NASA, JOHNSON SPACE CENTER

MISSION X: Train Like An Astronaut

International Fitness Challenge

Pilot Project Final Report

August 15, 2011

12 Countries
11 Space Agencies
4,164 Students
1 Mission

Executive Summary: The Mission X, Train like an Astronaut, pilot project was a 2-year effort directed by the International Life Science Working Group. The pilot was funded by the Human Research Program and was lead by the Human Research Program Education and Outreach (HRPEO) project and supported by a group of space agencies providing in-kind resources. The aim was to identify an international educational outreach concept that would promote a life science topic utilizing the education and outreach expertise of the various space agencies working on the utilization of the International Space Station. This in turn serves as an inspiration for the younger generation to aspire to go further in school, and provides insight into the capability of a participating country to ensure the effort provided value for their communities and children. The pilot project developed the necessary tools to promote communications between the partners and to use materials and expertise from all the countries' space agencies. The Mission X Website (trainlikeanastronaut.org) provided a single repository for the educational activities as well as a place for the Challenge Teams to provide their progress in the international fitness challenge. It also added to the International flavor as different countries were able to share and learn about what was happening with all those involved in the 6-week challenge period. A point system was utilized to promote constructive, cooperative competition in which 4164 students participated. The points were used to help FitKid, Astro Charlie, "Walk-To-The-Moon". The 18 physical and educational Mission X activities were made available on the Mission X website in seven languages. The Mission X pilot project was considered a success in 1) the design, development, and implementation of the multi-language website, 2) the expansion of healthy lifestyle awareness, and 3) the concept for drawing an international educational community together to highlight global topics in association with human space exploration. Metrics (70 post-event surveys) and lessons learned were collated and assessed. Key Lessons Learned were 1) foster and strengthen partnerships at all levels, 2) enhance and standardize MX Training, and 3) further expansion of activities and methods to teach the importance of fitness and nutrition. Methods used to teach the importance of nutrition and fitness are provided in the report.

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Mission X: Train Like an Astronaut
Pilot Project Final Report

"The children (and adults!) learned so much throughout the project, but this was a really special opportunity to apply lots of that knowledge and understanding in a practical way supported by passionate scientists!"

Para mi la "Mission X" ha sido una gran experiencia he aprendido nuevas formas de trabajo y nuevos ejercicios. … Me ha encantado la "Mission X".

"I think that "Mission x" classes are perfect to become in an astronaut."

Wir haben viel Spass bei den Aufgaben, leider meistens zu wenig Zeit, um alle Übungen zu machen!

MISSION: International Fitness & Health

The Mission X (MX) Pilot initiative was a global project to promote and inspire healthy lifestyles among young people by showing how astronauts and cosmonauts stay fit. The project was designed by some of the ISS International Partners, among others countries, and implemented in 12 countries, with two observing countries. Schools across the world were challenged to carry out physical exercises and science activities that demonstrated the importance of physical fitness and good nutrition. The challenge ran from January to March 2011.

INTRODUCTION

Physical inactivity and unhealthy eating habits are the two most pronounced and profound health risks that may lead to major non-communicable diseases, such as hypertension, cardiovascular disease, and type-2 diabetes. Extensive research generated from the United States, Spain, Russia, Japan, and Great Britain, among others, demonstrates that obesity and the lack of physical exercise are a serious cause for global concern. Likewise, studies suggest that there is a strong correlation between an unhealthy childhood diet and poor adolescent fitness, and the onset of chronic diseases as an adult. In many nations, efforts are underway to combat these problems by increasing physical activity during and after school, encouraging diets with less saturated fatty foods and more fruits and vegetables, and minimizing television viewing hours.

In light of these increasing global health issues and with an understanding of the actions needed to overcome them, the Mission X: Train Like an Astronaut challenge was developed to encourage proper exercise and nutrition at an early age by teaching young people to live and eat like space explorers. It is a collaborative effort between international partners and students that provides children and teachers with extensive information developed to be both fun and interactive. Using astronauts and cosmonauts as examples, Mission X was developed to inspire and educate young people and to instill a lasting healthy lifestyle. The Mission X challenge model is believed to be implementable during the school day or in an after-school venue.

The Mission X challenge is an international public education and outreach program designed to encourage exercise and proper nutrition. Utilizing the International Space Station (ISS) as a venue for international collaboration, the project promotes healthier, more active lifestyles by demonstrating to children how astronauts and cosmonauts stay fit during spaceflight. Mission X is designed as an ISS focused, International Partner (IP) joint education and outreach program that integrates fitness, nutritional and educational content from ISS partners and others. Mission X challenged students to be more physically active, increased awareness of the importance of lifelong health and conditioning, taught students how fitness plays a vital role in human performance for exploration, supported the development of scientific reasoning, and thus, hopes to inspire and motivate students to pursue careers in science, technology, engineering and mathematics (STEM).

Space agencies participating in the project worked together to design the international challenge that was implemented locally by each member country. Mission X, partnered with 12 countries, aimed to demonstrate how countries all around the world could work together to contribute to the fight against

childhood obesity. This first set of children and adults who participated in the pilot international fitness challenge will help to build a larger, improved Mission X project that can reach additional cities and countries. The Mission X: Train Like an Astronaut challenge brings teams around the world together to help address the global obesity issues and to enable a more fit future generation of explorers.

PILOT STUDY PARTICIPATION

Country	Lead Space Agency	Students	Teams	Partners
Colombia	CCE	810	40	IGAC, Fundacion Cuidad Horizon 2050
USA	NASA	807	7	College Station Independent School District
United Kingdom	UK Space Agency	500	8	Venture Thinking, Royal Observatory Greenwhich
Netherlands	ESA, Netherlands Space Office	490	21	
Spain	CDTI	359	18	Universidad Politecnica Madrid
Italy	ASI	300	7	Turin Planetarium (Infini.to)
Germany	DLR	297	12	
Austria	FFG	250	10	Planetarium Wien
France	CNES	221	10	
Czech Republic	ESA	75	3	Czech Space Office
Japan	JAXA	30	n/a	Tsukuba Young Astronauts Club
Belgium	ESA	25	1	
12*	**11**	**4164**	**137**	**9**

** Russia and Northern Ireland were included in the Working Group as Observing Partners, supporting the effort as it developed but not hosting teams for the pilot, with the expectation of potentially supporting the first full year of the project in 2012.*

OBJECTIVES

Mission X: Train Like an Astronaut is intended to:

- Generate global interest in space exploration and promote awareness of the importance of physical fitness and good health.
- Enhance awareness of the educational and outreach content available and provided by the ISS Partners.
- Perform international outreach opportunities, such as using downlinks with ISS astronauts and cosmonauts.
- Expand mutual understanding of the process needed to execute a multi-national educational outreach effort.
- Create an internet-based distribution of fitness and health educational materials.

METHOD OF APPROACH

Mission X: Train Like an Astronaut was implemented in four phases:

1) Formulation, 2) Pre-Challenge, 3) Challenge, 4), and Post-Challenge

1) The Formulation phase built the foundation of the challenge. Of utmost importance to this phase and to the challenge was the construct of the Mission X partners. Several meetings were held to confirm the partners to participate in all phases of the challenge.

2) During the Pre-Challenge phase, the Mission X international partners developed specific guidelines for the challenge including the development of teams, point structure and content. All processes and guidelines were properly documented and approved by all partners. Content pieces were developed by NASA and ESA and included both physical activities that introduced aerobic, anaerobic, hands-on science activities in nutrition, the food pyramid, hydration, and bone strength. In addition to the development of the foundational content pieces, the development of the Mission X website was crucial to this phase (www.trainlikeanastronaut.org). The development of the website included database creation, content translations, and graphics work. The website included the point structure, which provided the teams excitement and provided all participating teams to combine their points to help Mission X Astro Charlie “Walk-to-the-Moon!”. This website was the gateway to global communication for all countries, teams, and team leaders. It allowed the global community and observing partners to stay involved by asking questions and reading blogs written in seven languages. Pre-challenge training sessions were crucial during this phase also. The training was organized to help the instructors understand the entire Mission X pilot challenge, including the implementation of the activities, point accrual and submission, and the final challenge event.

3) The Challenge phase began with the introductory announcements from the ISS with astronauts Paolo Nespoli (ESA video) and Cady Coleman (NASA video). Almost every country held their challenge January through February. From the time they began, each

country was to develop points and participate in the challenge for a total of six weeks. Although the Mission X challenge was flexible, allowing each country to implement the challenge anywhere from two to seven times a week, each country was responsible for accruing points throughout the challenge. As they submitted points they also provided hundreds of updates to the Mission X blog and Facebook, including photos and videos.

4) For the Post-Challenge phase in most countries, upon completion of the challenge, after teams submitted their final points, teams celebrated their hard work and efforts with closing events. Although all countries celebrated the same accomplishments, each closing event was celebrated in various ways in the United States, Europe, and in the United Kingdom. The purpose of each closing event was to share their Mission X experiences and reinforce the importance of ongoing physical fitness and good nutrition.

ROLES & RESPONSIBILITIES

The Mission X effort was led by the NASA JSC Human Research Program Education & Outreach (HRPEO) team. This group was responsible for providing the overall leadership and guidance for the entire effort. The HRPEO maintained the Mission X implementation plan, coordinated planning sessions with the Mission X partners, and worked with Mission X partners to ensure that all aspects of the challenge were set up and implemented according to the Mission X plan. The HRPEO team tracked and compiled sets of metrics on the challenge and led the development of this Mission X Pilot Final Report. The HRPEO coordinated with other NASA offices as necessary, including the JSC Office of Education, the ISS Program, the Exploration Systems Mission Directorate, and the Office of External Relations to ensure success of the challenge.

The Mission X Partners were responsible for translation of the content if necessary, participating in the monthly teleconferences, supporting Mission X with necessary information on their national fitness policies, and providing content activity materials. The partners were also responsible for providing the development of various Mission X videos to more effectively communicate to the global Mission X community about on-going activities. Each partner developed their own Mission X partners, while creating their country challenge teams. They hosted a kick-off event, compiled data and tracked progress on the challenge teams, and organized the closing event for their competition. The partners provided their leader and student surveys and supported the development and review of the Mission X Final Report.

RESULTS

The results of the Mission X: Train Like An Astronaut Pilot Program are summarized below. Detailed results from each country are located in Appendix D, and graphical representations of survey questions from each country are located in Appendix E.

Post-surveys were distributed to countries in an effort to collect data relating to the comprehensive experience of participants. Surveys sought to gauge the effectiveness of the initial Mission X

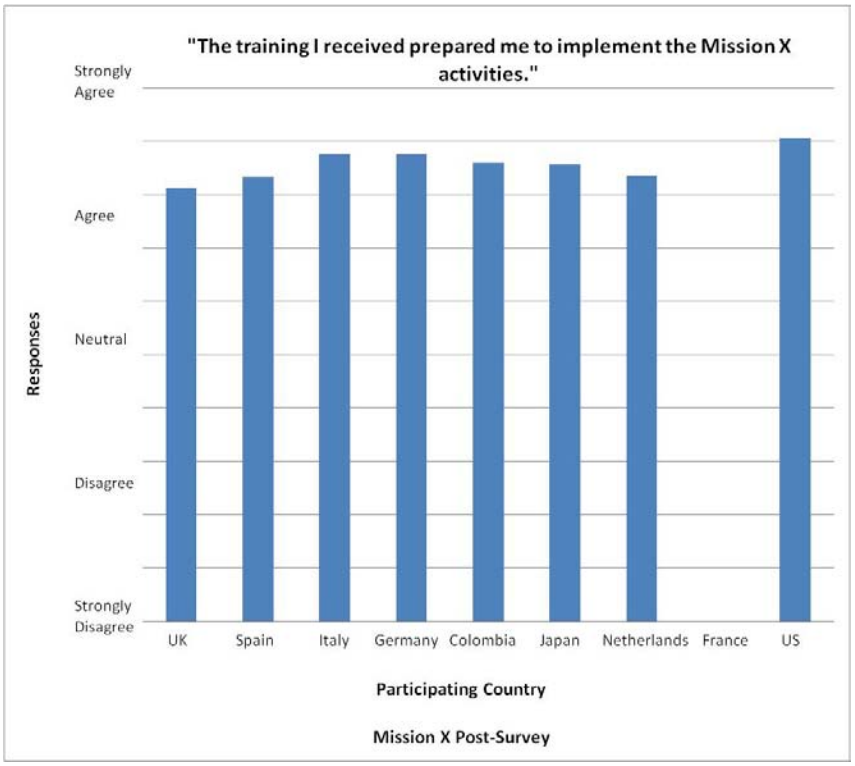
implementation and identify deficiencies in the project framework. The data yielded will be used to devise strategies for the improvement of the Mission X project.

Approximately 91 post-surveys were returned to the NASA Human Research Program Education & Outreach (HRPEO) project for compilation and analysis. Post-surveys were received from: United Kingdom (4), Spain (6), Italy (2), Germany (8), Colombia (21), Japan (7), Netherlands (9), France (21), and the United States (13). A five-level Likert Scale was used to measure the responses of participants. The results generated below collectively represent the data provided by the nine countries.

Post-Survey Data Analysis

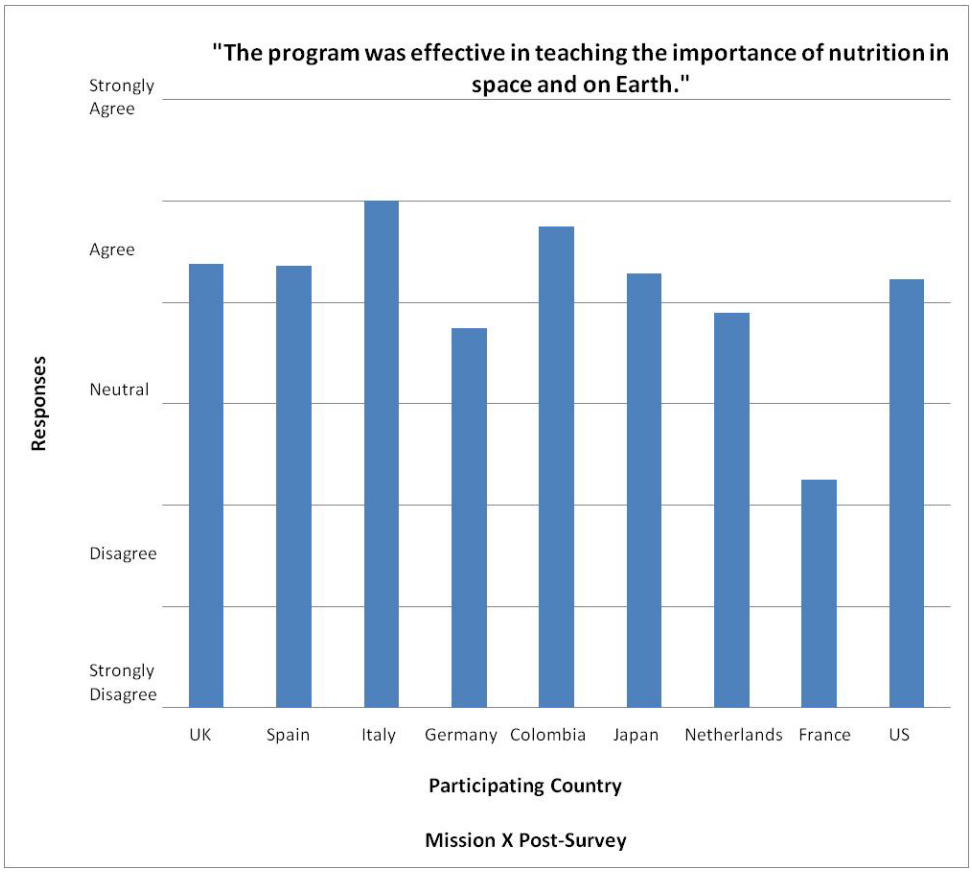
Post-surveys were conducted among the participating teams in each country. A set of fourteen questions were administered with five answer choices. The data is represented graphically below; it is shown as an average of the responses from teams from each country. Inevitably, variations existed in the number of post-surveys submitted by participating countries.

An analysis of the data indicates the Mission X training conducted by each country was sufficient to ensure preparedness for the activities' implementation. The majority of responses "agreed" that the training they received prepared them to execute the project with their teams. However, the majority was not in the "strongly agree" category, which indicates a need to enhance training events for future Mission X implementations. Note that France did not respond to this question.

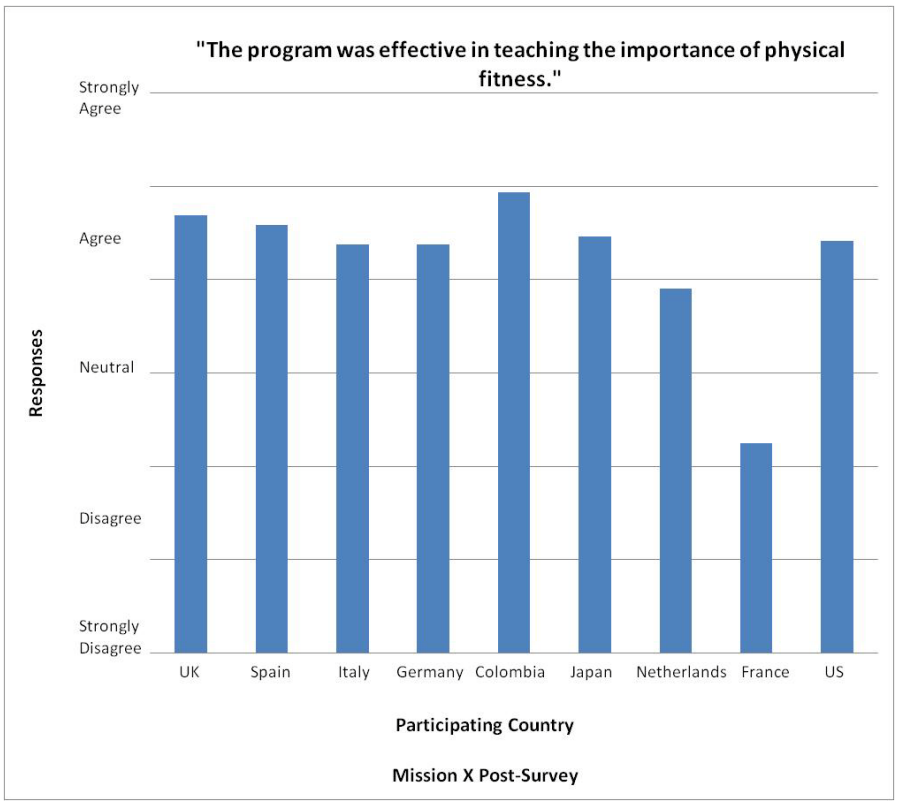


Post-survey responses revealed the need to strengthen partnerships and other networking opportunities. Overwhelmingly, 88% of respondents from Germany found Mission X ineffective in regards to the development of new partnerships with schools and employers. Further, with 71% neutrality, respondents from Japan implied uncertainty about their ability to "develop new partnerships with other schools." Analogous to Japan, survey responses received from the United States indicated vacillation in developing "new partnerships with other schools" and "developing new partnerships with employers."

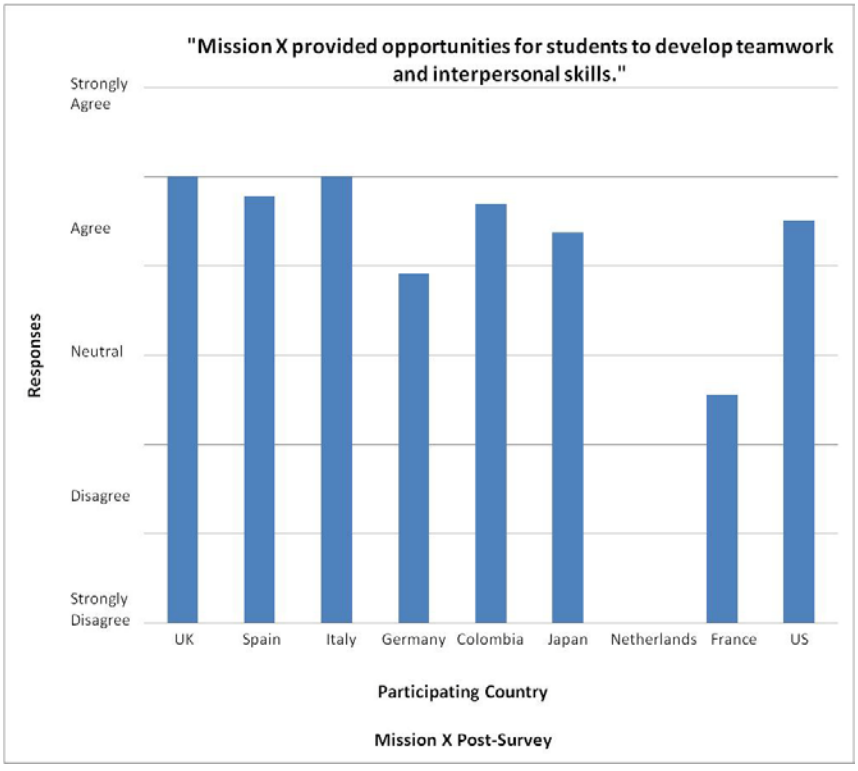
The administered post-surveys also revealed a considerable disparity among responses relating to the effectiveness of Mission X in "teaching the importance of nutrition in space and on Earth." More specifically, post-survey responses indicated that only 25% of respondents from Germany and 14% of respondents from France regarded Mission X as effective in conveying the importance of nutrition (as chosen by the "strongly agree" category).



