	23	<b>33</b>
<b>Total</b>				<b>531</b>

Providing a direct comparison to FY09 and FY10 event locations is not possible, as in these years this metric was only collected for presentations and live demonstrations, whereas in FY11 location details were collected for all events. Figure 3 shows the comparison between FY11 EVA Systems EPO and FY12 Q1-Q3 CTSD Strategic Communications event locations. Similar to FY11, the majority of events occurred at or within 50 miles of JSC this fiscal year. The number of events that occurred greater than 50 miles from JSC but within Texas is on par with that of the FY11 metrics. Due to the retirement of the Space Shuttle, volunteers traveled to multiple events at Kennedy Space Center for the STS-134 and STS-135 coverage; therefore, FY11 event locations outside of Texas is higher than that of FY12. It is anticipated that with the inclusion of FY12 Q4 metrics, the FY12 data will exceed the FY11 values for all event locations.



**Figure 3. Comparison of CTSD Strategic Communications event locations to FY11 EVA Systems EPO events.**

#### **D. Audience**

Tracking audience demographics is important to identify what groups we are reaching with our events. Strategic Communications tracks eight different types of audiences:

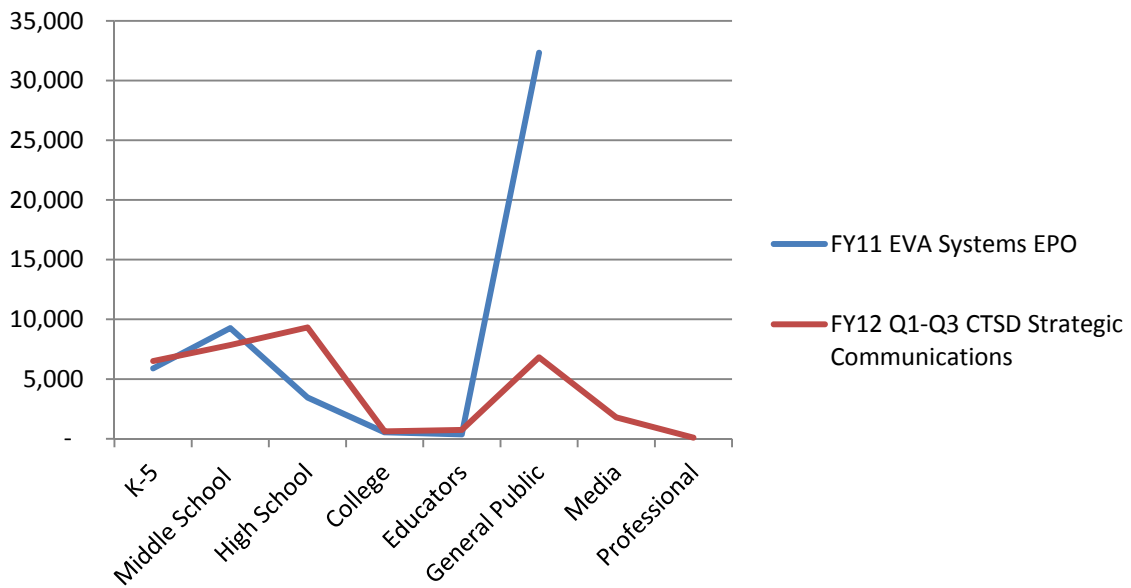
- K-5: Consists of students in grades kindergarten through five and associated educators. If parents attend the event, the number of parents and others are also included in the K-5 audience numbers.
- Middle school: Consists of students in grades six through eight and associated educators. If parents attend the event, the number of parents and others are also included in the middle school audience numbers.
- High School: Consists of students in grades nine through twelve and associated educators. If parents attend the event, the number of parents and others are also included in the high school audience numbers.
- College: Consists of university students and associated educators.
- Educators: Consists only of educators. These events are usually part of a NASA-sponsored workshop.
- Professional: Consists of business and/or technical professionals.
- Media: Consists of media entities such as reporters and photographers.
- General Public: Consists of audiences that do not fall under one of the categories listed above. These are usually audiences at large events such as JSC Open House, festivals, and displays.

Table 4 provides a summary of the audience participants for Q1-Q3. The total audience reached was 33,700. Values indicate that the majority of events supported target students in grades K through twelve, and the general public.

**Table 4. Summary of Strategic Communications Events by Audience Type for FY12 Q1-Q3**

<b>Audience Type</b>	<b>Q1 Events</b>	<b>Q2 Events</b>	<b>Q3 Events</b>	<b>Total Audience</b>
<b>K-5</b>	757	2,026	3,724	6,507
<b>Middle School</b>	1,806	3,525	2,518	7,849
<b>High School</b>	2,508	3,173	3,636	9,317
<b>College</b>	232	165	213	610
<b>Educators</b>	5	646	75	726
<b>General Public</b>	2,745	1,667	2,406	6,818
<b>Professional</b>	156	788	846	1,790
<b>Media</b>	22	47	14	83
<b>Total</b>				<b>33,700</b>

Providing a direct comparison to FY09 and FY10 audience metrics is not possible, as in these years this metric was only collected for presentations and live demonstrations, whereas in FY11 audience details were collected for all events, resulting in 51,837 interactions. Figure 4 shows audience comparisons for FY11 EVA Systems EPO and FY12 Q1-Q3 CTSD Strategic Communications. Values indicate that the metrics collected thus far for FY12 are on par with the values collected for the entire year of FY11, with the exception of the general public data. In FY11 there were several largely attended events, primarily attributed to the STS-134 and STS-135 launch activities, which included a Digital Learning Network Launchcast and general media interviews with an estimated 11,000 total participants. The STS-134 and STS-135 combined audience totals reached 12,919 participants. While it is unlikely that the FY12 year-end audience total will be as high as that of FY11, it is anticipated that all but the general public category will be higher in FY12 compared to FY11.



**Figure 4. Comparison of CTSD Strategic Communications event locations to EVA Systems EPO events.**



## V. Conclusions

This paper presents a summary of the implementation plan and CTSD Strategic Communications metrics for October 2011 through June 2012. These metrics, and projections for July through September 2012, indicate that FY12 will far exceed the number of events supported compared to FY09, FY10, and FY11, and audience participants will be comparable to FY11 data in all categories except general public. The data indicate that CTSD has been successful in implementing the plan to communicate CTSD capabilities, technologies, and personnel, and has tracked and compiled event metrics. CTSD plans to continue the Strategic Communications efforts in fiscal year 2013, with the intent to build upon the successes and lessons learned from FY12.

## Acknowledgments

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## References

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- <sup>2</sup>2011 NASA Strategic Plan [http://www.nasa.gov/pdf/516579main\\_NASA2011StrategicPlan.pdf](http://www.nasa.gov/pdf/516579main_NASA2011StrategicPlan.pdf)
- <sup>3</sup>NASA Education Recommendation Report [http://www.nasa.gov/pdf/536766main\\_NASA-Education-Recommendation-Report-v15-web.pdf](http://www.nasa.gov/pdf/536766main_NASA-Education-Recommendation-Report-v15-web.pdf)
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