However, respondents primarily reported that Mission X effectively conveyed the importance of physical fitness to participating students.



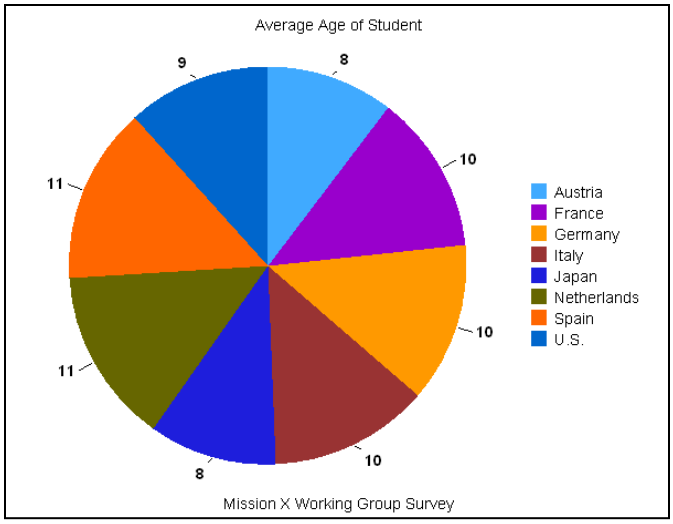
Additionally, the majority of respondents affirmed that "Mission X provided opportunities for students to develop teamwork and interpersonal skills."



Conclusively, post-survey data provided critical insight into the initial Mission X implementation. Data derived from surveys will allow for the adaptation of project components deemed as less effective. Thus, the continuous and consistent collection of data throughout the Mission X implementation will allow for the formulation of more informed decisions and will undoubtedly create a more engaging experience for participating students.

Working Group Surveys

Working group surveys were also distributed to participating countries for the duration of the Mission X implementation. Survey responses were not received from every participating working group member. The chart below shows the average age of students per their country's participants, as reported by each country that submitted a working group survey.



Mission X "Pros" (Working Group Surveys)

Beneficially, working group surveys prompted participants to elaborate on their experience during the Mission X project. Participants from Austria suggested that Mission X "raised awareness for space in general." In addition, the team from Austria integrated the celebration of Mission X with Space Day 2011.

> The celebration of the winning team was integrated in the Space Day 2011, an FFG event on the occasion of the anniversary of 50 years of manned space travel on April 12, which proved to be very successful and attracted the personal attendance of the Austrian Federal Minister for Transport, Innovation and Technology.

NASA HRPEO team members reflected on their interactions with Colombia during a training event for Mission X in Bogota:

> The trip to Colombia was a particularly special part of Mission X. The Colombian Space Commission didn't see Mission X as simply a short-term outreach program but rather as part of a strategic plan to ignite a love of space in their future space workforce.

Further, participants from France indicated that Mission X (in an after-school format) proved advantageous for students by providing an interactive and engaging environment. Similarly, participants from Germany emphasized that Mission X "conveyed the importance of health, nutrition, and space exploration" and "motivated students to do more physical exercises on their own." Participants from Italy also acknowledged the importance of Mission X in the acquisition of basic science skills for students.

Participants of the Mission X project also recognized the significance of the initiative in implementing and attaining agency-wide education and outreach goals. According to participants from Italy:

> The program was a good tool to add on to the outreach goals of the space agency. Not only students, but also through the mass media, the general public was informed about space exploration.

Additionally, Mission X provided leverage for strengthening collaborative initiatives. Participants from the Netherlands reported:

> The program fit well with [the] organization's needs and goals to promote human spaceflight while giving educational teams an opportunity to work with life sciences teams.

Participants from the United States also disclosed that the Mission X project aligned with similar initiatives that focus specifically on increasing awareness of childhood obesity.

> Mission X fit various state and national initiatives in increasing STEM knowledge as well as importance of nutrition in a country battling with childhood obesity.

Mission X "Cons" (Working Group Surveys)

Feedback acquired from working group surveys also offered perspective on challenges associated with the Mission X project implementation. Participants from France asserted that the "mission duration was too short," while participants from Germany found calculations relating to the scoring system inaccurate.

> A question I got from the German teams and I couldn't answer: How could the Bentfield team get a score of 1268 points? If you calculate the maximum number of points in each exercise, this gives 376(!?). Did they do every exercise 4 times and add the points?

Communication also emerged as a problem for some countries. Participants from Italy inferred that occasionally teachers struggled to adequately explain the materials. Comparable to Italy,

participants from Spain suggested that implementing the activities occasionally became an arduous task, primarily because many schools lacked the necessary equipment.

Collectively, budgetary shortages and website anomalies became the two most prevalent problems for most countries. Participants from Austria identified "translation mistakes on the website," and also encountered difficulty locating funding resources. As well, Spain and the United States described limited resources as problematic. The United States, Japan, and Germany cited speed, appearance, and accuracy as website deficiencies.

Dashboard Data Analysis

Dashboard, a web-based data collection instrument hosted by Google Analytics was also used to develop a web traffic analysis for the Mission X: Train Like an Astronaut website (http://trainlikeanastronaut.org/). Approximately 56,327 people from 164 countries and territories visited the Mission X site between August 1, 2010 and April 30, 2011. Of those visits, 72 percent were considered "new visitors." In addition, on average, visitors remained active on the website for nearly four minutes. However, a bounce rate of 44 percent indicated that many visitors accessed the site and left thereafter, rather than opting to explore other pages within the Mission X site. Those visitors that did explore the site to a further extent typically navigated through three pages before exiting.

Overwhelmingly, most site visits originated in the U.S. Nonetheless, thousands of visitors from Colombia, Italy, the United Kingdom, Germany, Spain, the Netherlands, Canada, and India also visited the Mission X site. Table 1.1 illustrates the dissemination of data yielded from Dashboard.

TABLE 1.1 SITE USAGES BY COUNTRY/TERRITORY

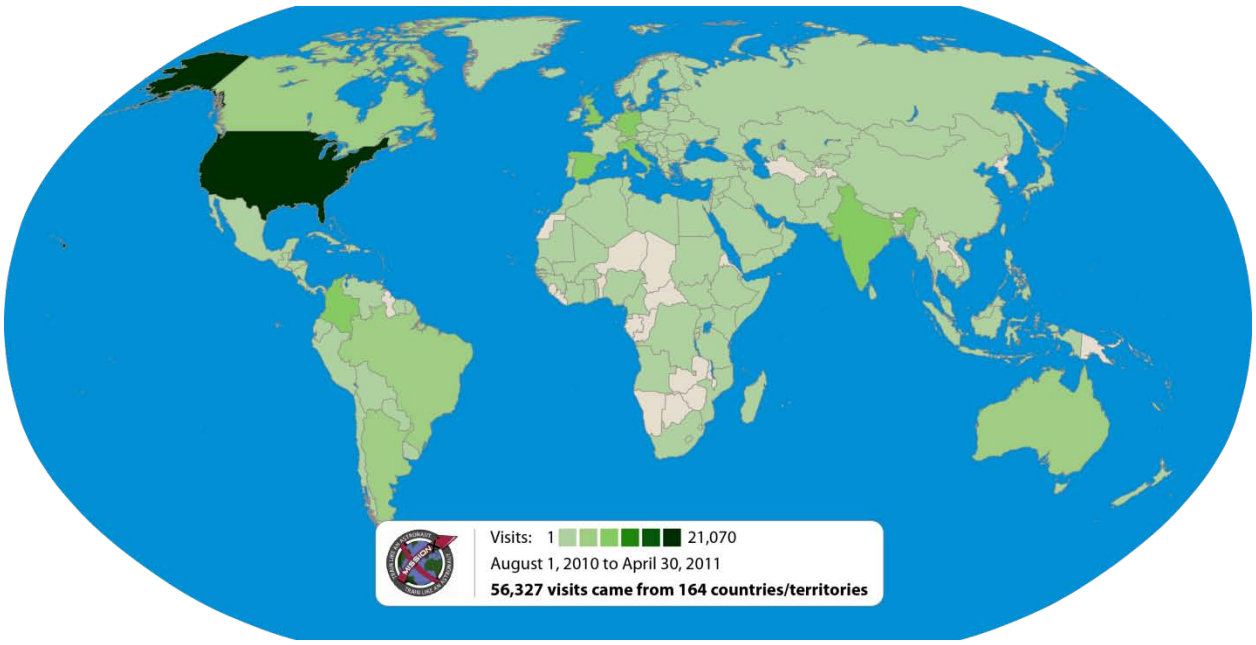
Country	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
United States	21,070	3.12	3:48	69%	47%
Colombia	3,687	5.28	8:32	49%	29%
Italy	3,536	3.23	4:01	74%	39%
United Kingdom	3,317	3.33	4:20	79%	37%
Germany	2,601	3.82	4:23	66%	39%
Spain	2,429	3.82	4:25	61%	38%
Netherlands	1,991	3.75	4:45	55%	40%
Canada	1,544	2.27	1:53	94%	47%
India	1,503	2.69	3:08	92%	43%
Austria	1,326	5.72	6:33	38%	28%
France	1,183	3.50	3:23	71%	42%
Brazil	969	2.11	1:33	96%	56%
Australia	675	2.12	2:00	90%	49%
Japan	507	2.54	2:32	74%	51%
Mexico	503	2.36	2:09	96%	54%
Belgium	404	3.38	3:26	78%	46%
Russia	359	1.93	1:16	94%	59%

Greece	348	2.49	2:34	80%	42%
Turkey	338	2.13	1:17	96%	54%
Poland	326	2.21	1:15	91%	53%
Argentina	320	2.07	1:39	82%	56%
Czech Republic	296	2.41	5:12	77%	51%

During 2010-2011 the Mission X site also received visits from individuals in:

Bulgaria (293), China (285), Portugal (271), Philippines (269), Indonesia (268), Sweden (224), Romania (216), Ireland (196), Switzerland (195), Venezuela (184), Chile (160), Peru (152), Thailand (149), South Korea (146), Denmark (142), Norway (137), Malaysia (122), Iran (120), Ukraine (116), Hungary (116), New Zealand (115), Finland (110), Sri Lanka (99), South Africa (96), Slovakia (92), Taiwan (92), Croatia (92), Serbia (92), Pakistan (89), Puerto Rico (85), Israel (85), Slovenia (82), Hong Kong (77), Ecuador (76), Saudi Arabia (73), Egypt (69), United Arab Emirates (67), Singapore (65), Morocco (63), Vietnam (56), Algeria (52), Estonia (48), Lithuania (47), Uruguay (41), Georgia (40), Macedonia (37), Panama (34), Costa Rica (34), Latvia (32), Guatemala (31), Dominican Republic (30), Lebanon (27), Cyprus (27), Luxembourg (25), Bangladesh (24), Qatar (23), Malta (21), Bosnia and Herzegovina (21), Albania (21), Iceland (19), Tunisia (19), French Guiana (18), Nepal (17), Bolivia (16), Jordan (14), Paraguay (14), Belarus (14), Moldova (13), Mauritius (12), Armenia (12), Kuwait (11), Oman (11), Nigeria (11), Iraq (11), Trinidad and Tobago (10), El Salvador (10), Kenya (10), Jersey (10), Nicaragua (10), Cambodia (8), Honduras (8), Ghana (8), Mongolia (7), Maldives (7), Azerbaijan (6), Guernsey (6), Martinique (5), Tanzania (5), Yemen (5), Syria (4), Kazakhstan (4), Myanmar [Burma] (4), Aruba (4), Montenegro (4), Libya (3), Bahrain (3), Macau (3), Burkina Faso (3), Cameroon (3), Belize (2), Isle of Man (2), Brunei (2), Timor-Leste (2), Afghanistan (2), Fiji (2), Barbados (2), Guadeloupe (2), Haiti (2), Uganda (2), Andorra (1), Palestinian Territories (1), Ethiopia (1), Cote d'Ivoire (1), Bermuda (1), Suriname (1), Saint Lucia (1), Seychelles (1), Uzbekistan (1), Madagascar (1), Kyrgyzstan (1), Greenland (1), Netherlands Antilles (1), Mozambique (1), Congo [DRC] (1), Senegal (1), Bahamas (1), Northern Mariana Islands (1), Djibouti (1), Guinea (1), Angola (1), Jamaica (1), Somalia (1), U.S. Virgin Islands (1), Lesotho (1), Mauritania (1), New Caledonia (1), Guam (1), Cayman Islands (1), Mali (1), Sudan (1), and Liechtenstein (1).

TABLE 1.2 WORLD MAP OF SITE VISITS BY COUNTRY/TERRITORY



IMPLICATIONS & RECOMMENDATIONS

Based on the survey and questionnaire results, as well as post-challenge teleconferences with the participating countries, there was some correlation between various results. These implications will be recommendations taken forward by the Mission X 2012 participating teams to increase the success of future challenges. The major implications and recommendations are as follows:

- Designate a strategy for fostering and strengthening partnerships between participating teams and employers and other schools.
- Modify and standardize the Mission X training event to ensure effectiveness.
    - The effectiveness/satisfaction level of participants is related to how well or poorly they felt the training was conducted in their country
- Identify a more effective approach for "teaching the importance of nutrition in space and on Earth."

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- National Wellness Institute http://www.nationalwellness.org/
- National Wellness Institute of Australia http://www.wellnessaustralia.org/
- Canadian workplace wellness http://www.healthworkandwellness.com/
- The German Wellness Association (DWV) http://www.wellnessverband.de
- President George W. Bush's HealthierUS initiative http://www.healthierus.gov/
- US Local School Wellness Policy http://www.fns.usda.gov/tn/Healthy/wellness_policyrequirements.html
- World Health Day Web Site: http://www.un.org/depts/dhl/health/index.html

Appendix A1: NASA Press Release, Challenge Start

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Jan. 18, 2011

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RELEASE: 11-019

NASA CHALLENGES STUDENTS TO TRAIN LIKE AN ASTRONAUT

WASHINGTON -- NASA and 14 international space agencies are challenging students to complete a nutrition and fitness program known as "Mission X: Train Like an Astronaut." Approximately 3,700 students from more than 25 different cities worldwide are participating in this six-week pilot project.

NASA's Human Research Program is sponsoring the U.S. component of the international challenge that began Tuesday. Teams of students between eight and 12 years old will learn principles of healthy eating, exercise and compete for points by finishing training modules. Students also will practice scientific reasoning and teamwork while participating in hands-on training that targets strength, endurance, coordination, balance and spatial awareness. The exercises will involve the same types of skills astronauts learn during training for spaceflights.

"A part of the human space exploration mission is to inspire our youth to stay in school and master professions in the sciences and engineering fields to carry on this important work well into the 21st century," said Charles Lloyd, NASA's Human Research Program Education and Outreach Project manager. "We believe this starts with our youth in elementary school. We hope this international fitness challenge will assist them with that lifelong endeavor."

Mission X challenges students to be more physically active; increases awareness of the importance of lifelong health and conditioning; teaches students how fitness plays a vital role in human performance for exploration; and inspires and motivates students to pursue careers in science, technology, engineering and mathematics.

The U.S., Netherlands, Italy, France, Germany, Austria, Colombia, Spain and United Kingdom are hosting teams for the challenge. Team USA is hosted by the College Station Independent School District (ISD) in College Station, Texas. It consists of more than 800 fourth-grade students. After six weeks of training, the U.S. challenge will culminate in a March 24th event, called the Fit Explorer Hometown Hullabaloo, to celebrate the students' success.

"Mission X is an exciting way to actively involve students in learning the importance of nutrition and physical fitness," said Becky Burghardt, director for curriculum, College Station ISD. "Children are fascinated by the training experiences of astronauts and are motivated to mirror what real-life astronauts do to prepare for space missions. Teachers and administrators are hopeful the rich science and physical education experiences designed by NASA will help students become aware of the importance of living a healthy lifestyle."

Upon completion of this pilot, the goal is to expand the program to more schools in additional countries.

To see NASA astronaut Cady Coleman kick off the challenge from the International Space Station, visit:

http://www.nasa.gov/multimedia/videogallery/index.html?media_id=46235751

The 18 core activities of the challenge are available for download in seven languages.
To view country updates and Mission X teams' progress, visit:

http://trainlikeanastronaut.org/en

For more information about other NASA education programs, visit:

http://www.nasa.gov/education

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Appendix A2: NASA Press Release, Fit Explorer Hometown Hullaballoo

Jenny Knotts
Johnson Space Center, Houston
281-483-5111

March 15, 2011

Dana Davis
Johnson Space Center, Houston
281-244-0933

RELEASE: JO11-003

MISSION X COMPLETE, NASA TO CELEBRATE STUDENTS' SUCCESS

HOUSTON -- A NASA team and two space shuttle astronauts will kick off a celebration for more than 800 College Station Independent School District (ISD) students who recently completed a six-week health and fitness challenge known as "Mission X: Train Like an Astronaut."

The event will take place from 10 a.m. to 2 p.m. March 24 at College Station Tiger Stadium in College Station, Texas.

Former astronaut Leland Melvin, now NASA's associate administrator for education, and astronaut Rick Linnehan will share their space travel experiences and bring the excitement of science, technology, engineering and mathematics to students at Tiger Stadium. During the program, young explorers will participate in several interactive exercise activities.

Linnehan and Melvin will be available for media interviews from 10:50 a.m. until noon.

Visitors also will have the rare chance to touch a piece of a moon rock. The NASA Driven to Explore exhibit will be on display from 9 a.m. to 2 p.m. in the stadium.

During the six-week Mission X program, participants completed physical activities modeled after the real-life training requirements of humans traveling in space. In physical education, students practiced teamwork while participating in training missions targeting strength, endurance, coordination and balance. In science classrooms, students gained an understanding of the science behind nutrition and physical fitness by participating in hands-on science activities involving human energy requirements, hydration and bone strength.

-more-

College Station ISD was selected by NASA to participate on behalf of the United States. The students are among 3,700 other students from more than 25 different cities worldwide participating in Mission X. The U.S., The Netherlands, Italy, France, Germany, Austria, Colombia, Spain and the United Kingdom participated in the challenge.

The 18 core activities of the Mission X challenge are available to download in seven languages. For more information about Mission X, visit:

http://trainlikeanastronaut.org

The Driven to Explore exhibit offers a look at America's space exploration initiatives to extend human presence throughout the solar system, as well as showcase the accomplishments of the Space Shuttle Program and the International Space Station.

The centerpiece of the exhibit is the lunar rock sample brought to Earth by the astronauts of Apollo 17 in 1972, America's last human mission to the moon. The almost 4-billion-year-old rock is one of only eight lunar samples made available for the public to touch and feel.

Other area locations to visit the exhibit include:
-- March 23: The Brazos Valley Museum of Natural History from 9 a.m. to 3 p.m.
-- March 25-27: The George Bush Library on the campus of Texas A&M University.
-- March 31: The Texas State Capitol in Austin for NASA's Space Week Texas festivities.

For exhibit hours and more information about NASA's Space Week Texas, visit:

http://www.nasa.gov/centers/johnson/events/sed.html

For more information about other NASA education programs, visit:

http://www.nasa.gov/education

-end-

Appendix B: Media Coverage

Major highlights

- Wired.com: Geek Dad column
  http://www.wired.com/geekdad/2011/01/mission-x-helps-kids-train-like-an astronaut/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+wiredgeekdad+%28Blog+-+GeekDad%29
- KBTX.com (Bryan-College Station CBS affiliate)
  http://www.kbtx.com/home/headlines/NASA_Selects_CSISD_For_Astronaut_Training_Class_114320724.html
- Confirmed an article will be in Space: UK magazine
- A news spot from KHRD.com
- Twittered from space (Paolo Nespoli)

Other news reports *(many additional internet sites picked up the press release, and not listed)*

- http://www.nasa.gov/multimedia/videogallery/index.html?media_id=46235751 (Cady Coleman video)
- http://www.redorbit.com/news/space/1981517/astronautlike_training_focus_of_new_phys_ed_program/ (redOrbit)
- http://501news.org/?p=883 (Hispanic non-profits)
- http://www.examiner.com/education-headlines-in-baltimore/mission-x-students-challenged-to-train-like-an-astronaut (Baltimore Examiner)
- http://www.fox41.com/story/13862962/nasa-challenges-students-to-train-like-an-astronaut (FOX41.com – Kentucky)
- http://www.myfoxchicago.com/dpps/news/space-agencies-challenge-kids-to-train-dpgonc-km-20110118_11490867 (My Fox Chicago)
- http://www.google.com/hostednews/afp/article/ALeqM5jW5NwQ9FRY7zI3IcJ9x0AI68BgtQ?docId=CNG.c471a4256f677123d3aefab76804a32d.371 (AFP)
- http://www.rocketeers.co.uk/node/1229?utm_source=twitterfeed&utm_medium=twitter (Rocketeers – UK Space News)
- http://news.yahoo.com/s/afp/20110119/sc_afp/usspaceeducation (Yahoo news)

Other partners

- Japan
  - http://iss.jaxa.jp/med/missionx/ (JAXA news)
- Germany
  - http://www.dlr.de/next/desktopdefault.aspx/tabid-7217/12011_read-28539/ (DLR webarticle)
- France
  - http://www.forum-conquete-spatiale.fr/t11492-salon-jeunes-mission-x-entraine-toi-comme-un-astronaute (French space forums)
- ESA/Europe
  - **http://www.esa.int/esaHS/SEMSXWYOBFG_education_0.html**
  - http://www.esa.int/SPECIALS/magisstra/SEM9QB4SNIG_0.html (ESA official mission webarticle)
  - http://www.science-news.eu/space-exploration-news/cluster64417/ (European Science News)

- http://www.collectspace.com/ubb/Forum32/HTML/000176.html (Forum threads re: magISStra mission)

Appendix C: Terms of Reference (TOR)

MISSION X: TRAIN LIKE AN ASTRONAUT
Terms of Reference

Increasingly sedentary lifestyles among children and adolescents, combined with unhealthy diets, are two of the most significant risks that may lead to the onset of chronic adult health issues. International research demonstrates that physical inactivity and poor eating habits among children can lead to major non-communicable diseases, including high blood pressure, cardiovascular disease, and type-2 diabetes. Organizations worldwide recognize this problem and advocate increased physical activity and healthier diets for young people in order to promote healthier societies.

In light of these increasingly global health issues, and seeking to take actions to help address them, the Mission X: Train Like an Astronaut pilot project aims to encourage proper exercise and nutrition starting at an early age. This concept was developed by members of the International Space Life Sciences Working Group (ISLSWG) and is an effort of the space agencies[1] and organizations involved in this pilot project to encourage healthy, active lifestyles among children. Using the unique example of space explorers, the Participating Agencies[2] seek to motivate and educate young people worldwide that good fitness and nutrition are life-long endeavours.

These Terms of Reference establishing the Mission X: Train Like an Astronaut pilot project outline the parameters for the activity and the anticipated role of each Participating Agency.

1. PURPOSE AND SCOPE OF ACTIVITIES

1.1 Purpose

The purpose of the Mission X: Train Like an Astronaut pilot project will be to demonstrate to children the value of exercise and nutrition by

- Developing a multi-national health and fitness challenge that each Participating Agency will implement within its own region;
- Creating an activity website to provide student participants a forum for exchange and an online database for activity-related materials; and
- Performing international outreach opportunities with astronauts and cosmonauts to increase awareness regarding the importance of physical fitness and good health.

1.2 Scope of Activities

The Mission X: Train Like an Astronaut pilot project, also referred to as the activity, will focus on accomplishing the health and fitness challenge outlined in these Terms of Reference. Upon completion of the activity, the Participating Agencies may choose to extend the pilot project by repeating or adapting the activity in the future.

2. PARTICIPATION GUIDELINES AND IMPLEMENTATION PROCEDURES

2.1 Participating Agencies

[1] "Space Agencies'' refers to government organizations responsible for space activities.

[2] Participating Agencies are defined in paragraph 2.1

Participation in the Mission X: Train Like an Astronaut pilot project is open to space agencies or organizations delegated by space agencies with established educational or outreach programs and the ability meet the responsibilities outlined in paragraph 2.3 (hereinafter "organizations").

Space agencies or organizations delegated by space agencies that previously contributed to the planning and development of this activity can become participating agencies at any time through an executive level acceptance of these Terms of Reference by a letter addressed to the Director of the Exploration Systems and Aeronautics Research Division, NASA Office of International and Interagency Relations.

2.2 Responsibilities of the Chair

During the pilot project, NASA will serve as Chair of the Mission X: Train Like an Astronaut activity. The Chair of the pilot project will contribute to the development of the Challenge by

- Providing health and fitness educational materials to be used during the activity;
- Coordinating monthly teleconferences, and additional planning sessions as needed, with the Participating Agencies;
- Drafting and maintaining the Mission X: Train Like an Astronaut pilot project planning documents, including the implementation plan;
- Managing the development of the Mission X: Train Like an Astronaut pilot project activity website, www.trainlikeanastronaut.org;
- Supporting the Participating Agencies to ensure that the Challenge is properly implemented;
- Compiling data on the activity and leading the development of a final report; and
- Fulfilling the responsibilities of a Participating Agency as outlined in paragraph 2.3.

2.3 Responsibilities of Participating Agencies

Participating Agencies will contribute to the development and implementation of the activity by

- Providing health and fitness educational materials to be used during the activity, including information on national fitness policies;
- Taking part in teleconferences and additional planning sessions;
- Providing regular feedback on the Mission X: Train Like an Astronaut planning documents, including the implementation plan;
- Sharing agency web links and online content for the development of a Mission X: Train Like an Astronaut website;
- Sharing available video content for a Mission X: Train Like an Astronaut pilot project promotional video;
- Working with domestic organizations as necessary that will help organize and host the activity;
- Conducting activities to implement the activity within their country, including hosting a kick-off event, compiling data and tracking progress on the Challenge teams, and organizing the closing event for their domestic competition;
- Supporting the development and review of a final report; and
- Working with the Chair and other Participating Agencies to ensure success of the project.

3. SCHEDULE

The Participating Agencies plan to continue to implement the Mission X: Train Like an Astronaut pilot project along the following schedule:

- Pre-Challenge Phase: Spring 2009 to December 2010
- Challenge Phase: 6 to 12 week period between January 2011 and March 2011
- Post-Challenge Phase: Spring 2011 to Fall 2011

4. STATUS OF TERMS OF REFERENCE AND RESOURCES

The adoption of these Terms of Reference will not create any legal obligations on the part of the Mission X: Train Like an Astronaut pilot project Participating Agencies. Unless other arrangements are made, each Participating Agency will bear the costs of discharging its responsibilities under this Arrangement, including travel and subsistence of its own personnel and transportation of all goods for which it is responsible. The amount of resources provided for any particular activity may vary among Participating Agencies.

5. EXCHANGE OF DATA AND GOODS

Materials developed for the Mission X: Train Like an Astronaut pilot project and made available on the Mission X: Train Like an Astronaut website, www.trainlikeanastronaut.org, including images and educational guides, will be available worldwide without restriction as to their use or redistribution.

6. RELEASE OF INFORMATION ABOUT THE PILOT PROJECT

Participating Agencies may freely release information on the Mission X: Train Like an Astronaut pilot project Program as deemed appropriate.

7. MODIFICATIONS

These Terms of Reference may be modified by the Participating Agencies by consensus.

8. WITHDRAWAL

Any Participating Agency may withdraw from the Mission X: Train Like an Astronaut pilot project at any time by providing written notification to the Director of the Exploration Systems and Aeronautics Research Division, NASA Office of International and Interagency Relations.

9. ESTABLISHMENT, REVIEW AND ADOPTION

NASA accepts these Terms of Reference effective November 5, 2010. Upon acceptance in writing of these Terms of Reference by at least one additional space agencies or organization that previously contributed to the planning and development of this activity, these Terms of Reference will become effective for those Participating Agencies on 1 December 2010.

The Mission X: Train Like an Astronaut pilot project Terms of Reference will remain in effect for the necessary period of time until the Post Challenge Phase is complete, or for two years, whichever is sooner. Upon completion of the activity, the Participating Agencies may choose to extend the Mission X: Train Like an Astronaut project by revising and renewing these Terms of Reference.

Appendix D: Result Outcomes by Country

United States (HRPEO Team)

Description of the approach taken:

Team USA was a consolidated group of 807 fourth grade students in the College Station Independent School District (CSISD) in College Station, Texas. Team USA was made up of seven elementary schools in the CSISD allowing for cooperative and constructive competition but ultimately allowing for all the children that participated in the Mission X Pilot study to be "winners". In the USA schools systems there is a strong feeling about avoiding too much competition and the resultant labels of winners vs. losers. Thus a key component to the model that was implemented for Team USA embraced the challenge of allowing for cooperative and constructive competition with the end result that each of the seven schools were identified as Winners, and were awarded one of seven "Best Awards":

- The Most Inquisitive
- The Most Dedicated (Never gave up)
- The Most Enthusiasm (Asking good questions)
- The Most Improved
- The Most Committed Team
- The Most Cooperative
- The Most Points

Major points:

The use of a single school district in a small city as Team USA allowed the Mission X developers (NASA/HRPEO) the opportunity to more carefully characterize the "needs" of the challenge teams as well as to provide a venue for using the Mission X educational activities in the science classrooms. At the beginning of the event there were concerns and hesitations on the part of the school district regarding the time required, the use of the point system and the overall concept of "challenge" with elementary children. By the end of the challenge phase it was evident that the issues were properly addressed and the students, teachers, administrators, and Community leadership were satisfied with the experience and outcomes. The feedback from College Station Independent School District (CSISD) included observations from the District Leads, the Teachers that participated and observations indirectly and directly from the students that made up Team USA.

Positive points:

- The international aspect of the Mission X event was fascinating and appreciated.
- The program allowed for an alternative approach to performing standard physical activities
- Provided information and videos on NASA space exploration that were exciting to see and learn more about
- Good set of tools and resources on an easily accessible website
- The program provided an opportunity to the district to implement integrated teaching techniques from Science to Physical education to Health and it was recommended that journaling and the English Teachers should participate.
- The materials were developed to meet Texas Essential Knowledge and Skills (TEKS) requirements
- The materials were also felt to be motivating to make lasting lifelong healthy choices
- The materials stimulated the students to generate good diet and exercise questions

- The Closing event was very exciting and appreciated by everyone as a method to celebrate the event

Negative points (areas for improvement):

- The program added additional demands on already stretched time and resources
- The scoring system was generally disliked
- Some of the activities were considered to be too complex and not grade and age appropriate
- Improvement suggestions for Instructor Training
- Concepts to simplify the Mission X Handbook
- Little or no resources to support the Closing Event

Issues:

Issues that were identified and addressed during the challenge phase:

1. Effective training of the teachers and leadership for the event
   - During the Pilot project the NASA Mission X Project Team arranged to travel to College Station once in September and again in October to work with all the Teachers that would be involved with the Challenge. In the future alternative means such as training videos and distant leaning video conferences will need to meet this need as the number of sites around the USA grows.
2. Use of the Mission X materials in the science classrooms and the physical activities being used during the school week as a part of their regular PE class time
   - This desire requirement was met by the CSISD during the school year. Timing on when the Mission X educational topic fit into the scope and sequence was not aligned with the time period of the Challenge so exceptions were made so the students could get credit during the Challenge for using them. Being able to implement the Training sessions as addressed above as well as that the materials being traced to State Educational Standards were key to ensuring that the teachers were comfortable using the Mission X educational activities during the class day. This issue will once need to be addressed as we expand the reach of the Mission X effort across the USA in regards to having an effective mechanism for training of our Leaders and making sure the educational activities are properly traced to the various State Standards.
3. The use of a "point structure" for performing the activities and the time constraints for the teachers
   - The issue of what type of point structure should be used during the Mission X challenge was worked on up until the time of the first challenge period. As we entered the challenge phase it was understood that there were two types of point structures that each Challenge Site/Country could consider, but only one would be allowed per Challenge Site/Country. The first point structure was focused on the over all team performance and was subjective in nature. It provided simplicity for the Team Leads to use and was based on a Maximum score of 25 points. The second point structure was focused in the individual performance and allowing for the students and Leaders alike to better discern individual improvement. However, it was considered to be more complex and labour intense. The users of this point structure was told that there was a formula to scale the total points back to a 25 point structure such that the Mission X Team could accumulate a total

number of points from all Challenge sites/Countries to be used in various ways on the Mission X web site. In the end neither point structure was considered to be ideal nor dissatisfaction remains with the type of point structure and scoring to be used for the challenges. There remains no consensus either on if we should be attempting to us any point structure that would result in "Winners and Losers".

- Points were initially individually recorded as part of the lessons. This was the simplest method and made the most sense, although it doesn't really tell us anything about fitness unless you have several sessions and can track improvement, which we felt would rarely happen in the Mission X challenge model. Some of the Mission X countries liked this method because they perceived it as objective. We had to change point structures because it was a deal breaker for the US teams since the teachers felt that it was too much detail to record for too many kids at once. In short, it became impractical. The other arguments against the original system were that they were sort of meaningless (most of the teachers thought that kids this age aren't really motivated by invisible competition), and that kids this age all had to win and succeed. We chose to do a rubric that measured all of our values on a 1-5 scale. Even though they were somewhat subjective, it came back to our core value that the teacher is the best one to judge the progress of their class on their own terms. It was largely well received, except that again, the teachers felt like it didn't mean anything. The real problem with points is ambiguity. We gave each country the right in the pilot to do it their way within boundaries as long as they were consistent. Most of them did not train their teachers in this, and we couldn't clean up points on the website since we were not privy to the details of how the various countries actually chose to do it. We need to create the standard, obligate all the countries to it, and provide an easy way to use it. A draft of a simple graphical way to record points for each activity, which we felt pedagogically, reinforced the idea and was easy to use in mission journals, but we decided it wasn't worth developing the idea at the time.

4. Resources needed for transporting children to the closing event
   - The need for resources to bus the Team USA students to the Closing event held at the CSISD district stadium was resolved by the NASA Mission X Team. However it is important to note that in this case that was a simply fix since it was only a single school district and the entire Team USA was localized to College Station. This issue will continue to be a problem in future challenges. These types of expenses are never accounted for by the school district. In the future the closing events will have to be structured such that bussing is not required or other community provided funds provided to support the event. Cost for bussing, and other material needs to be minimized or the schools will not be able to run Mission X.

5. Community involvement.
   - Community involvement in the Mission X pilot was achieved with a local after school group doing the initial assessment of the activities, and support from Texas A&M university in terms of volunteers and other faculty supporting the closing

event. However, it is our opinion that as the reach of Mission X grows to multiple communities less NASA support will be available for such components as the "Closing Events". Therefore the success of the Mission X experience in a community will become far more dependent on local support and resources. This issue will continue to be addressed as we proceed with the Implementation of Mission X Multi-Year Campaign.

Participation in a closing event:

The make-up of Team USA allowed for use to work with the school district to easily arrange for a half-day celebration at the district football stadium. Since Team USA was made up of only one school district there was no need for working on separate events in different venues. It also allowed for all of us to pool our resources and provide the students with what turned out to be an outstanding event. The Fit Explorer Hullaballoo took over four months to plan, and was featured with two Astronauts, seven large group 40 minute activities, of which each group of students would have the opportunity to participate in two of them. There were also four table top displays and demonstration areas, and the opportunity for the students to tour through the NASA "Dare To Explorer" Trailer exhibit. The students had an opportunity to hear from the two Astronauts as well as time to ask them questions. At the end of the event each of the seven schools were awarded as "Best In" for one of seven categories, and group pictures of the awards ceremony were completed. The "Best In" Certificates we hope will be proudly displayed in each of the schools to help everyone reflect on the experience and hopefully continue annual participation in an event like the Mission X International Fitness Challenge. This cohort of students and educators also allowed for us to most effectively celebrate the end of the six weeks of the international fitness challenge with the use of the district football venue which was large enough to allow for a large number of people, along with room for other activities during the half day celebration and leaning.

Recommendation for future Mission X events:

The Developer Team's remaining challenge is how to reproduce the components of this experience in multiple communities with less direct contact from the developers. This will be addressed during the follow on efforts in the Mission X Multi-Year Campaign. Two concepts for addressing this issue are; 1) continued word of mouth allowing for a slow process for adding new cities and towns to the Mission X Team USA, and the 2) is establishment of a partnership with the White House Let's Move Initiative which as of Spring 2011 has over 400 Let's Move Cities documented. This second approach would significantly increase the growth rate of potential Team USA Mission cities and participants as well as help grow the overall use of the Train-Like-An-Astronaut activities on a National scale. The challenge of working with the Let's Move Team will be to be careful and ensure we are able to manage the communications across a rapidly growing group of participating cities. For 2012 the focus will be on 1) enhancing the international aspect of participants doing an international fitness challenge, 2) improving the Mission X point system, 3) addressing training concern with expansion by either training videos or a training webinar, 4) baseline the total number of countries willing to participate in Mission X 2012, and 5) changing up the Mission X website to more effectively support the needs of the Mission X Teams.

United Kingdom

(See Appendix G for more details)

Description of the approach taken:

- Six primary and one secondary school took part. 300 students from an inner city secondary school participated in a 'walk through day'. Six schools were based in rural Essex and one was based in outer London. The schools worked with the lead secondary school at key points – astronaut visit, launch, community moonwalk, and closing events. Each school customized Mission X to suit their timetable and curriculum priorities. Mission X was delivered through activity days hosted by Mountfitchet Mathematics and Computing College (MMCC), topic based delivery using literacy, art, drama, science and PE time; mission weeks, one off workshops, homework challenges and discrete subject lessons.. 270 young people in years 5, 6, and 7 took part. Participants came from a range of abilities and included students with special needs and English as an Additional Language.
- A soft media launch took place at the House of Commons with Richard Garriott, Dr. Piers Sellers and Flat Charlie in December 2010.

Major points:

- Teachers noted an increased motivation in PE, and positive changes in eating and drinking habits in students. Schools, students and parents described Mission X as exciting, inspirational, fun, and engaging. Mission X generated other benefits such as improved school partnerships, positive publicity, and increased status of science, nutrition and PE. It provided students with an opportunity to experience secondary school, meet new students, and fostered teamwork and ICT skills.
- NASA and ESA staff were enthusiastic and generous with sharing resources such as press releases, training programmes etc. The face to face meeting was highly beneficial.
- UK schools were strongly supported by Headteachers who encouraged full commitment from classroom teachers, assistants, students and parents. The enthusiasm, professional and goodwill of all the partners, especially the Head of Science and Headteacher at MMCC, was key to the project success. The project was brought to life by motivated classroom teachers who invested significant amounts of their own time in Mission X activities.
- The schools valued the real life learning context and involvement of international space agencies - UK Space Agency, NASA, ESA. The astronaut training context brought fitness, nutrition and science to life and generated excitement and interest from teachers, children and parents. Contributions from astronauts and space specialists enriched the learning and added an aspirational element. The children enjoyed the hands on, inquiry based style of the challenges.
- The Mission X content inspired classroom teachers. The free and easily accessible content could be used flexibly.
- Teachers valued the leadership of the UK Space Agency and Venture Thinking's role in introducing the project, identifying and briefing partners, sourcing additional resources, customizing materials, developing delivery models and timescales, orchestrating astronaut and external speaker involvement, arranging press and media releases, planning start and end events, leading the evaluation, and managing press and communications. This enabled teachers to concentrate on engaging students in the classroom.

- The training sessions were helpful to run through the activities, materials, resources required and discuss delivery approaches. Teachers valued paper copies of the resources and Word versions of the activities..
- Teachers and students highly valued the website and blog, the goodies, T-shirts, sweatbands, astronaut pins, songs, etc. This added 'glitz' to the project.
- Students and teachers enjoyed the international dimension and blog entries. There is potential for the Flat Kids to promote global and cultural awareness and language skills.
- Several schools encouraged students to take on the role of 'astronaut trainer' sharing the activities and their learning with younger students and their peers – and one school organized a community event themed around Mission X.
- The ideal age for involvement is Years 5-7 for the United Kingdom (ages 9-12). Mission X inspired students across ability groups and across a range of special needs. Delivery in Year 5 was especially popular as it contributed to the space topic within the curriculum.
- Parents helped with homework and attended assemblies and closing events.
- The January – April window worked well for delivery in most schools. Devoting a single term to the topic allowed teachers to be flexible with delivery and monitor progress.
- Several schools involved in Mission X have decided to increase the importance of STEM activities in their development plans.
- Media coverage was valued by the schools and students and helped generate interest from the wider community – especially through the local radio coverage.

Issues:

- The UK committed to Mission X in mid November 2010. This late entry to the programme created pressures on budgets, timings, organisation and delivery ready for a January 2011 start. Jeremy Curtis from the UKSA championed the project and worked with Venture Thinking as the programme manager to deliver the project. The project was made possible by good will and in kind support from all partners. This included management time, teacher cover, refreshments, photocopying, resource purchase, travel expenses. Schools reshuffled teaching plans at short notice but would normally require at least two terms notice to build into the lesson planning. .
- The materials are not yet cross referenced with UK curriculum standards and resource links but has the potential to contribute to increased student aspiration and attainment across the curriculum. A clear bulleted list of potential benefits for each year group with indicated time commitments required would be helpful for potential new schools..
- The pilot identified potential new activities e.g. space food menu design, design a mascot, mission patch design, rocket launching, body hygiene, hidden sugar, writing, science, numeracy and ICT activities.
- It is important to link with existing UK health initiatives e.g. Change 4 Life, MEND, MRC, Bodycare, Healthy Schools standards to avoid overlap and competition amongst initiatives. Ways of measuring baseline fitness and the impact of the programme would be helpful but would require careful consideration and negotiation with health experts.
- Teachers struggled with the points system. They wanted to reward enthusiasm, teamwork, and engagement of the students and they wanted the points to be used as motivators – especially for students who dislike sports because they are not natural athletes.
- Many UK primary schools lack subject expertise, laboratory equipment, and gymnasium space. The partnership with the secondary school enabled schools to enrich the experience of the students.

- Staff training in delivery should cover not just the resource content but also the social media elements such as blogging, twitter, skype, and online chat.
- The programme has potential to engage students over different year groups – for example astronaut trainees in year 5 could become astronaut trainers in year 6. This would keep the interest and involvement in the programme sustained.
- It would be interesting to repeat the project in an area with high levels of risk of pediatric obesity – however schools in these areas may require additional support as they are meeting with a range of complex social and educational needs.

Participation in a closing event:

- Many schools arranged assemblies for parents and other students – and used these events to announce the in school wining team. A community astronaut graduation event chaired by Jeremy Curtis and with input from the Medical Research Council was hosted by MMCC. Certificates and badges were presented to students in front of their families. Major Tim Peake and Ali Llewellyn participated through SKYPE. Schools showcased their work and students demonstrated the science activities to visitors. A mobile planetarium was also available Approximately 150 students and parents took part. It was not possible to host the date to coincide with the European closing event.

Recommendation for future Mission X events:

- A menu of high profile events e.g. speech from Michelle Obama in the White House, astronaut message, announcements Olympics Committee available in a range of broadcast media e.g. NASA TV, You Tube, Skype etc would be of value.
- A message board of new resources, offers to pair up with other countries would be helpful too.
- Need to clarify if there are any restrictions on the use of Mission X materials by other partner organisations
- The astronaut involvement at the start and end provides the unique inspiration, excitement and life learning context.

Willingness to support future Mission X events:

- The UK Space Agency is interested in supporting Mission X in the futures. Schools who were involved in the pilot are keen in extending the project to future years. All external partners were also enthusiastic about the extension.
- There is interest from other schools in the UK to take part in the next phase.

Internet sites:

Radio
http://www.heart.co.uk/essex/news/local/essex-students-space-mission/

Local press

http://www.saffronwaldenreporter.co.uk/news/essex_college_enrols_nasa_and_european_and_uk_space_agencies_to_train_children_to_be_astronauts_1_779977

http://www.stanstedlink.org.uk/On%20line%20editions/Feb%2011.pdf

http://www.elsenham.essex.sch.uk/docs/news/28_8apr11.pdfhttp://www.bis.gov.uk/ukspaceagency/news-and-events/2011/Jan/fit-for-space

National Press
http://www.rocketeers.co.uk/node/1229
http://www.esero.org.uk/news/mission-x-launches-on-the-internet
http://www.bis.gov.uk/ukspaceagency/news-and-events/2011/Apr/uk-students-astronaut-challenge-participants-receive-message-from-the-international-space-station
http://www.bis.gov.uk/assets/bispartners/ukspaceagency/docs/spaceuk/11-69a-spaceuk-31

Japan

In 2002, the Central Education Council of Japan published a policy report concerning the decline in children's physical strength and its solutions. According to the report, children's athletic ability has declined slowly but continuously since the 1980s in Japan. It concludes that it is essential to provide opportunities for regular exercise and maintain a balanced lifestyle. Against the background of this situation, we supported the international Mission X's standpoint and became a partial participant for the international pilot mission in 2010-2011. The reason why we hesitated to become a full participant was because we had to initially monitor whether the concept could suit Japanese children's lifestyles.

A total of 3 events (whole day events, from 10 AM to 3 PM) , once a month for three months, were arranged together with the Tsukuba Young Astronaut Club (TAC) members. Seven contents were selected from the 18 original core contents for our Mission X in Japan, each of which was slightly downgraded because participants varied considerably from 3 to 15 years old, and with wide-ranging education levels (pre-school to junior high school). In addition, we created an original content for the nutrition lecture, entitled "What a sweet soda!": in order to demonstrate how much sugar contained in a soda. Finally, five forms of exercise training and three nutritional lectures are adopted. A nutritional lecture was planned just after the lunchtime at the first event, however, it was hard for the students to maintain their concentration. As a result, the lectures were shifted to the morning after that.

To understand how effective the curriculums were for children and their parents in improving their daily life habits, we conducted a questionnaire survey for each event. The questionnaire consisted of multiple choices and free descriptions. From the result of the questionnaire survey, most participants were interested in the program and answered "strongly yes" or "yes" to the following question: "Did you figure out why the astronauts can live and work healthy in space?". However, several curriculums seemed unfit to students under developmental age and 10- years old. Muscle strengthening exercises might be especially unfeasible for children whose muscles were still underdeveloped.

The Mission X pilot study in Japan was held in a restricted area, Tsukuba, Ibaraki, and for a restricted group, TAC. We consider Mission X worth continuing in order to promote and educate students to instill and adopt good nutrition and physical fitness as life-long practices. To expand this program into a nationwide activity, we will have to develop a sustainable system for supporters/educators training and provide interactive contents for multimedia and internet.

The earthquake and tsunami crisis in March 2011 have shown us that physical fitness, nutrition, and teamwork are indispensable, not only for exploring space but also overcoming disasters. We would

like to provide some activities to cheer up earthquake victims with our Mission X program in the near future. We will be continuing the education/public outreach to promote the public understanding of science and contribute to education through manned space exploration specialties and knowledge, our outcomes.

The Mission X pilot study in Japan was reported at the following websites (part, in Japanese):
1) JAXA space biomedical web site;
http://iss.jaxa.jp/med/missionx/
2) JAXA astronauts' activity report;
http://iss.jaxa.jp/astro/report/2011/1102/mission_x.html
3) Twitter @Astro_Satoshi on Jan. 18th, 2011;
http://twitter.com/#!/nogu5353/statuses/27339427118325760
and interviewed by the 4 newspapers.

Colombia
See Appendix H

Czech Republic
Description of the approach taken:
Reaching 3 targeted schools, which have cooperated in the previous period in space projects for this specific age group of children.
Major points:
(what has been achieved): Active involvement of children, their own modifications of disciplines (eg. remotely controlled "robotic hand" in the Crew Assembly)
Issues:
Lack of uniformity in scoring disciplines, we need to use the standard approach.
Participation in a closing event:
NON-PARTICIPATION
Recommendation for future Mission X events:
Puzzle and / or gloves for the Crew Assembly (with space theme and logo of MissionX)
Willingness to support future Mission X events:
Yes
Internet sites:
http://www.czechspace.cz/cs/vzdelavani/mise-x-trenuj-jako-astronaut

Austria
Description of the approach taken:
Mission X in Austria was operated by the Vienna Planetarium with a team of 3 persons and FFG as local Austrian Space Agency.
Major points:

- 2010: Preparation of Mission X
- Mission started on 10 January 2011 at Kuffner Observatory with a Kick Off meeting for all teachers.
- Individual visits to all school classes from February to April
- Final event for all schools at Vienna Planetarium on 5 April 2011

- Final event at Technical Museum Vienna on 12 April 2011 (incorporated into Space Day 2011 of FFG)
- Final school visit for 2nd winning team on 31 May 2011

Issues:

- Helping the schools to manage their exercises
- Organise and manage the workshops
- The Planetarium Vienna organised the final event at the Vienna planetarium for all school classes and teachers, FFG organised a winning ceremony with one of the winning teams at the Technical Museum in the framework of the FFG Space Day 2011 and a visit of ESA Astronaut Gerhard Thiele to the other winning team at the school
- Trouble shooting in case of problems

Participation in a closing event:

Closing event for all participating school classes on April 5 at the Planetarium Vienna, FFG used Mission X to raise awareness for space in general, the celebration of the winning team was integrated in the Space Day 2011, an FFG event on the occasion of the anniversary of 50 years of manned space travel on April 12, which proved to be very successful and attracted the personal attendance of the Austrian Federal Minister for Transport, Innovation and Technology, a visit of ESA Astronaut Gerhard Thiele (fellow resident at the European Space Policy Institute in Vienna) at a participating school class near Vienna on May 31 was also organized.

Recommendation for future Mission X events:

The European Space Agency ESA should be an active partner in motivating all 18 ESA member states to contribute to the challenge and make it an ESA wide undertaking, more ESA support would be desirable.

Willingness to support future Mission X events:

FFG is willing to support another challenge.

Internet sites:

http://www.astronomie-wien.at/missionx.html

Italy

Description of the approach taken:

We published an application form on the ASI web site to select the schools for the challenge. 7 team participated with 300 students from the North of Italy. Each school customized Mission X to suit their timetable and curriculum priorities. We had very small budget so we used ICT (skype, mails, on line chat, etc) to communicate with and to train the teachers.

Major points:

We believe that a face-to-face training session with teacher is necessary. It's important to better explain the point system, the use of the web site and the lessons contents to make the challenge work. Because of lack of laboratory equipment in Italians schools we had to change or eliminate some lessons that couldn't be done. Staff training in delivery should cover not just the resource content but also the social media elements such as blogging, twitter, skype, and online chat.

From the teachers involved in the project has emerged predominantly the need to allow at least 3 training sessions, organized as follows:
. project presentation, description and discussion about activities
. analysis of possible modifications and variations emerged after the first meeting, suggested by the same teachers

. practical exams of some activities

Moreover, teachers suggested the utility of an ongoing tutoring. The ability to create a forum for discussion between teachers and tutors. It seems also very useful to provide them with a kit with all the didactic material then they found also on the site.

Issues:

We believe that a three years challenge could successfully be organized in three different steps: first step: train like an astronaut. Second step: work like an astronaut. Third step: see your experiment fly on the ISS.

Participation in a closing event:

The closing event was a success, wit more that 300 students participating. It was held in Turin, at the ALTEC Centre, that is an ASI affiliate, the same day of the European event. The ESA Italian Astronaut Samantha Cristifiretti was the chair of the day and the students had the opportunity to ask many questions about the astronaut training. The Centre also have the swimming pool were the astronaut trains and other interesting facilities about Space and ISS. Students could also see the Martian ground with the rover on it. At the and of the event, before the prize-giving ceremony, we connected (streaming) through ESA with the ESA Italian Astronaut Paolo Nespoli on the ISS. Nespoli answered some questions from Italian schools too. The prize for the winning team was gym equipments, but every participating students received a little prize from ASI (a bottle with the Mission X logo) and the Mission X certificate, with the original signature of Samantha Cristoforetti. Many media were present to the event and we had an important TV space on the Italian most important scientific TV news for children that is TG Leonardo on RAI TV.

Recommendation for future Mission X events:

Italian young students are not fluent in English. If another in-flight call with an Italian astronaut on the ISS is arranged, let the astronaut to speak in Italian too.

Willingness to support future Mission X events:

The Italian Space Agency is interested in supporting Mission X in the future. Schools who were involved in the pilot are keen in extending the project to future years. The external partner Infini.to was also enthusiastic about the extension. There is interest from other partners (ALTEC, others planetariums) to join the project.

Internet sites:

www.asi.it
http://www.esa.int/esaCP/SEMTTJ1PLFG_Italy_0.html
http://www.asi.it/it/educational/scuole/mission_x_train_like_an_astronaut_
http://www.asi.it/it/press_room/comunucati_stampa/mission_x_da_grande_far_lastronauta_
http://www.planetarioditorino.it/Progetti/mission_x_def.pdf
http://www.esa.int/esaCP/SEMUX7SRJHG_Italy_0.html
http://www.esa.int/esaHS/SEMDI76UPLG_education_3.html
http://www.torinoscienza.it/articoli/mission_x_da_grande_faro_l_astronauta_21153
http://bambinioggi.blogosfere.it/2011/04/bambini-come-astronauti.html
http://www.flickr.com/photos/magisstra/5353519713/
http://www.wired.com/geekdad/2011/01/mission-x-helps-kids-train-like-an-astronaut/
http://www.nextme.it/scienza/universo/1600-vuoi-diventare-un-astronauta-la-nasa-lancia-mission-x-
http://www.flickr.com/photos/magisstra/5403477113/
http://www.esero.org.uk/news/mission-x-launches-on-the-internet
http://www.torinoscienza.it/eventi/mission_x_allenati_come_un_astronauta_21425
http://daily.wired.it/news/scienza/addestramento-astronauta-nespoli.html

http://businesspeople.it/Societa/Attualita/Paolo-Nespoli-un-italiano-nello-spazio.-E-su-Twitter_13892
http://www.italiamagazineonline.it/archives/5273/nuova-missione-del-maverick/
http://www.ilcittadinoonline.it/news/132386/Paolo_Nespoli_partito_con_la_Soyuz__rester%C3%A0_nello_spazio_____giorni.html
http://www.youtube.com/user/TrainLikeAnAstronaut
http://www.ilsussidiario.net/News/Scienze/2010/6/8/SPAZIO-Chi-trovera-un-nome-per-la-prossima-missione-di-Paolo-Nespoli-/91374/
http://www.esa.int/esaCP/SEMEA2TOREG_Italy_0.html
http://leonardo.blog.rai.it/ (news of 31-03-2011)
http://www.asitv.it/ ("pulsar" – 1-04-2011)

Spain

Description of the approach taken:

10 primary schools and 359 students from 4 different regions around Spain (Madrid, Castilla la Mancha, Andalucía and Cataluña) were selected by the university according to the high interest of the teacher for the project. Each school customized Mission X to suit their timetable and curriculum priorities but within the period from January to March. UPM got the entire budget to give to the schools a kit of material to develop the project and to bring to the teachers to Madrid for the teacher training day. During all the challenge UPM offered support by mail to the teachers to solve any questions or doubt.
ESA Spain collaborated with us to organize the final event at ESAC and to bring all the students to the center.

Major points:

Translation of the materials into the Spanish (from May to July, 2010)
Contact with sponsors and institutions to get founding (May to November, 2010)
Selection of the schools (September 2010)
Preparation and sending of the materials to the schools: T-shirts, gloves, MX puzzles, MX ruler, handbook for teachers and students, Physical Education Kit (foam balls, tape measure, cones, etc) (from June 2010 to January 2011)
Teacher training day (December, 2010 at Faculty of Physical Activity and Sport Sciences, in Madrid)
Mission started on 20 January 2011 without any special event
Final event at ESA/ESAC with the schools on 30 March, 2011

Issues:

The project has been developed successfully in Spain. It has been a great surprise even for the teachers how the program engaged to the students.
We needed a long time to get money support from the companies. It was not easy to get the money. Therefore, we contacted the schools late for them. It must be done at the beginning of the academic year (September).
A very good relationship with ESA/ESAC has been established, even when, from the beginning, they weren´t involved in the project. ESA/ESAC supported us for the final event with all the organization of the visit to ESAC, founding for the buses, lunch for the pupils, etc.
The participation and implication of CDTI has been poor.
Many SP primary schools lack subject expertise and laboratory equipment, the science lessons should be easier to apply for all the schools.

The quality of some lessons according to the opinion of the teachers can be improved.
We would like to change same minor aspects in some of the lessons.

Participation in a closing event:

6 schools from 10 could participate in the closing event at ESA/ESTEC on March 30. The schools very far from ESAC couldn´t participate in the final event because of there wasn´t enough money to bring them there.
ESA/ESAC organized a visit to the complex and a funny and interested PowerPoint about space exploration, living in space, etc. After this, ESAC connected with the sign sent by ESTEC and all the students and teachers enjoyed Paolo Nespoli and her mate.

Recommendation for future Mission X events:

All the topics, materials, support, sites, etc., must be finished by September when the academic year starts in Europe. It is necessary to clarify to the schools and teachers at the beginning of the scholar course that the project will be part of the annual program.
ESA and NASA have a lot of online materials really nice for the students. This material could be available on the Mission X web page. Most of our teachers asked us for more materials about space, astronauts, etc.
We do not agree to present the challenge as a competition between teams, we will present our ideas during the F2F meeting in Netherlands.
The cooperation between teams or schools from different countries would be really nice and interesting for them. May be to develop some activities where it would be necessary to get in contact with another foreign school would be perfect.
It is important to have funding to carry out the project.

Willingness to support future Mission X events:

The UPM is interested to coordinate Mission X in Spain in the future with the support of ESA Spain if funding from companies or institution is possible. Mission X cannot be carried out without funding, because children like the goodies and materials very much, and it is a plus of motivation for teachers. All schools who were involved in the pilot want to repeat if the project goes on.
There is interest from other schools in the SP to take part in the next phase.

Internet sites:

http://entrenacomounastronauta.wordpress.com/
http://www.actualidaduniversitaria.com/2010/11/proyecto-mission-x-entrenar-como-un-astronauta/
http://www.upm.es/institucional/UPM/CanalUPM/Noticias/599348cf4f43f210VgnVCM10000009c7648aRCRD
http://www.munideporte.com/noticias_seccion.asp?id_noticia=8079&id_seccion=12
http://www.sener.es/EPORTAL_DOCS/GENERAL/SENERV2/DOC-cw4dca63dd1e864/revista-sener-noticias-41-mayo-2011.pdf
http://www.esa.int/esaCP/SEM4WU4XT9G_Spain_0.html

France

Description of the approach taken:

• Seven primary and three secondary school took part, which represents a total of 221 students'.
Seven schools were based in Toulouse or vicinity, one near Paris and 2 in French Guyana (we choose schools not too far from the CNES centres in Toulouse, Paris, French Guyana, to have an easier connection with them…)
Each school customized Mission X to suit their timetable and curriculum priorities.

Major points:

• The Mission X content inspired classroom teachers who noted an increased motivation in PE, Based on experience by means of a series of behavioural and physical activities
• Students and teachers enjoyed the international dimension and blog entries
• The program was very much appreciated by the involvement of international space Agencies
    - Similarity between astronaut training and student training. –
    - Mythical effect and the human achievement inherent in the image of space exploration

Issues:

•.We had not time for teacher training, we meet the teachers independently before the challenge start;
• The mission duration was too short
• Late entry to the programme created pressures in organisation for a January 2011 start...
• The materials are not yet cross referenced with France curriculum standards
• We had no money and no time to translate the material
• Teachers had hard time with the points system.
• The primary schools lack equipment, and gymnasium

Participation in a closing event:

• We organize 3 separate closing events, one in Toulouse with 7 classes and one in Paris the same day, one day after the European closing event (It was not possible to coincide with the European closing event) and one later in French Guyana.

Recommendation for future Mission X events:

• Translation in French of the resources.
• drawing up a programme of extra-curricular activities,
• Link Mission X with existing France health initiatives
• developing a tool related to the nutritional program (video game)
• plotting the points on an explicit graph or diagram
• make scoring more credible
• use the points to reward teamwork, and engagement of the students including in extra curriculum, especially for students who dislike sports
• using a weekly program in the form of a matrix table
• making the awarding and counting of points clearer
• reading up on mission protocols as early as possible at the beginning of the year.
• Introducing more physical health and sports activities
• emphasize the competitive aspect with respect to others and to each person's physical fitness. Exchanges between students via Internet

Willingness to support future Mission X events:

CNES is interested in supporting Mission X in the futures
All of the participants were unanimously in favor of introducing the space context into schools and curricula. It is obviously motivating, innovative, fascinating and challenging and stimulates participation by all students:
Open the Project to the other schools in France.
• try to involve partnership like Cité de l'Espace in Toulouse…

Internet sites:

http://www.cnes.fr/web/CNES-fr/8404-em-mission-x-entraine-toi-comme-un-astronaute.php

Belgium

Description of the approach taken:

Major points:
Issues:
Participation in a closing event:
Recommendation for future Mission X events:
Willingness to support future Mission X events:
Internet sites:

Germany
Description of the approach taken:
Major points:
Issues:
Participation in a closing event:
Recommendation for future Mission X events:
Willingness to support future Mission X events:
Internet sites:

Netherlands
Description of the approach taken:
Major points:
Issues:
Participation in a closing event:
Recommendation for future Mission X events:
Willingness to support future Mission X events:
Internet sites:

Appendix E: Post-Survey Results by Country

United Kingdom

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	50%	25%	25%		
My understanding of science concepts were strengthened as a result of the Mission X **training**.	25%	25%	50%		
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	25%	50%	25%		
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	50%		50%		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	50%		50%		
The program was effective in teaching the importance of physical fitness.	75%	25%			
The program was effective in teaching the importance of nutrition in space and on Earth.	50%	50%			
Mission X was effective in helping me to develop new partnerships with other schools.	50%	50%			
Mission X was effective in helping me to develop new partnerships with employers.	50%	25%	25%		
Mission X provided me an opportunity to work with parents.	25%		75%		
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	100%				
The Mission X website was helpful.	25%	75%			
All the materials needed to implement Mission X were easily accessible.	50%	50%			
All resources needed to implement Mission X were easily accessible.	50%	50%			

Total surveys received: 4

Spain

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	33%	67%			
My understanding of science concepts were strengthened as a result of the Mission X **training**.	50%	33%	17%		
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	67%	33%			
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	83%		17%		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	60%	40%			
The program was effective in teaching the importance of physical fitness.	67%	33%			
The program was effective in teaching the importance of nutrition in space and on Earth.	66%	17%	17%		
Mission X was effective in helping me to develop new partnerships with other schools.			83%	17%	
Mission X was effective in helping me to develop new partnerships with employers.		33%	17%	33%	17%
Mission X provided me an opportunity to work with parents.		17%	50%		33%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	83%	17%			
The Mission X website was helpful.	50%	50%			
All the materials needed to implement Mission X were easily accessible.	17%	17%	33%	33%	
All resources needed to implement Mission X were easily accessible.	33%	33%		33%	

Total surveys received: 6

Italy

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	50%	50%			
My understanding of science concepts were strengthened as a result of the Mission X **training**.	50%	50%			
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	50%	50%			
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	50%	50%			
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	50%	50%			
The program was effective in teaching the importance of physical fitness.	50%	50%			
The program was effective in teaching the importance of nutrition in space and on Earth.	100%				
Mission X was effective in helping me to develop new partnerships with other schools.			100%		
Mission X was effective in helping me to develop new partnerships with employers.			100%		
Mission X provided me an opportunity to work with parents.		50%	50%		
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	100%				
The Mission X website was helpful.	100%				
All the materials needed to implement Mission X were easily accessible.	100%				
All resources needed to implement Mission X were easily accessible.	100%				

Total surveys received: 2

Germany

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	50%	50%			
My understanding of science concepts were strengthened as a result of the Mission X **training**.		50%	38%		12%
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	25%	63%	12%		
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	50%	38%	12%		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	75%	25%			
The program was effective in teaching the importance of physical fitness.	50%	50%			
The program was effective in teaching the importance of nutrition in space and on Earth.	25%	50%	25%		
Mission X was effective in helping me to develop new partnerships with other schools.				12%	88%
Mission X was effective in helping me to develop new partnerships with employers.				12%	88%
Mission X provided me an opportunity to work with parents.		12%	12%	38%	38%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	38%	37%	25%		
The Mission X website was helpful.	38%	37%	25%		
All the materials needed to implement Mission X were easily accessible.	13%	50%	25%	12%	
All resources needed to implement Mission X were easily accessible.	13%	50%	12%	25%	

Total surveys received: 8

Colombia

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	48%	48%	4%		
My understanding of science concepts were strengthened as a result of the Mission X **training**.	67%	33%			
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	75%	20%	5%		
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	67%	29%	4%		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	85%	9%	5%		
The program was effective in teaching the importance of physical fitness.	95%	5%			
The program was effective in teaching the importance of nutrition in space and on Earth.	90%	5%		5%	
Mission X was effective in helping me to develop new partnerships with other schools.	10%	50%	20%	10%	10%
Mission X was effective in helping me to develop new partnerships with employers.	10%	32%	37%	11%	11%
Mission X provided me an opportunity to work with parents.	24%	24%	42%	5%	5%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	81%	14%	5%		
The Mission X website was helpful.	81%	14%	5%		
All the materials needed to implement Mission X were easily accessible.	29%	24%	24%	19%	4%
All resources needed to implement Mission X were easily accessible.	24%	24%	38%	10%	4%

Total surveys received: 21

Japan

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	43%	57%			
My understanding of science concepts were strengthened as a result of the Mission X **training**.	42%	29%	29%		
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.		100%			
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	14%	43%	43%		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	29%	57%	14%		
The program was effective in teaching the importance of physical fitness.	57%	43%			
The program was effective in teaching the importance of nutrition in space and on Earth.	43%	57%			
Mission X was effective in helping me to develop new partnerships with other schools.	29%		71%		
Mission X was effective in helping me to develop new partnerships with employers.	50%	33%	17%		
Mission X provided me an opportunity to work with parents.	29%	43%	14%		14%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	50%	50%			
The Mission X website was helpful.	14%	72%	14%		
All the materials needed to implement Mission X were easily accessible.		83%	17%		
All resources needed to implement Mission X were easily accessible.		83%	17%		

Total surveys received: 7

Netherlands

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	45%	44%	11%		
My understanding of science concepts were strengthened as a result of the Mission X **training**.	22%	11%	45%	22%	
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.					
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	33%	33%	23%	11%	
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.					
The program was effective in teaching the importance of physical fitness.	45%	33%	11%	11%	
The program was effective in teaching the importance of nutrition in space and on Earth.	45%	33%	11%	11%	
Mission X was effective in helping me to develop new partnerships with other schools.					
Mission X was effective in helping me to develop new partnerships with employers.					
Mission X provided me an opportunity to work with parents.					
Mission X provided opportunities for students to develop teamwork and interpersonal skills.					
The Mission X website was helpful.	11%	67%	11%		11%
All the materials needed to implement Mission X were easily accessible.	45%	33%	11%		11%
All resources needed to implement Mission X were easily accessible.	45%	33%	11%		11%

Total surveys received: 9

United States

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	62%	38%			
My understanding of science concepts were strengthened as a result of the Mission X **training**.	39%	38%	23%		
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	38%	54%	8%		
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	62%	38%			
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	54%	46%			
The program was effective in teaching the importance of physical fitness.	61%	31%	8%		
The program was effective in teaching the importance of nutrition in space and on Earth.	46%	46%	8%		
Mission X was effective in helping me to develop new partnerships with other schools.	8%	22%	62%	8%	
Mission X was effective in helping me to develop new partnerships with employers.	8%	15%	69%	8%	
Mission X provided me an opportunity to work with parents.	22%		39%	31%	8%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	69%	23%	8%		
The Mission X website was helpful.	77%	15%	8%		
All the materials needed to implement Mission X were easily accessible.	46%	15%	31%	8%	
All resources needed to implement Mission X were easily accessible.	53%	31%	8%	8%	

Total surveys received: 13

France

	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.					
My understanding of science concepts were strengthened as a result of the Mission X **training**.	18%	19%	19%	19%	25%
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	21%	16%	21%	16%	26%
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	17%	17%	17%	22%	27%
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	21%	16%	21%	16%	26%
The program was effective in teaching the importance of physical fitness.	16%	21%	16%	21%	26%
The program was effective in teaching the importance of nutrition in space and on Earth.	14%	19%	24%	19%	24%
Mission X was effective in helping me to develop new partnerships with other schools.	22%	17%	27%	17%	17%
Mission X was effective in helping me to develop new partnerships with employers.	18%	12%	28%	24%	18%
Mission X provided me an opportunity to work with parents.	27%	9%	27%	9%	28%
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	20%	20%	25%	15%	20%
The Mission X website was helpful.	23%	29%	18%	6%	23%
All the materials needed to implement Mission X were easily accessible.	19%	25%	12%	13%	31%
All resources needed to implement Mission X were easily accessible.	21%	21%	11%	21%	26%

Total surveys received: 21

Appendix F: ESA Final Report - MISSION X – TRAIN LIKE AN ASTRONAUT

1. Concept and scope

In light of increasingly global health issues, and seeking to take actions to help address them, "Mission X– Train like an Astronaut" aims to encourage proper exercise and nutrition starting at an early age. This concept was developed by members of the International Space Life Sciences Working Group (ISLSWG) and is an effort of the Space Agencies and organizations involved to encourage healthy, active lifestyles among children. Using the unique example of space explorers, the Participating Agencies seek to motivate and educate young people worldwide that good fitness and nutrition are life-long endeavours.

The purpose of Mission X is to demonstrate to children internationally the value of exercise and nutrition by

- Developing a multi-national health and fitness challenge that each Participating Agency will implement within its own region;
- Creating an activity website to provide student participants a forum for exchange and an online database for activity-related materials; and
- Performing international outreach opportunities with astronauts and cosmonauts to increase awareness regarding the importance of physical fitness and good health.

Mission X also allowed each Agency to enhance its awareness of the educational and outreach content provided by each partner.

2. Challenge phases

Formulation phase: Summer 2008-spring 2009
Pre challenge phase: Spring 2009-December 2010
Challenge phase: Jan-March 2011
Post challenge phase: March-July 2011

3. Partners

The challenge has been endorsed and implemented in 12 countries with national space agencies and partner institutions.

Country	Lead Agency	Supporting institution
Austria	FFG	Planetarium of Wien
Belgium	BELSPO	Euro Space Centre
Colombia	CCE	IGAC, Fundacion Ciudad Horizon 2050
Czech Republic	CSO	
France	CNES	
Germany	DLR	
Italy	ASI	Planetarium of Turin
Japan	JAXA	Young Astronauts Club
Netherlands	ESA	NSO, Space Expo
Spain	CDTI	Universidad Politecnica Madrid
UK	UK Space Agency	Venture Thinking, Royal Observatory Greenwich

USA	NASA	College Station Independent School District
Europe	ESA	

NASA (Charles Lloyd, NASA Human Research Program, Education & Outreach Manager) served as the Chair for Mission X by coordinating the project and designing and implementing the website. Russia, Belgium, Czech Republic and Japan were included in the Working Group as "observing" partners, supporting the effort as it developed but not hosting teams or following the challenge rules (e.g. starting date, translations, …).
More European countries (Finland, Denmark and Ireland) showed interest to join the challenge
Mission X has been a rare opportunity for international partners to work together on outreach and represents a unique example of an educational programme developed by such a large partnership of Space Agencies which have worked together on content, outreach, and objectives. This inter-agency aspect was one of the scopes of Mission X.

4. Participants

Country	Students	Teams
Austria	250	10
Belgium	25	1
Colombia	810	40
Czech Republic	75	3
France	221	10
Germany	297	12
Italy	300	7
Japan	30	N/A
Netherlands	490	12
Spain	359	18
UK	500	8
USA	807	7

Total: about 4100 children aged 8-12 years old, from 12 countries, 40 cities and 128 teams.

5. Activity development

19 new activities were developed for Mission X – Train like an Astronaut: 15 physical exercises (with science introduction) and 4 science class activities (about nutrition with teacher's guide). ESA developed 4 physical exercises, 1 science lesson with teacher's guide and a point system; NASA 11 physical exercises, 4 science lessons and a point system. The other agencies translated the material and adjusted it to national curricula. All the material was provided in 6 + 3 languages (English (US & UK), French, German (AU & DE), Italian, Spanish (ES & Colombia), Dutch), translated by the national agencies.
ESA organized training for Dutch teachers and supported the training for teachers in the UK.

6. Website

The Mission X – Train like an Astronaut website (www.trainlikeanastronaut.org) was designed and implemented by NASA with the partners' approval. ESA provided translations in 6 languages. About 650 messages (posts, videos, pictures) were posted by participating countries (in their own language) from March 2010 to March 2011. Little Charlie, the Mission X mascot, made it to the

Moon thanks to the collective effort (points corresponded to steps towards the Moon) of the 12 countries.
A Mission X Facebook page (133 friends, NASA-ESA-UKSA administrators) and Mission X twitter (NASA administrator) were set up during the pre challenge phase.

7. Opening and closing event

Each country was responsible of its opening and closing events, depending on national constraints, available manpower and budget. Opening events took place around mid January and closing events at the end of March.
ESA contribution to the events is the following:

- Dutch opening event (300 participants) in collaboration with NSO and Space Expo on January the 14th
- ESA/EAC supported German opening event
- Promotional items and Mission X posters to all European countries for opening events
- ESA astronaut Paolo Nespoli as ambassador of Mission X via recorded message
- ESA videos made available for European opening events
- German closing event (90 participants) in collaboration with DLR on March the 30th. Belgian delegation attended.
- ESA/ESAC supported Spanish closing event
- ESA/ESTEC supported Dutch closing event
- In-flight call with ESA astronaut Paolo Nespoli distributed (streaming) to all partners
- Mission X exposition at EAC
- Promotional items and certificates of participation to all European countries for closing events

8. Outreach

16 astronauts were involved in Mission X, giving their contribution to inspire children worldwide:

- Mike Barratt took Charlie mascot to ISS on STS-133 (pictures)
- Cady Coleman, video from ISS and in-flight call
- Leland Melvin, US closing event
- Rick Linnehan, US closing event
- Paolo Nespoli, ESA ambassador and in-flight call
- Andre Kuipers, double interview and DE closing even
- Christer Fuglesang, NL opening ceremony
- Samantha Cristoforetti, IT closing event
- Frank de Winne, NL closing event
- Michel Tognini, DE closing event
- Pier Sellers, UK closing event
- Mike Barrat, UK closing event
- Chiaki Mukai, Japan closing event
- George Zamka, Colombia closing event (TBC)
- Satoshi Furukawa, DE closing event,
- Michael Fossum, DE closing event

Mission X got 1 in-flight call (30/3), 1 video (Cady Coleman), and several pictures and tweets from the International Space Station.

NASA produced 2 clips (1 promo and 1 highlight) with contributions from the partners.
ESA produced 3 clips: the official opening message with Paolo Nespoli (ESA HSF), double interview with André Kuipers (NL and EN, ESA HSF), highlight and conclusion (ESA LEX) and raw material for future ESA productions (Dutch opening events, interviews with children, Dutch children performing exercises).
Mission X was the topic of presentations at IAC (2009 and 2011), ISU (2010), HIS (2011), ISBNPA (2011) and ISLSWG (2010) presented by the interagency collaborations.
ESA published 4 web articles about Mission X (2 on the ESA homepage), translated in the 5 Mission X languages. NASA released 2 official press releases and most agencies got media coverage in their own country. Besides the ESA press clippings about the Dutch event, NASA will provide an overview of media coverage. In general, the joint effort of so many organizations led to good media coverage.
The initiative supports the goals of First Lady Michelle Obama's "Let's Move" programme announced in February 2010.

9. ESA manpower and budget

Mission X was initiated by the ISS Utilisation Department as member of the ISLSWG and implemented in ESA by Cristina Olivotto (HSF-CO contractor) with a substantial support of Nicole Sentse (HSF-COU contractor) especially for the Dutch part.
Internal support:

- HSF-COU (production of videos, organisation in-flight call, writing Mission X web articles, production of promotional items, technical and graphical support)
- HSF-AM (EAC astronaut training consultancy)
- HSF-USP and USL (scientific consultancy and general support)
- HSF-AA (astronauts)
- LEX-CDA (EAC)
- LEX-C (ESA National Country Desks)
- LEX-CBO (HSF Communication Officer and web editor)
- LEX-CAS (ESAC Communication & Education Office)
- OPS-ETG (ESTEC Internal Transport)

Mission X has been a relatively low-budget programme. The main expenses correspond to (roughly):

- Promotional items (ca. 20000 euro)
- Translation Dutch exercises (ca. 7000 euro)
- Translation Mission X website (ca. 1500 euro)
- Training day NL (ca. 200 euro)
- Mission X meeting Spring 2010/ESTEC (ca. 300 euro)
- Mission X meeting Autumn 2010/CNES (ca. 400 euro for 2 missions)
- Mission EAC closing event (ca. 1300 euro for missions)

10. Survey

The Mission X partners (led by NASA) prepared 2 Mission X assessment forms, one addressed to teachers and team leaders, the other one to the partners. ESA collected 8 of the 12 questionnaires from Dutch schools (4 still missing) and NASA is collecting the ones from the partners and all the teachers (through national agencies).
NASA collective report is targeted for July 1 but a preliminary report will be presented during the ISLSWG meeting which will take place in Italy from 6-9 June 2011.

11. Future opportunities

NASA expects to have a formal commitment for the future (second edition of Mission X) in July 2011. Currently the other major partners are all enthusiastic in continuing Mission X but funding and manpower can be an issue. It is expected that NASA leadership is essential to continue the project. Mission X could be implemented again in the Netherlands during André Kuipers' mission end 2011. André Kuipers is a medical doctor by training and the material is already available in Dutch. However, new strategies to promote the programme in schools must be implemented (e.g. closer collaboration with NSO). Finding 12 schools that wanted to join the programme required quite an effort as schools receive many interesting proposals of educational projects each year.

12. Recommendations and considerations

Mission X aligns very well with ESA's needs and wishes as it promotes many aspects of Human Spaceflight, involves several European member states and a close collaboration with the ISS partners. It also gave the educational team the opportunity to work closely with other teams in the Directorate of Human Spaceflight and our colleagues of Communication.
The best parts of the programme were: the international collaboration, the theme (space & fitness) which is very appealing to schools, and the opening event in the Netherlands.
In order to improve the programme, the following recommendations have been identified:

- Have a clear understanding of budget needs before undertaking the programme (core financial plan to be provided by main partners).
- Have a clear understanding of the relation between ESA and the national space agencies (who is responsible for what).
- For each agency: identify high management that endorses the project AND educational officers who implement it.
- Have a clear policy about institutions which are collaborating with national space agencies/offices.
- Collaboration with national governments and the international World Health Organisation.
- Officially inform relevant ESA Country Desks in advance, to have an active role in the promotion, communication, and support of national teams.
- For the Netherlands: involve a Dutch native speaker to ensure good communication with Dutch schools and third parties.
- Involve more science teachers.
- Offer teachers more workshops and support throughout the challenge (2-3). The first one could be dedicated to better understand curricula's needs and better tailor the lessons. The following to support the teachers with the implementation.
- Add more activities from all countries (not only ESA and NASA)
- Add more European countries, and Russia, South Korea, India...
- Exchange of experiences between children from different countries

Appendix G: UK Mission X Assessment Summary

Mission X: Train Like an Astronaut
Survey Responses

Country Represented	Team	No of Students	Average Age
UK	Henham & Ugley (H&U)	30	9.5 years
UK	Henham Leaders (HL)	(above)	(above)
UK	MMCC Science Leaders (MCSL)	60	11 years
UK	MMCC Science (MCS)	(above)	(above)
UK	MMCC PE (MCPE)	60	11 years
UK	Bentfield (BF)	20	9 - 10 years
UK	Birchanger (BR)	26	10 years
UK	Elsenham (E)	30	9 - 10 yrs
UK	St. Marys (SM)	30	9- 10
UK	Grove (G)	61	11 years
UK	Leaders (Lead)	270	9-10
UK Totals	1 Secondary 6 Primary Schools	527	

Please rate the following:	Strongly Agree 5	4	Neutral 3	2	Strongly Disagree 1
The training I received prepared me to implement the Mission X activities.	xxxxx	xxx	xx		
My understanding of science concepts were strengthened as a result of the Mission X **training**.	xxx	xxxx	xxx		
My **students'** understanding of science concepts were strengthened as a result of the Mission X **program**.	xxxxx	xxx	xx		
My understanding of space exploration content was strengthened as a result of the Mission X **training**.	xxxxxxx	xx	x		
My **students'** understanding of space exploration content was strengthened as a result of the Mission X **program**.	xxxxxxx	xx	x		
The program was effective in teaching the importance of physical fitness.	xxxxxx	xxxx			
The program was effective in teaching the importance of nutrition in space and on Earth.	xxxxxxxxx	x			
Mission X was effective in helping me to develop new partnerships with other schools.	xxxxx	xxxxx			
Mission X was effective in helping me to develop new partnerships with employers.	xxxx	xx	xx	xx	
Mission X provided me an opportunity to work with parents.	xx	xxx	xxxxx		
Mission X provided opportunities for students to develop teamwork and interpersonal skills.	xxxxxxxxx	x			
The Mission X website was helpful.	xxxxx	xxxxxx			
All the materials needed to implement Mission X were easily accessible.	xxxxxx	xxxx			
All resources needed to implement Mission X were easily accessible.	xxxxxx	xxx			

SUMMARY OF COMMENTS

1. What was the most rewarding part of the Mission X program for your students? Why?
H&U: Involvement of astronauts, scientists, etc. Exciting and motivating.
HL: Involvement of space agencies. It was tremendously exciting.
MCSL: The team activities
MCPE Working in teams and competing against each other.
BF: Achieving the challenges and the awards ceremony.
BR: Understanding need for fitness and good nutrition.
E: There were lots. Meeting an astronaut, working at one of the feeder secondary schools using facilities on the open day, group competition, improving fitness, teamwork, learning in Science, basing their class assembly on it, the closing ceremony and winning best assembly, parent involvement, learning how to blog, meeting other children, handouts e.g. t-shirts.
G: To carry out the physical activities during indoor PE lessons. The children were more motivated to take part in PE lessons that they knew would be competitive and fun. The fact that they were recording their heart rate and monitoring this throughout, encouraged them to better themselves and be physically active during each PE lesson.
Lead: The students loved the space context and activities such as the hydration station and a space perspective onto existing activities in physical education.
They enjoyed the outside speakers and enrichment activities such as rocket launching, planetarium experiences.
They enjoyed blogging and seeing themselves on screen.
They loved being part of an international high profile project with NASA and ESA.
They loved meeting astronauts and speaking to astronauts in person.
The teamwork and opportunity to work with new people

2. What was the most rewarding part of the Mission X program for your organization? Why?
H&U Links with other schools/organisations/excitement across the whole school.
HL: Involvement of space agencies as it allowed other year groups to participate.
MCSL: Interaction with other schools and evening presentation.
MCPE Organising the PE mission X for our children plus primary school pupils
BF: Awards ceremony – achievement for the children.
BR: Visitors and planned events at MMCC.
E: Parental involvement, promoting schools health ethos, making cross curricular links to help improve writing, enrichment of the curriculum, forging links with colleagues at the secondary school, children's' enjoyment and enthusiasm.
G: To see the change in the children's behavior with regards to PE (they now understand and see the importance of keeping and leading a healthy lifestyle). To observe groups of children who may not usually work together to work collaboratively and enjoy it.
Lead: A new cross-curricular approach to existing topics.
High profile activities which were interesting to young people and attracted press interest.
Working in partnership with other primary schools and forging links with the MMCC secondary school.
Students sharing their enthusiasm with parents in assemblies and at the closing event.
3. What did your students find most challenging about the Mission X program? Why?
H&U Team work – not a strength in this particular year group
HL: Working successfully as a team.
MCSL: Agility run, football dribble activities/fitness activities
MCPE Getting used to writing their results into their books.
BF : Some of the PE Missions because they found them difficult.
BR: Completing work independently – at home.

E: Changing eating habits, esp in lunch boxes because this is often out of their control.

G: Keeping their journal up to date. Most children were very keen to take part in the lessons and complete their heart rate log before and after but some found this difficult to organize and compare. More time and lessons needed to be used to teach the children these skills as I feel when I did sit with some groups and analyze their heart rate changes it was a very valuable process.

Lead: Recording responses on paper.

4. What did your organization find most challenging about the Mission X program? Why?

H&U Fitting in the additional activities into a curriculum already planned

HL: Fitting in everything – devoting enough curriculum time as 'space' had already been covered.

MCSL: Organising

MCPE Organising space and timings of the PE activities for large groups.

BF: Organising the awards ceremony – preparing resources.

BR: Finding the time to complete blogs. Timing of project would have been better in autumn.

E: Fitting it in with all the other learning that is expected. Although we used cross curricular links wherever we could, had we known earlier in the year we would have done this even further

G: Some of the science lessons were not practical for primary schools and so we had to adapt these to suit the needs of our children and school. However I do feel the fact that we were able to visit a secondary school really helped as some of the more demanding science lessons (resource wise) were covered on this day.

Lead: The short notice and finding time in the curriculum. We need to link topics to art/mathematics/literacy/drama/music as well. So we did this but were supported by materials sourced by Heather MacRae rather than materials on the Mission X website.

Finding resources such as log books, photocopying, and finding money for bus travel to secondary schools.

Photocopying all the materials for the students.

Working out the time elements for the different missions.

5. What was most beneficial about using the website? Why?	
H&U	Resource availability – - in future we would use blog more for literacy
HL:	The lesson resources were useful and easy access to the song.
MCSL:	Material to teach and additional information to support this.
MCPE	Blog – seeing what others have done and how**.**
BF:	The steps to the moon – the children loved watching it move along.
BR:	Resources, updates and to see what others were doing.
E:	Access to the materials. Blogging for the children.
G:	The blogs, our children enjoyed seeing images and information about our school and other schools in our team as well as the international links. The lesson plan activities were also very good and easy to access. Our children also loved learning the mission x song too, which we downloaded from the website**!**
Lead:	Having the resources to hand.

6. Would you suggest modifying the website for future implementations? How?	
H&U	Need more intuitive steps e.g. guidance to show how to record data
HL:	I would have clear places for log ins.
MCSL:	Not really, just add additional information. Useful to have interviews of the astronauts for students to see.
MCPE	No
BF:	No
BR:	More interesting facts about space travel.
E:	Point scoring system.
G:	More games and activities for the children to take part in on the actual website.
Lead:	Yes, putting suggested time allocations for each activity e.g. using hour glass symbols to identify length of activities. Similarly, using a symbol for activities that require no external equipment or resources.

	Adding video clips e.g. that can be used as context setting.
7. Which activities were your favorites? Why?	
H&U	Reduce gravity/reduce fat – practical and visible results
HL:	Reduced gravity/hydration.
MCSL:	Practicals.
MCPE	PE and science information on bones
BF:	All of the PE missions – very challenging for the children.
BR:	Designing space food. Visitor brought session to life.
E:	Urine testing because it was a new way of looking at the importance of hydration with the children. Mission:Control because our school had the fastest runners on the opening day.
G:	The hydration station completed in a secondary school lab and the climb the Martian mountain challenge. Our children enjoyed climbing up and down the wall bars in the hall imagining they were astronauts in training!
Lead:	Hydration stations Astro-agility The fat contents
8. Which activities were difficult to implement? Why?	
H&U	Reduce gravity - OK in secondary schools. Crew assembly – lots of gloves needed. Also one with medicine balls – not used in primary schools
HL:	See 8 – more suited to secondary school.
MCSL:	None
MCPE	N/A
BF:	The cycling one – no bikes in school.
BR:	Astro – agility course because of lack of space.
E:	Cycling one because not all the children have bikes and we don't bring bikes to school.
G:	We did not complete the challenge were it taught the children how to eat healthy-Reduced gravity, low fat. We felt it was not practical in a

primary classroom. **Lead**: Food pyramid was fiddly and didn't link to UK Eatwell plate.
9. Did you modify any activities? If so, how and why?
H&U Undertook some activities at secondary school. **HL**: No. **MCSL**: We adapted materials for ease in teaching. **MCPE** No **BF:** I set some of the activities as homework. **BR**: Broadened the remit to provide a literacy and history focus. The History of Space Travel. **E**: Sometimes we adjusted the suggested equipment in PE activities to use what was available in school. **G**: Yes, as a school we didn't have a medicine ball and also felt this would be too dangerous for our children to lift so we used primary shot put weights to complete this particular activity. **Lead:** Yes, in a number of ways … Used paper instead of index cards for the Living Bones. Used skeleton bones instead of chicken bones. Used coffee granules for urine. Used school lunch contents for fat identification. Added art/mathematics/drama/additional science activities Added create a mascot, mission badge Added in Maximum Absorbency Garment. Added in additional context setting sessions
10. Did you conduct any of the fitness accelerations? Why/Why not?
H&U No – not enough time. Would within a space project. **HL** No – not enough time

MCSL: No – concentrated on science.

MCPE Agility run

BF: Yes – to see if the children had improved.

BR: No, lack of time and they were confusing.

E: Yes, to extend more able children.

G: Yes we conducted the astro agility course and repeated it several times, this was a useful way of showing the children that they were improving their physical fitness.

11. What part of the training and/or planning was most helpful to you? Why?

H&U Working with nutritionalist – helped clarify understanding. Working with secondary schools specialist knowledge

HL: The information given was very clear.

MCSL: Introduction and meeting people involved was useful. We had some in-house training to explain what to carry out.

MCPE: N/A

BF: All of the activities and planning as a group rather than individually.

BR: Planning with other teachers – time to do it.

E: Website. Meetings with colleagues from other schools taking part to share ideas and organize events.

G: The detailed lesson plans were so easy to locate and follow. They included cross curricular links, learning objectives and a resource list so you knew exactly what resources you needed for each lesson.

Lead: I would have preferred to do a full run through of the activities, the blogs, and the points structures. The planning was focused around the start and end dates with individual schools then interpreting how they were going to implement the programmes.

Having a collective starting event gave everyone a good start and was a good motivational point.

12. What other suggestions do you have for improving the training? Please explain.

H&U Access funding for release of teachers for training.

HL: Being clear about dates, everything needed at the start of the project

MCSL: Useful to have had a training evening involving all teachers from other schools for all to be aware of what was required.

MCPE	n/A
BF:	None
BR:	Training on the ICT side of things.
E:	Simplify the scoring system. It is too complicated and not easily accessible for the children to self assess.
G:	N/A
Lead:	Training on blogs, a bit of background for the students on the geography of the countries

13. Do you think that your students will maintain a healthy lifestyle as a result of their participation in the Mission X program? Why/why not?

H&U	Will drink more and do more physical exercise after the impact of investigations.
HL:	I think they will be more aware of how much they drink.
MCSL:	Some are following this already. They are now aware of what would be helpful.
MCPE	Yes due, to them understanding the benefits of exercise and diet.
BF:	Yes – they are more aware now.
BR:	Hopefully. Yes! Message has got through.
E:	It was an addition to the way we promote healthy living in school and helped to keep reminding the children of the long term effects of a healthy lifestyle and promote future aspirations in careers. Hopefully it will have planted more seeds to show how important it is.
G:	Yes I do. We as year 6 teachers have already noticed a drop in non participants during PE and the children have evaluated their space journals and found that the program helped to improve their physical fitness.
Lead:	Feedback from teachers, parents and students has been positive. Would be excellent to have a more scientific impact study.

14. As a leader, did you notice any changes in your students' physical abilities? Please elaborate.

H&U	More can skip.
HL:	More children can skip.
MCSL:	Some have.

MCPE Yes, all improved over second PE activities.

BF: Yes – their fitness improved.

BR: Able to complete agility course in quicker time.

E: Improvements in scores for physical challenges. I think if we did it again I would be more conscious of thinking of ways of recording these changes for the children to see for themselves.

G: Yes they were able to work for longer periods of time as the project went on.

Lead: Students noted in their diaries that they were cycling to school more, more aware of what they were eating, drinking, and the level of activities.

15. Did teamwork improve among your students as a result of their participation in the Mission X program? How?

H&U Yes, getter communication. Focused on objectives of activity

HL: Yes, better communication and more focused on success.

MCSL: Helped in communication skills and listening.

MCPE Yes – all were supportive and encouraging each other, and working as a team

BF: Yes – the children learnt to work as a team and communicate.

BR: Teamwork already strong, but great activities to enhance further.

E: Yes, helping others with suggestions about good practice if they were more able. Healthy competition between groups.

G: Definitely. By year 6 we usually find that children very rarely choose to work with class members other than their friends. However many of these activities have encouraged the children to work with other class members and overall the children have done this with minimal fuss and actually got a lot out of it.

Lead: Yes, students, worked with different team members.

16. Did parents become involved in the Mission X program? How?

H&U Open evenings – mission journal homework.

HL: Through homework

MCSL: In helping with homework activity and through the awards ceremony.

MCPE Through the awards ceremony.

BF: Yes – the parents loved looking at their journals and coming to the awards ceremony.

BR: Not really. Something to develop.

E: Yes, general interest and support for children by borrowing / buying books to support their interest. Very well supported by attending the closing ceremony. Watching the children perform their class assembly of work in school.

G: The parents knew about the project as a letter explaining the project was sent home with the website address so they could find out more and get involved**.**

Lead: Yes, letters sent home about opening, closing events, homework etc. One school's PTA is now organizing a Mission X themed summer fair to involve the whole school.

17. Were parents supportive of their child's participation in the Mission X program? How?

H&U Yes – very excited about opportunities to meet specialists/space specialists.

HL: Yes – very excited.

MCSL: Yes, in helping with homework.

MCPE: NC

BF: Yes

BR: Happy for children to participate, but not really sold as something for them to be involved in too. Could improve this next time.

E: Yes, see above.

G: Out of 61 children in the year group 59 attended the school trip for mission X which shows a very high level of support from the parents. Also all the children were able to learn the song at home to share in a whole school assembly.

Lead: Yes, we received several emails commenting on how much the children were enjoying the programme. Excellent turnout at the 'graduation' closing event. Parents keen to speak to Tim Peake, experience planetarium and see students work.

ADDITIONAL COMMENTS/OBSERVATIONS:

MCSL: Very interactive and interesting and enjoyable for the students. More activities and competitions would have increased the fun.

BR:	Excellent topic. Would like to investigate science side more. Felt emphasis was on fitness. Opportunities to broaden into literacy and history worked really well at our school. Could some maths/numeracy activities be included? Very enjoyable – thank you.
E:	We would like to thank Heather MacRae for her support and enthusiasm which was invaluable throughout
G:	We also completed a whole school moon walk. Every member of the school from nursery children to year 6 walked a mile. This was a really fun day and our children all got a lot out of this.
Lead:	I'm not sure that the schools realized just how little budget and how little staff resource had been allocated to support the programme.

FUTURE CONTACT:			
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Lead	Heather MacRae	Heather@venturethinking.com	01279 817370

Appendix H: Colombia Mission X Action Report

MISSION X ACTION REPORT

FUNDACIÓN CIUDAD HORIZONTE 2050

2010-2011

COLOMBIA

COLOMBIAN SPACE COMISION

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3

Action Report for the project "Mission X 2011"

For development of the Project "Mission X" in Colombia, defined six phases to the implementation and development:

- *Phase 0.* Mission Planning.
- *Phase I.* Bidding process
- *Phase II.* Study documentation.
- *Phase III.* Local training at the CSC.
- *Phase IV.* NASA training.
- *Phase V.* Development of the Mission and evaluation of results.

1. PHASE 0. Mission Planning

1.1 Planned Activities. Phase 0

The first stage of the development of the project began in June 2010 with the preparation Phase which includes all preparations for the implementation of Mission X in Colombia, the establishment of Roadmap to follow and document management project.

Nombre de tarea	Duración	Comienzo
Fase 1: Preparación	89 días?	lun 17/05/10
Propuesta de participación de Colombia en Misión X	0 días	lun 17/05/10
Desarrollo del plan de participación de Colombia en la Misión X	4 días	vie 18/06/10
Aprobación del plan de participación	0 días	vie 25/06/10
Gestión para el desarrollo de reuniones con entidades nacionales	11 días?	vie 25/06/10
Envío de cartas a instituciones	4 días	mié 04/08/10
Reunión con entidades nacionales relacionadas con la educación	0 días	lun 23/08/10
Diseño gráfico y temático de la convocatoria	14 días?	lun 23/08/10
Revisión y ajuste del material guía	33 días?	mar 03/08/10
Primera versión de las guías de la Misión	0 días	vie 17/09/10

Figure 1. Picture of Gantt Chart Phase 0

1.2 Activities made. Phase 0

1.2.1 Proposal for participation of Colombia in "Mission X"

The proposal participation of Colombia in the project was conducted by Dr. Ing. Rafael Lorza Pitt, Space Systems Engineer of the European Space Agency – ESA, he suggested leading the Mission X through the Colombian Space Commission - CSC and the Foundation Horizon 2050.

1.2.2 Development Plan for Colombia's participation in Mission X:

Plan objectives:

Participate effectively in the Mission X proposed by NASA, ESA and other space agencies on behalf of Colombia.

Plan goals:

- Ensure the participation of at least 5 Colombian groups in the Mission.
- Achieve excellent results with each of the participating groups.
- Show the coordination capacities of the Executive Secretary of the CCS.

The plan specifies five phases of the project implementation, which describes the activities and milestone that were considered, together with the working diagram (schedule) for its execution of the same. The last registered version of the Gantt diagram and the participation plan was December 12, 2010

In addition to the information previously recorded in the plan, a preliminary list of formal and non-formal educational institutions that could be part of the project has been included. The selection processes for the participating teams, the evaluation committee and the jury have been specified, too.

4.1.2.1. Results obtained developing the plan

Tabla 1. Results obtained in the development of Participation Plan Colombia's in Mission X

Document	Latest Version	Last Update	Location
"Plan participation of Colombia in the Mission X Project"	Version. 4.1	2010/12/10	Mission X file folder digital and hard copy
Gantt Diagram	Version. 10	2010/12/10	Mission X file folder digital and hard copy

1.2.3 Approval of plan participation.

The Technical Coordination of the CSC reviewed and validated the roadmap for implementation of the project trough the CSC Executive Secretariat in cooperation with the Foundation Horizon 2050.

1.2.4 Management development meetings with national entities.

Two informative meetings led by the CSC were conducted in August and October in which the institutions that expressed their intention to participate in Mission X were informed about the project.

4.1.2.2. Conduction and Results of the Meetings

Table 2. Conduction and Results of the Meeting

Meeting Date	Site	AGENDA
August 24, 2010, 9: 00 am.	CIAF Hall A - First floor.	- Welcome Dr. Lilia Patricia Arias Duarte. Chief CIAF-IGAC - Presentation of the CSC Dr. Lilia Patricia Arias Duarte. Chief CIAF-IGAC - Youngsters and space sciences. Knowledge of space technologies, exercise and appropriate nutrition benefits for the youngsters. Dr. Janneth April - Foundation Horizon 2050. - Objective of the Mission X Project. Roadmap, activities to be developed by young people. Ing. Alí Santacruz, CIAF – IGAC. - Participation of institutions in the Mission X Project. Discussion and interaction with officials.
October 05, 2010, 2:30 pm. 	CIAF Hall H - First floor.	- Welcome Dr. Lilia Patricia Arias Duarte, chief CIAF-IGAC. - Presentation of the CSC Dr. Lilia Patricia Arias Duarte. Chief CIAF-IGAC. - Youngsters and space science. Knowledge of space technologies, exercise and appropriate nutrition benefits for the youngsters. Dr. Janneth April - Foundation Horizon 2050. - Objective of the Mission X Project. Roadmap, activities to develop by young people. Ing. Alí Santacruz, CIAF – IGAC. - Requirements and commitments to participate in the Mission X project. Discussion and interaction with attendants. - Delivery of material to teachers intending to participate in the project.

1.2.5 Graphic and thematic design of the announcement

As part the process of diffusion event and develop of information material of the Mission X project, welcome and informative posters were designed for the meetings in the training phase. In addition to the posters created from CSC, the international poster was adapted into Spanish version.

Two additional posters were produced by participating schools. These posters were delivered to ESA to be exposed during the Closing Event in the European Space Astronauts Training Centre in Cologne - Germany.

Table 3. Graphics Products derived.

Product	Description
POSTERS   	**Illustration 1:** Images of some of the graphic materials produced by the CEE for information and training events.
	**Illustration 2.** International Poster adapted for Colombia.

Carrera 30 N.º 48-51 Conmutador: 369 4100 - 369 4000 Fax: 369 4098 Información al Cliente 368 3443 - 369 4000 Ext. 4674 Bogotá, D.C. www.igac.gov.co

Product	Description
	**Illustration 3:** Collage of same of the graphic materials produced by the students in of participating schools, utilizing a precious prehistoric national symbol.
	**Illustration 4.** Collage for the National representation of Colombia and the European Closure Event. Kohln - Germany

In addition and as strategy of publicity and call for participation a web microsite within the CSC website was develop. This produced a mapsite which was subject to revision by the technology management team at CIAF and after being approved the microsite was developed. It contains the basic information for activities developments, presentations and posters downloads, if required by those students and teachers that accessed the site (Illustration 5).

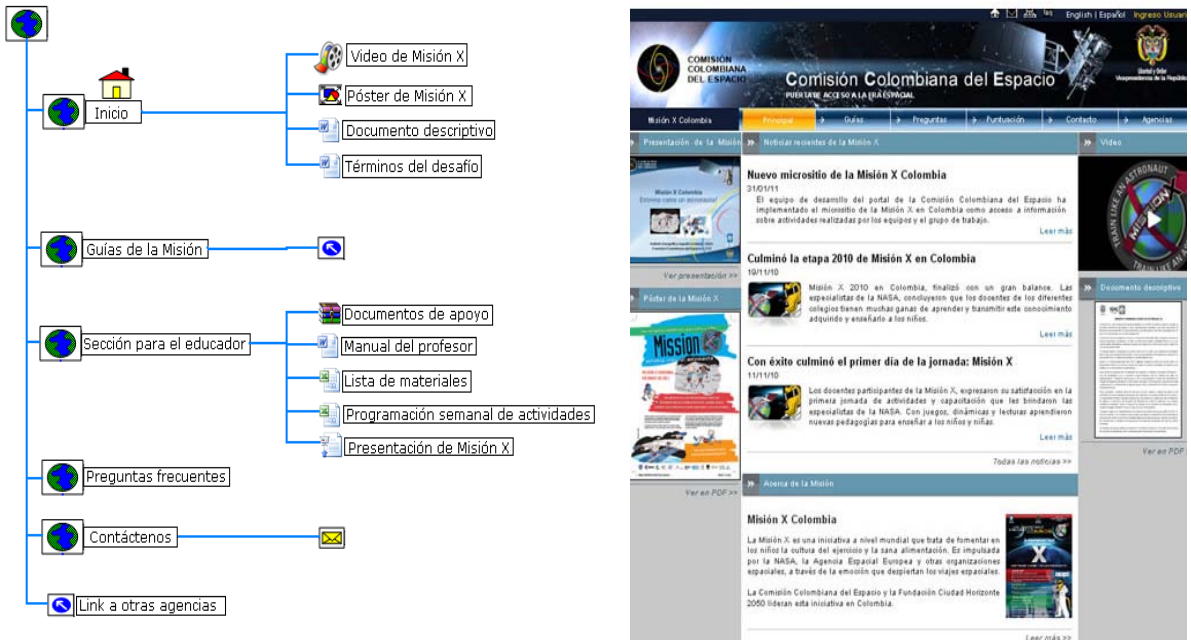


Illustration 5. Site Map created by the CSC for handling the information about Mission X and image of the Microsite to consult the information http://www.cce.gov.co/web/mision-x-colombia/

1.2.6 Resulting Graphic and thematic design of the announcement

Table 4. Resulting Graphic and thematic design of the announcement

Document	Last Version	Last Update	Location.
"Poster"		2010/12/10	Mission X 2011 File folder digital
Microsite		2010/12/10	http://www.cce.gov.co/web/mision-x-colombia

1.2.7 Review and adjustment of guidance material

32 documents were received from NASA and ESA including the work guides and score cards for the proposed activities in the Mission X project. These documents were originally in two versions, English and Spanish (including Mexican variants), these served as reference for the technical team of the CSC and Dr. Ing. Rafael Lorza-Pitt in the preparation of guidelines for Colombia. The final information was passed several CDs that were given to teachers as an aid in one of the informative meetings in October 5, 2010.

Below is the list of the revised guidelines by the CSC and Foundation Horizon 2050.

Item	Code	Title [English]	Reference	Title [Spanish]
1	A1	Base Station Walkback	COL-CCE-MX-A1	Regreso a Pie a la Estación Base
2	A2	Crew Strength Training	COL-CCE-MX-A2	Entrenamiento de Fuerza Física para la Tripulación
3	A3	Do a Spacewalk	COL-CCE-MX-A3	Haz una Caminata Espacial
4	A4	Jump for the Moon	COL-CCE-MX-A4	Saltar a la Luna
5	A5	Mission: Control	COL-CCE-MX-A5	Misión: Control
6	A6	Explore and Discover	COL-CCE-MX-A6	Explora y Descubre
7	A6B	Support_explore	COL-CCE-MX-A6B	Material de apoyo para la preparación del Área de exploración
8	A7	Agility Astro-Course	COL-CCE-MX-A7	Astro-Recorrido de Agilidad
9	A7B	Support_agility	COL-CCE-MX-A7B	Material de apoyo para situar el recorrido
10	A8	Speed of Light	COL-CCE-MX-A8	Velocidad de la Luz
11	A8B	Support_speedoflight	COL-CCE-MX-A8B	Tabla de distancia/tiempo para el Folleto de la misión
12	A9	Building an Astronaut Core	COL-CCE-MX-A9	Desarrollar un núcleo muscular de Astronauta
13	A9B	Support_core	COL-CCE-MX-A9B	Material de apoyo para los Toques de lado del talón del especialista de misión
14	A10	Crew Assembly	COL-CCE-MX-A10	
15	A10B	Support_assembly	COL-CCE-MX-A10B	Material de apoyo para montar el proyecto/preparar el rompecabezas
16	A11	Let's Climb a Martian Mountain	COL-CCE-MX-A11	Subamos una Montaña Marciana
17	A12	Planet you GO, Gravity you Find	COL-CCE-MX-A12	Al Planeta que vayas encontrarás gravedad
18	A13	Get on your Space Bicycle	COL-CCE-MX-A13	Súbete a tu Bicicleta Espacial
19	A14	Space Roll and Roll	COL-CCE-MX-A14	Rodar y Rodar en el Espacio
20	B1	Living Bones, Strong Bones	COL-CCE-MX-B1	Huesos Vivos, Huesos Fuertes (HV-HF) (Estudiante)
21	B1E	Living Bones, Strong Bones Edu	COL-CCE-MX-B1E	Huesos Vivos, Huesos Fuertes (HV-HF) (Educador)
22	B2	Hydration Station	COL-CCE-MX-B2	Estación de Hidratación (Estudiante)
23	B2E	Hydration Station Edu	COL-CCE-MX-B2E	Estación de Hidratación (Educador)
24	B3	Energy of an Astronaut	COL-CCE-MX-B3	EM_Energía de un Astronauta-Estudiante_52410
25	B3E	Energy of an Astronaut Edu	COL-CCE-MX-B3E	EM_Energía de un Astronauta- Educador_52410
26	B4	Reduced Gravity, Low Fat	COL-CCE-MX-B4	Gravedad Reducida, Baja en Grasa (Estudiante)
27	B4E	Reduced Gravity, Low Fat Edu	COL-CCE-MX-B4E	Gravedad Reducida, Baja en Grasa (Educador)
28	S0	Punctuation Criteria	COL-CCE-MX-S0	Hoja de Criterios de Puntuación
29	S1	Team points page (Points Individual	COL-CCE-MX-S1	Hoja de Puntuación del Equipo
30	S2	ESA points page (Puntos por Activida	COL-CCE-MX-S2	Actividades Físicas (Hoja de Puntuación)
31	S3	Mission journals page	COL-CCE-MX-S3	Página Diario de Misión
32	S4	Glossary	COL-CCE-MX-S4	Glosario

Figure 5. Picture of the revised guidelines for CCE and CH2050

The guides were assigned with a local code to better versions control while the Foundation and the CSC reviewed each of the documents. In addition to style correction and language, the images contained in theses guides were also adapted because the majority contained texts in English.

4.1.2.3. Results obtained in the review and adjustment of material:

Document	Last Version	Last Update	Location.
32 corrected Guides		November / 2011	Mission X 2011 File folder digital
Translation of graphic material contained in the guides.		November / 2011	Mission Guides

2. PHASE 1. CALL PROCESS.

2.1 Planned Activities. Phase 1

Several aspects were taken into account for the development of the call:

- Considerer both actors, formal and non formal education.
- Invite other national institutions to become participants in the Mission, for example working with the announcement and call for participation activities, equipment selection, personnel training and/or collaborations with resources of any kind.
- Establish pre-testing to the teachers and teams related, in order to select the best equipment.
- Establish a review committee responsible for selecting participants.
- Promote receiving the greatest number of the calls across country.
- Establish awards that encourage the participation of children, teachers and groups.

Fase 2: Proceso de convocatoria	24 días	vie 03/09/10
Desarrollo de la convocatoria	21 días	vie 03/09/10
Cierre de la convocatoria	0 días	vie 01/10/10
Preparacion de material informativo para los docentes	11 días	vie 17/09/10
Reunion informativa con los docentes	0 días	mar 05/10/10
Carta de invitación a entrenamiento local	0 días	mié 06/10/10

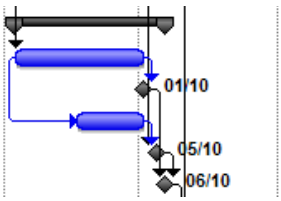


Figure 6. Gantt chart Phase I

2.2 Realised Activities. Phase 1:

2.2.1 Development of the call for participation:

Participation in the plan had contemplated the possibility of involving a number of institutions of formal and non formal education collected as initial database, the following information (table 5) which includes the institution, its objectives, functions and possible contact:

Table 5. Institutions related to formal education.

Document	Last Version	Last update
Ministry of Education	• The Ministry of Education would develop the coordination and management of the Mission X. • Assist in the publicity of Mission X across all national schools at national level. • Promote the realization of the event, posting relevant information on its website in the Events section. • Give information about the mission through their on line customer service.	**Henry de la Ossa** Chief Office of Educational Innovation Using Secretary Blanca Isabel Gil **innovacioneducativa@mineducacion.gov.co** Tel: 2222800 Ext. 2112 Contact in Bogotá Phone: 3305000 Fax: 3305050
Social Protection Ministry	The Ministry of Social Protection, attending to their duties, could work with the management of the Mission X as follows: • Establishment of staff trained in education to the routines developed in the Mission with the purpose of implementing in the future the promotion of child health through physical and recreational activities based on the use of geospace.	
COLCIENCIAS	Colciencias could collaborate in the development of the mission by: • Bringing groups of children participating in the mission to research groups related to the topic. • Publicity through y 13 section information concerning Mission X and	Professional national program of science and health technology. Nancy Liana Henao inhenao@colciencias.gov.co Colciencias: 6258480

Document	Last Version	Last update
	promote the participation of young. • Working with the selection process.	
Icetex	In relation to the Mission X ICETEX could: • Provide advice and financing in the process of transferring knowledge between relevant actors in the program. • Collaborate with the mobilization of NASA personnel or personnel necessary to Colombian development of the mission. • Collaborate with the management of the mission in order to establish important contacts with NASA to develop future cooperation projects.	Technologic Director: José Fernando Castillo Cañón Chief International Relations Office: Ruby Stella Montaño Fajardo Contact the entity Bogotá Tel: 417-3535

Table 6.Institutions related to non-formal education.

INSTITUTION	FUNTION	CONTAC
Ceres Scool Project – Bogota Planetarium	• Promote the project through the participation Ceres Scool groups. • Collaborate in providing installation.	JORGE GUEVARA jorge.guevara@scrd.gov.co Scientific Director of the Bogota Planetarium Ceres S'cool Project “Astronomy Group of the Bogota planetarium”. Adress: Cra 6 N0 26-07 Bogotá, Colombia.
Extension courses in space science Maloka	• Promote the project through the participation Ceres Scool groups. • Collaborate in providing installation • Promote the project through the	JORGE IVÁN ZULUAGA CALLEJAS Extension Coordinator Courses Space Science, Institute of Physics, Faculty of Science (Of. 6-111) DIEGO CORRALES CARO

INSTITUTION	FUNTION	CONTAC
	clubs of science and technology involving groups of children • Collaborate in the case where facilities are needed for the development of activities or specific events.	Email: dcorrales@maloka.org Educational coordinator of the lines of science and technology Museum of Science and Interactive Technology Maloka Address: Carr. 68D No. 24 A- 51 Bogotá, Colombia

4.1.2.4 Results Achieved

Although initially it had provided the previous database, the CSC team decided to involve those institutions that have some degree of relationship or related spatial issues. For this stage, we resorted to the databases of the schools that were interested or had worked on projects related to the subject with FCH-2050 space and planetary Bogota for it contacted the representatives of these colleges, the Secretariat Facatativá and the Planetarium, where teachers were informed about the objectives and requirements for participation in the project.

In the original scope of the participation plan intention was incorporate 5 teams, but after the announcement and selection process, 40 teams were nominated from 22 schools, representing more than 780 students in Bogotá, Facatativá (Cundinamarca), Cogua (Cundinamarca) and Pasto (Nariño), as shown in Table No. 7.

Table 7. Schools intention of participating in Mission X Colombia

Institución	Ciudad
IEM Cartagena	Facatativá, Cundinamarca
IEM John F. Kennedy	Facatativá, Cundinamarca
IEM Policarpa Salavarrieta	Facatativá, Cundinamarca
IEM Juan XXIII	Facatativá, Cundinamarca
IEM Comercial Santa Rita	Facatativá, Cundinamarca
IEM Técnico Industrial	Facatativá, Cundinamarca
Colegio Policarpa Salavarrieta	Bogotá, D.C.
Rodrigo Lara Bonilla	Bogotá, D.C.
Colegio Simón Bolivar	Bogotá, D.C.
IED Cundinamarca	Bogotá, D.C.
Colegio Paulo VI Kennedy	Bogotá, D.C.
IED Colegio la Victoria	Bogotá, D.C.
IE El Paraiso de Manuela B	Bogotá, D.C.
IED Alberto Lleras	Bogotá, D.C.
IED Colegio El Rodeo	Bogotá, D.C.
Colegio la Aurora	Bogotá, D.C.

Institución	Ciudad
Colegio San Francisco	Bogotá, D.C.
IED Marsella	Bogotá, D.C.
Colegio Rural José Celestino Mutis	Bogotá, D.C.
Gimnasio Militar FAC	Bogotá, D.C.
INEM de Pasto	Pasto, Nariño
Fundación Ciudad Horizonte 2050	Facatativá, Cundinamarca
Planetario Distrital	Bogotá, D.C.
Instituto Geográfico Agustín Codazzi	Bogotá, D.C.

2.2.2 Closure the call for Participation.

The deadline for receipt of applications for Project Mission X was fixed for the first of October 2010 (Gantt View Phase I), although there was an exception with the Military Gymnasium school who expressed their intention to participate in Mission X after the date of closure of the call.

3. PHASE II. STUDY DOCUMENTATION

3.1 Planned Activities - Phase II.

Informational project material was handed to representatives of the concerned schools during the meetings in order to obtain their review about the documentation and the feasibility of developing the proposed activities with the help of the Director of the Institutions. Subsequently, the parties agreed deadlines and sending questions and comments via email. During the later stages of training questions about the development of guidelines were resolved.

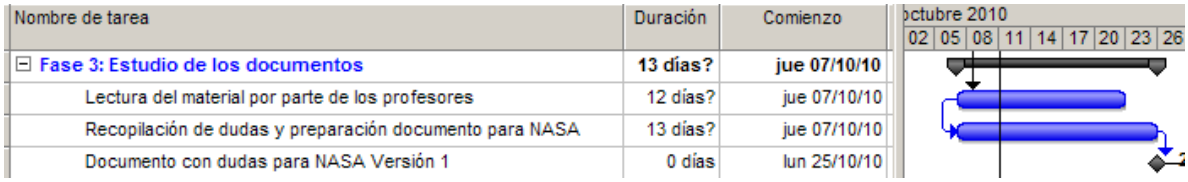


Figure 7. Gantt chart Phase II

3.2 Realized Activities Phase II.

3.2.1 Reading of the material by teachers.

In the informative meetings (see Phase 0 - Conduction of meetings with national entities) CD with information about the guides and general material were handed over to each team in order for the teachers to study and formulate the questions that would arise via email. In addition, a virtual space was created in order to allow the teachers to download the information required, as a second option for access to information. This activity was developed in October, prior to the training with NASA.

4.1.2.5. Results Obtained on the reading material.

Table 8. Results of reading and adapting the material produced by NASA.

Document	Last Version	Last Update	Location
Compilation of all the base material in the virtual site of the CIAF	1.0	2010/11/23	IP:190.254.22.52
CD with information and material about Mission X	1.0		

3.2.2 Compilation of questions and preparation of documents for NASA

A format in which teachers would reporte doubts and questions about the guides of the Mission was designed. Teachers sent this form by email to the staff of CSC, which was presented at the teleconference held with NASA in September 2010.

3.2.2.1. Results obtained

Table 9. Results of the review of documents for NASA.

Document	Last Version	Last Update	Location
Format explanation of doubts	1.0	2010/11/12	Files Folder Mission X 2011 digital
Teleconference notes with NASA	Ref:COL-CCE-MX-N02 V2.0	2010/09/15	Files Folder Mission X 2011 digital
Teleconference notes with NASA	Ref:COL-CCE-MX-N02 V3.0	2010/09/22	Files Folder Mission X 2011 digital

4. PHASE III. LOCAL TRAINING - CCE

4.1 Planned Activities - Phase III

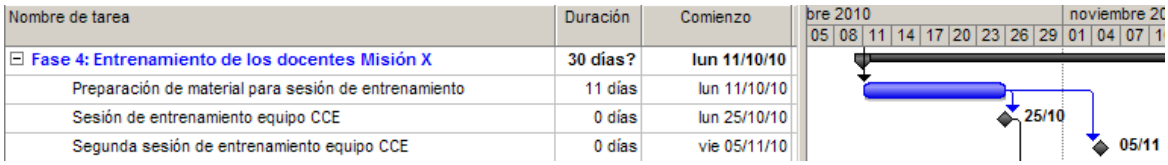


Figure 8. Gantt chart Phase II

The local training was developed in the CIAF facilities the October 25, 2010 (see Figure 6). The aim was to develop the activities proposed in the guides of Mission X to check that the guides contained and easy-to-understand language and to rehearse situations that could arise during the course of the event. The doubts raised by teachers were clarified by the technical team of the IGAC, lead by Research and Development Center for Geographic Information - CIAF. Those doubts allowed the crew to adjust the guides and teachers understand the dynamics.

4.2 Realized Activities Phase III.

4.2.1 Preparation of material for training session.

The materials, documents and guides were prepared for the local training conducted by the team of the CSC. Apart from the guides it was prepared the list of materials.

Table 10. Location from the list of materials for the development of the training session.

Document	Last Version	Last Update	Location
List of Training materials	V2	2010/1105	Files Folder Mission X 2011 digital

4.2.2 Training session by the team of the CCE.

For the training session led by the technical team of the CSC, an agenda was generated and the CIAF facilities ware available so that the teachers could rehearse the project proposed activities, trying to act like those students that they would subsequently train to exercise Mission X.

Date: October 25, 2010, 8:00 am
Room H - CIAF


Figure 9. Images of the training conducted by the CCE.

The points that were developed for the training session included:

- Welcome and registration of attendees.
- Reading the meeting agenda and instructions for the day.
- Explanation and simulation activities A1 - A14, Mental and Physical Training.
- Break.
- Continuation of the explanation and simulation activities A1 – A14.
- Lunch break.
- Explanation and simulation activities B1 - B4, Development activities in the classroom and laboratory.
- Break.
- Continuation of the explanation and simulation activities B1 – B4.
- Discussion of activities and commitments for the development of the project Mission X.

4.1.2.6 Results obtained in the CCE training

Table 11. Results from the training session.

Document	Last Version	Last Update	Location
AGENDA: TRAINIG DAY LOCAL TEAM - CCE		2010/10/25	Files Folder Mission X 2011 digital
MEETING MINUTES	No. 2010 – MX003	2010/10/25	Files Folder Mission X 2011 digital
Mission X, training session report	V1	2010/11/03	Files Folder Mission X 2011 digital

5. PHASE IV. SECOND TRAINING SUPPORT OF NASA

5.1 Planned Activities - Phase IV

To reinforce the training of teachers, appropriate arrangements were made because the training was conducted by a NASA team of three experts between 15 and 19 November 2010 and who lead Mission X at United States. To properly develop this training between 18 and November 19 (see Figure 7), and to have the required material in the planned activities, a part was brought by the team of NASA and the other was provided by the IGAC. The days prior to the Mission X training there the facilities in which the event the training took place were visited, the guides for the development of Mission X were checked and everything was arranged to make the working day successfully. A number of meetings with entities of the Colombian Space Commission, as the Planetarium, the Sergio Arboleda University and the Foundation Horizon 2050 (CH2050) were organized.

Figure 10. Gantt Chart Phase IV

5.2 Realized Activities Phase IV

5.2.1 Organization and preparation of questions and comments from NASA.

The doubts raised during local training sessions that were not resolved jet in the first phase of local training were compiled and prepared for the training session by NASA.

5.2.2 Document with questions and comments to NASA.

A document was prepared for NASA which compiled concerns, entitled "Doubts, questions and concerns about the activities guides - Mission X Colombia 2011".

5.1.2.1. Results for the document de Doubts, questions and concerns about the activities guides - Mission X Colombia 2011

Table 12. Format of doubt as outcome of the training session with NASA.

Document	Last Version	Last Update	Location
Format: “Comments and questions about the guides”	V1.0	2010/11/12	File Folder Mission X 2011 digital

5.1.3. Training of Teachers – NASA Team.

For training by NASA, there was a logistical deployment that included the generation of schedules of activities during the visit of the experts, the receipt and organization of materials provided by NASA and the preparation of the locations of CIAF for the development of activities.

Figure 2. Images of training of NASA at CIAF facilities

5.2.3.1 Results obtained in the NASA training

Table 13. Results obtained in the NASA training.

Document	Last Version	Last Update	Location
ACTA CAPACITACIÓN (Spanish Title)	No. 2010 – MX005	2010/11/15	File Folder Mission X 2011 digital
SCHEDULE: Visit and training performed by NASA experts Mission X project: "train like an astronaut"	V2	2010/11/15	File Folder Mission X 2011 digital
SCHEDULE: Training conducted by experts from NASA Mission X Project		2010/11/15	File Folder Mission X 2011 digital

6. PHASE V. DEVELOPMENT OF THE MISSION AND EVALUATION OF RESULTS

In the mission developing between february 7 to march 18, 2011, activities were carried out with the students from the teams with the NASA trained teachers leaders.

The CSC Technical Team performed the overseer work for the proper conduction of the activities and correcting some of them due to lack of clarity during the process of implementation of the mission.

6.1 Activities during the Mission

6.1.2 Educator's Handbook and Guidelines for handling of the scores

According to the rating system sent by NASA for each of the activities contained in the guides, a support guide contained in Educator's Handbook was produced, with the aim of providing additional clarification on the methodology to be followed with each activity, detailing the implementation of activities, the introduction to the guidelines and their classification, scoring tables, the use of the websites and the formats of the evaluation sheets.

The guidelines for the management of the scores were generated due to the experience difficulties by teachers in the records of scores in the qualifying format. The averages were not correctly weighted and this caused a difference between the score of teams Mission X Colombia and the teams score of other countries.

Aspects of safety during the execution of the activities were also stressed in this handbook

6.1.2 Weekly review of scores record on the official web

In order to properly upload the score to the website www.trainlikeanastrout.org, all teams were requested to weekly send the results of the made test to be evaluated by the

Technical Team of Mission X Colombia and check whether they had understood the instructions contained in the guides. The recording of the score was sent by two means: digital file by official e-mail of Mission X and a physical copy to CSC.
After reviewing the material and performed the calculation according to the rules, it was necessary to request the website administrator at NASA www.trainlikeanastronaut.org to correct the results already and put the score right.

6.1.3. Publications related to news and photos on the blog of Mission X

The Colombian teams showed great enthusiasm and initiative in publishing news, photos, videos, posters and comments on the blog site of Mission X as a result of implementing the activities of experience, this of course led by teachers in charge of developing the tests.

6.2 Results Achieved

Table 14. Results of Development of Mission X in Colombia.

PRODUCT	DESCRIPTION	RESULTS	LOCATION
Updating the database of schools, teams and teachers participating in Mission X	Updated the database with teachers and support leaders for each team, emails and contact numbers	Matrix with names of school, teams, teachers, telephone numbers and email contact	File Folder of Mission X 2011 in digital
Notice and receipt for the composition of a question to an astronaut on the International Space Station	Notice to equipment, receiving and shipping of the questions to ESA for the astronaut located in ISS	Questions sent by the students to ESA	File Folder of Mission X 2011 in digital
Notice and receipt of the posters produced to represent to Mission X Colombia at the Mission X Europe Closing	Notice of teams and to receipt the poster, create a poster collage between sent and send to ESA	Generating a digital file (collage) between the posters sent and send to ESA	File Folder of Mission X 2011 in digital
Notice and support for exchanges of ideas on the experience of Mission X between Colombian and Dutch schools	To communicate to schools participating interest in two schools in the Netherlands to enter into communication via videoconference	Notice to schools in the initiative and sent to Rafael Lora Pitt of Colombian schools interested	File Folder of Mission X 2011 in digital
Translation Certificate of participation of Mission X to Spanish	Receiving the original certificate file and send proposal to ESA for its	Sending a pdf file with the certificates	File Folder of Mission X 2011 in

PRODUCT	DESCRIPTION	RESULTS	LOCATION
	realization	translation	digital
Matrix of scores registered on the website by each team	We performed the compilation of the scores registered on the official website of Mission X for each team broken down by activities, containing the number of students and the average of each team in the activities	Matrix with scores recorded directly by teachers in the website	File Folder of Mission X 2011 in digital
Matrix of scores for each team sent to the CCE and corrected	Received files in digital and analog for each activity shipped by participating teams	Parallel matrix to the score registered on the website to substantiate the qualification for each activity	File Folder of Mission X 2011 in digital
List of students and teachers participating teams with age	Reception and update lists of students and teachers participating from each team	Final list of students and teachers participants with age	File Folder of Mission X 2011 in digital
Surveys completed by each team	Compiling and sending surveys developed in the respective format by the leaders teachers on each team	Surveys folder organized for shipment to NASA	File Folder of Mission X 2011 in digital
Quantitative summary of development activities, surveys, lists and teams retired the experience	Generation of the final report of participating teams, retired teams, total score, surveys filled out, received lists with age, doubts	Quantitative picture of each activity developed	File Folder of Mission X 2011 in digital

6.3 Evaluation Results

The experience Mission X Colombia, counted with participation of 22 schools in the cities of Bogotá, Facatativá (Cundinamarca) and Pasto (Nariño), for a total of 40 teams of boys and girls between 8 and 14 years, list can be seen in Table No. 15.

Table 15. Teams and schools participating in Mission X Colombia.

CITY	SCHOOL	TEAMS	TEAM NAME
FACATATIVÁ	I.E.M Cartagena	2	Viajeros Espaciales Los meteoritos
	I.E.M Jhon F Kennedy	2	Tripulación Kennedy 1 Tripulación Kennedy 2
	I.E.M Policaparpa Salavarrieta	2	Ganímedes Galileo
	I.E.M Juan XXIII	3	Columbia XXIII Facanautas Cosmonautas XXIII
	I.E.M Comercial Santa Rita	4	Orión Pólux Cosmonautas Voyager
	I.E.M Silveria Espinosa de Rendón	1	Sernautas
	IEM Técnico Industrial	1	Júpiter
BOGOTÁ	Colegio Policarpa Salavarrieta	1	Poliastronautas
	Rodrigo Lara Bonilla	2	Extremófilos
	Rodrigo Lara Bonilla	2	Phoenix
	Colegio Simón Bolívar	2	Pequeños Astronautas 1 Pequeños Astronautas 2
	I.E.D. Cundinamarca	1	Luna Llena
	Colegio Paulo VI Kennedy	2	Pegasus Fénix
	I.E.D. La Victoria	2	Tripulación Victoria 1 Tripulación Victoria 2
	I.E.D. El Paraíso	2	Constelaciones

CITY	SCHOOL	TEAMS	TEAM NAME
	Manuela Beltrán		Estrellas Unidas
	I.E.D. Alberto Lleras	2	Tripulación Subanautas
			Tripulación Econautas
	I.E.D. El Rodeo	2	Betelgeuse
			Rigel
	Colegio La Aurora	2	Alnitak
			Antares
	Colegio San Francisco	1	Auriga
	I.E.D. Marsella	1	Gaia
	Colegio Rural José Celestino Mutis	3	Astromochuelos
			Espacio Extremo
			Súper X
	Gimnasio Militar FAC	1	Astrogimfa
PASTO	INEM de Pasto	1	Inemitas al Espacio

Based on the results of the scores sent to schools, students lists and surveys the following statistics was developed.

6.3.2. Teams

– *Involvement*

Until the completion of the training session with specialists from NASA confirmed 40 teams, but finally took the test a total of 33 teams making activities. Despite the efforts only responses was obtained for two of them and are illustrated in Table No. 16:

Table 16. Teams Reasons for quit Mission X.

TEAM	CAUSE RETREAT
Tripulación Kennedy 1	No response was obtained
Tripulación Kennedy 2	No response was obtained
Pólux	The teacher Jose Bernardo Velandia, Professor Team Leader, said of 20 students enrolled, only stays 9 girls for the activities, because the a(27 s were performed in opposite journey, this

	communication was sent via email, on 12 February.
Pequeños Astronautas 2	No response was obtained
Fénix	No response was obtained
Espacio Extremo	In a telephone conversation with Professor Alexander Sanabria Diego, Espacio Extremo team leader, said the drawbacks presented for both teams to do activities with children is that the activities were performed in the opposite journey and, as is in the rural part, the Rural School Jose Celestino Mutis, travel times and distances between houses and the school, students did not allow members often participate in testing.
Super X	

– *Website*

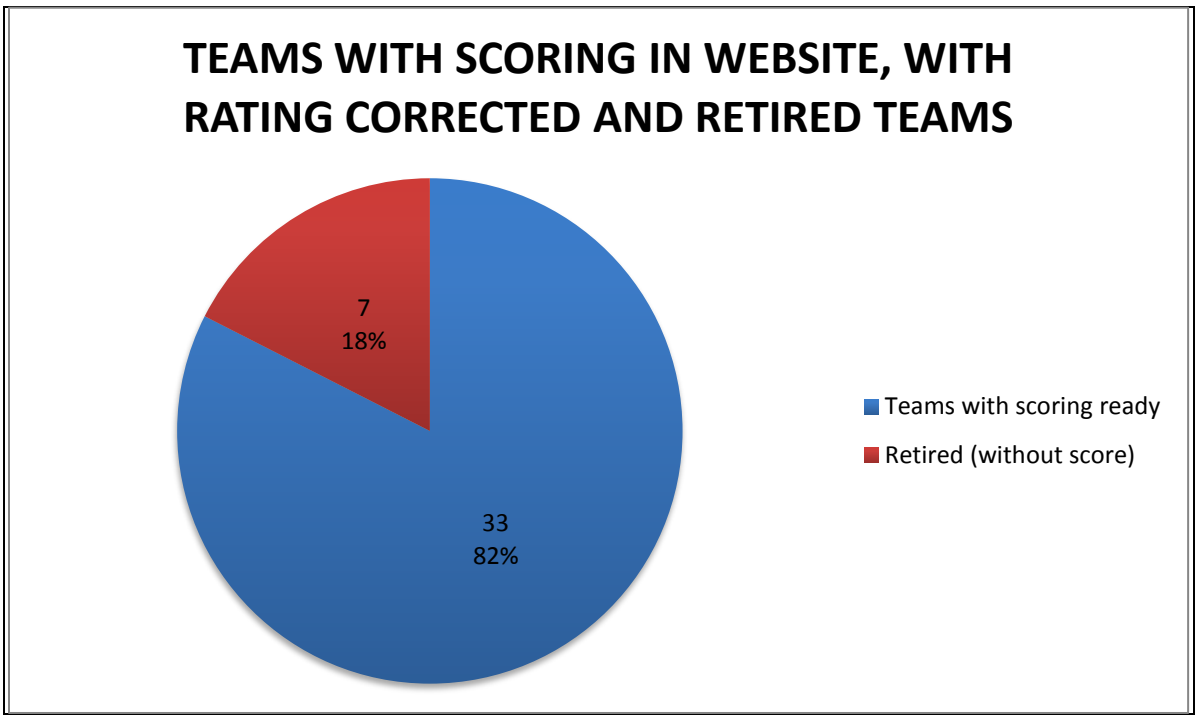
The technical staff of Mission X Colombia sent the passwords to access the web page www.trainlikeanastronaut.org to team leaders so they could upload the test scores of students, but there were some drawbacks such as loss of password or email in which he was consigned, lack of understanding the mechanics of the page to record the scores or simply forget to do this work. Table No. 17 is related to the participation of teams.

Table 17. Activities recorded on the website per team.

PARTICIPATING TEAMS		REGISTERED TEAM ACTIVITIES
Los Meteoritos		18
Viajeros Espaciales		18
Galileo		18
Ganímedes		18
Columbia XXIII		18
Voyager		18
Sernautas		18
Júpiter		18
Extremófilos		18
Phoenix		18
Pequeños Astronautas 1	28	18
Luna Llena		18

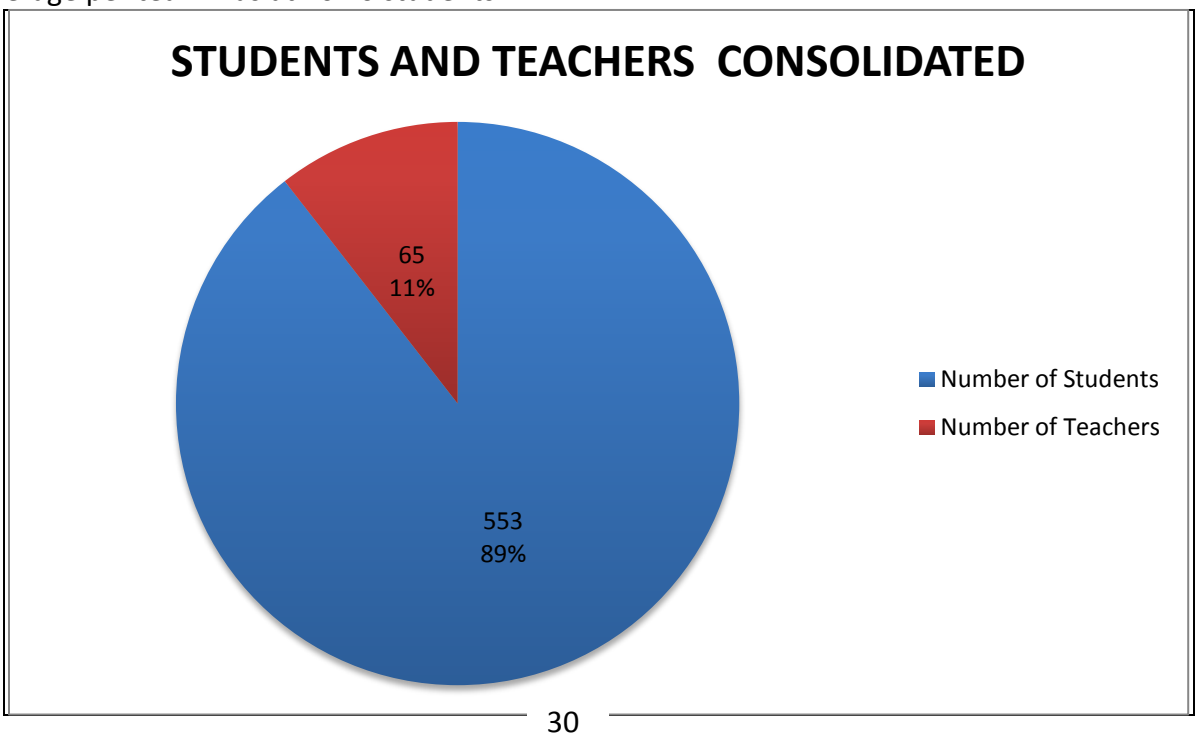
PARTICIPATING TEAMS	REGISTERED TEAM ACTIVITIES
Pegasus	18
Tripulación Victoria 1	18
Tripulación Victoria 2	18
Constelaciones	18
Estrellas Unidas	18
Tripulación Subanautas	18
Tripulación Econautas	18
Betelgeuse	18
Rigel	18
Altinak	18
Antares	18
Auriga	18
Gaia	18
Inemitas al Espacio	18
Poliastronautas	17
Cosmonautas	14
Astromochuelo	13
Astrogimfa	7
Facanautas	4

Of the 33 teams with scores on the website, 29 of them were corrected and updated for shipment to NASA, because the scores were incorrectly weighted. Corrections are generated for both 1 activities like that 18 activities based on the error introduced in each team.

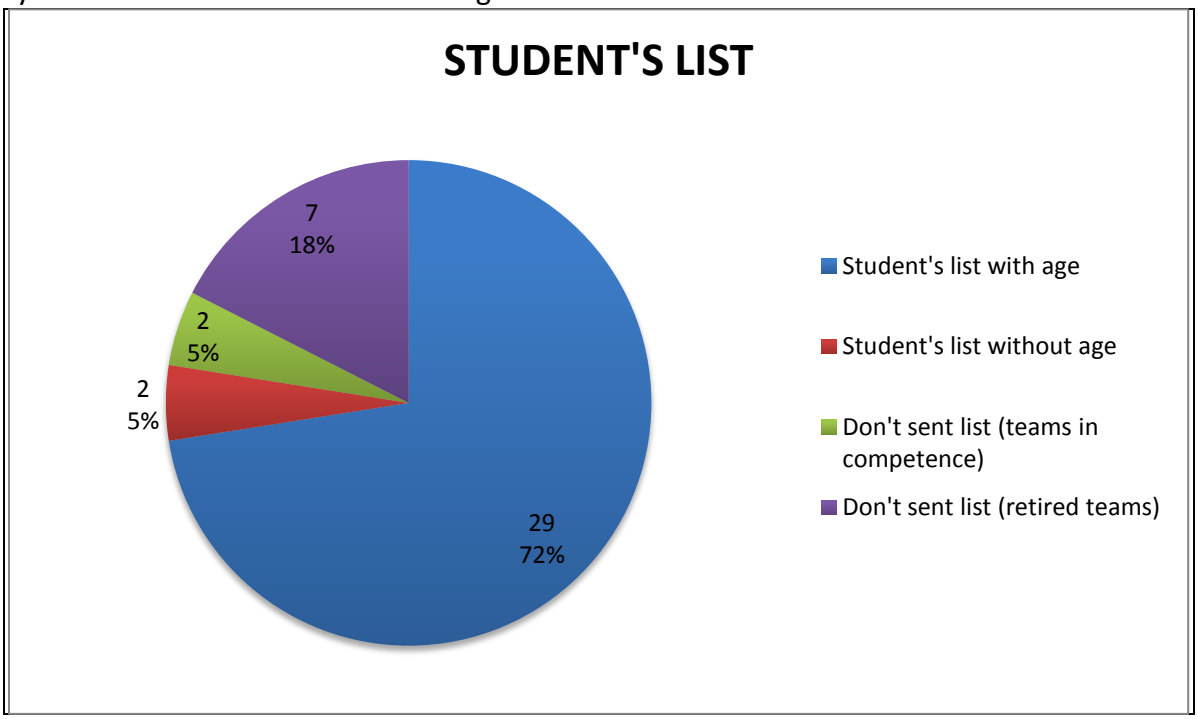


6.3.3. Number of students participating

In all, 535 children, and 65 teachers of the areas of physical education and basic sciences. The average per team was at 16.70 students.

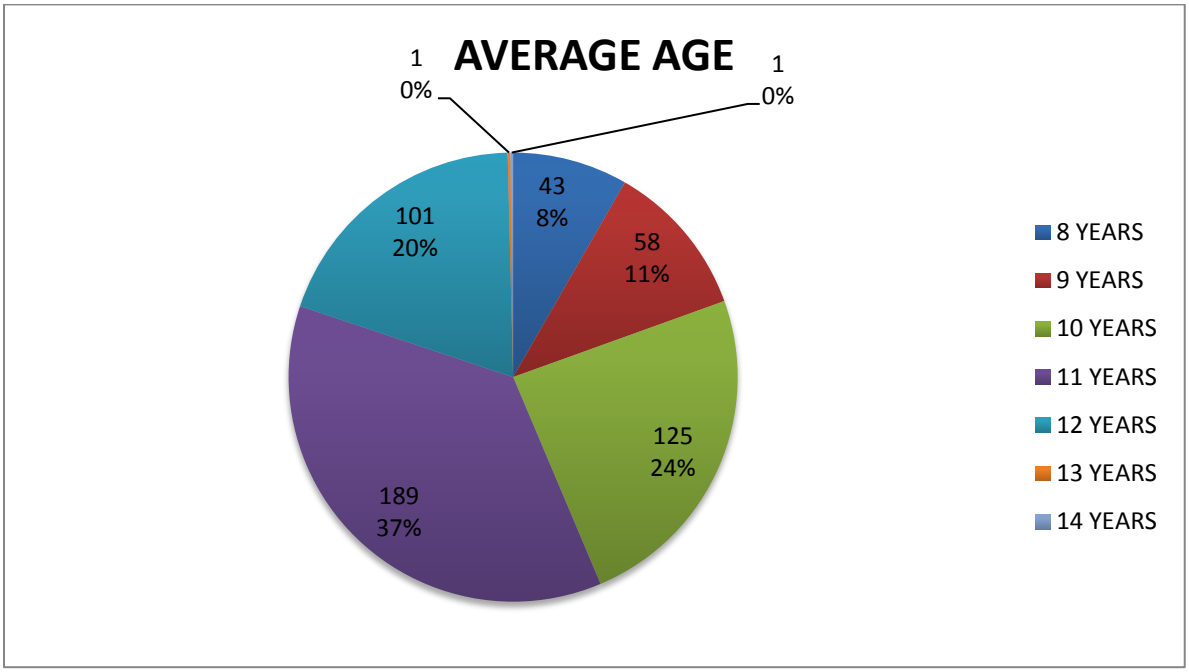


Note: The table above is subject to only 29 of the 33 teams due to the sending of lists of students with ages from each team. The following table shows the indicator of age, supported only on 29 teams who sent the lists to generate statistics.



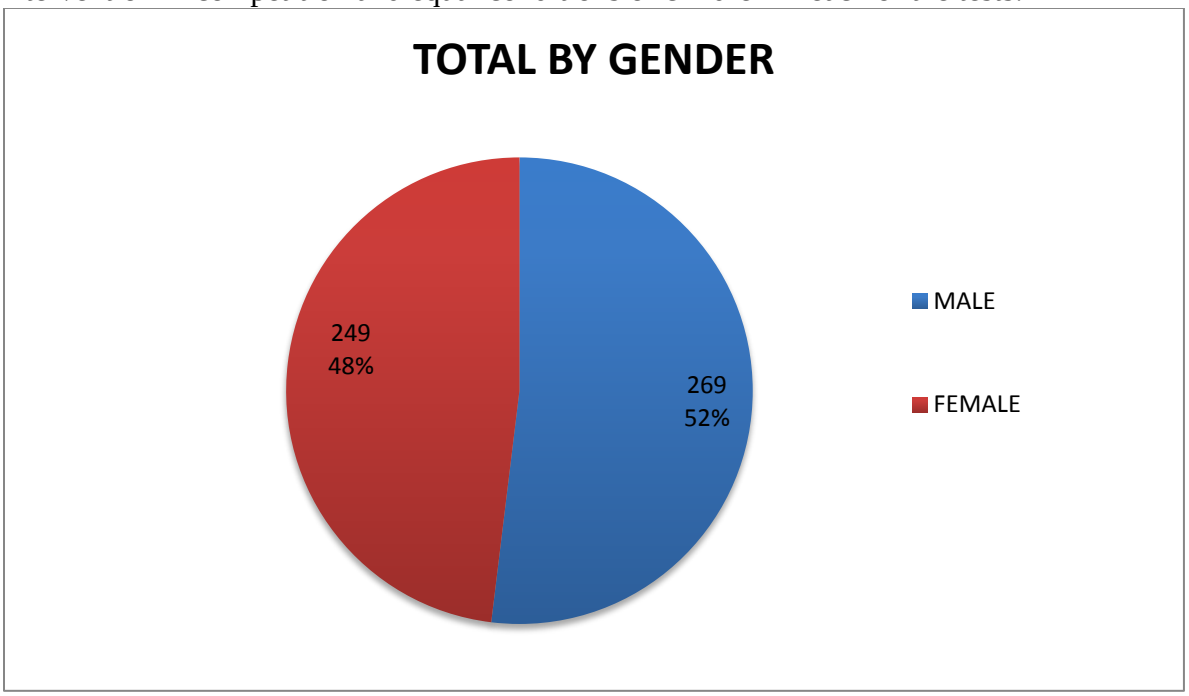
6.3.4 Ages of participant students

The ages of participating children were between 8 and 14 years of age. As evidenced in the following graph, 189 of them were in the 11 years, with most of the representative age. The average ages were between 10.50 years.



6.3.5. Participation of boys vs. girls

Of the total number of participating students, 249 were children, representing 48% and 52% girls, representing 269 students (Figure). The high participation of mixed schools, evidence of intervention in competition and equal conditions of children in each of the tests.



6.3.6. Scored by teams

The following is the overall ranking of the teams with the total scores for each. The top three teams are for Subanautas, Econautas and Phoenix, respectively, leading to eventual winner Subanautas team.

Table 18. Position held by the participating teams.

PLACE	TEAM	POINTS
1	Tripulación Subanautas	441
2	Tripulación Econautas	440
3	Phoenix	439
4	Rigel	425
5	Gaia	421
6	Júpiter	420
7	Sernautas	414
8	Betelgeuse	410
9	Pequeños Astronautas 1	393
10	Tripulación Victoria 1	393
11	Tripulación Victoria 2	391
12	Ganímedes	388
13	Inemitas al Espacio	385
14	Columbia XXIII	373
15	Voyager	373
16	Auriga	371
17	Galileo	369
18	Orión	367
19	Antares	360
20	Luna Llena	353
21	Alnitak	329
22	Cosmonautas XXIII	323
23	Extremófilos	318
24	Estrellas Unidas	313
25	Los Meteoritos	299
26	Pegasus	298
27	Constelaciones	294
28	Viajeros Espaciales	293
29	Cosmonautas	266
30	Poliastronautas	254
31	Astromochuelo	205
32	Astrogimfa	124
33	Facanautas	83

In Annex No. 1 and Annex No. 2 (Appendicess Report.xlsx) shows the scores for each team activity and graphed in relation to the scores obtained by all participating teams.

6.4. Surveys sent by teams

One of the activities of the teams was to fill the survey form sent by NASA to collect, monitor and analyze questions and concerns that leaders teachers in Mission X have in the development process. 21 teams actively participated and sent their concerns to be taken into account for a new version of Mission X.