

## **LEVERAGING THE EDUCATIONAL OUTREACH EFFORTS OF LOW-COST MISSIONS**

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### **ABSTRACT**

A small portion of the budget for every NASA mission must be devoted to education and public outreach. The question is, how can projects best leverage these funds to create a high-quality message and get it disseminated to the largest and most appropriate audience? This paper describes the approach taken by a small educational outreach team for NASA's New Millennium Program (NMP). The team's approach has been twofold: develop a highly desirable suite of products designed to appeal to, as well as enlighten, the target audience; then negotiate relationships with existing, often under-utilized channels for dissemination of these products. Starting with NMP missions as the base of support for these efforts, the team has invited participation by other missions, NASA-wide. This approach has resulted in a richer and broader message, and has allowed the continuing development of the audience base.

### **THE CHALLENGE TO REACH OUT AND EDUCATE**

The U.S. National Aeronautics and Space Administration (NASA) strongly emphasizes the importance of public and educational outreach as an intrinsic part of every space mission. Not only is it necessary to gain and retain public support for space science missions, but also NASA has an explicit mandate to make every effort to offer genuine and accessible value to the general public in exchange for its support. The product of value is, first of all, information. Of course part of this outreach effort includes industrial technology transfer and free access to raw data for study by science investigators. But an equally important part includes reaching out to the youngest members of our society, those who will soon be choosing their careers, paying taxes, voting, and helping to decide the direction that space exploration and other scientific research will—or will not—take in the coming decades.

NASA seeks to implement this commitment through each of its space missions. Thus, even the lowest-cost NASA missions must include a small budget for public and educational outreach. But how can these missions best use this limited resource? Not every mission can afford to hire its own outreach manager, and other project team members may not have appropriate outside contacts, nor much familiarity with the existing infrastructure for developing educational outreach products in order to make efficient use of the project's outreach funds.

NASA's New Millennium Program (NMP)—whose primary mission is to test and validate advanced technologies required for revolutionary spacecraft capabilities, thus reducing the cost and risks to future missions—has evolved an integrated approach to educational outreach for all its missions. The market for NMP information is diverse. Thus its outreach strategy first of all

identifies the different target audiences and attempts to reach each in the most effective and efficient way. Children and young people make up a significant part of this audience. However, adults are also important.

In addition, NMP seeks to make the most efficient use of its fixed outreach budget by leveraging as much as possible existing distribution channels for dissemination of technology information and products.

This paper describes the principles and details of NMP's outreach approach addressing its youngest, perhaps ultimately most important, audience, and how its resources and infrastructure have been expanded to embrace other, non-NMP missions.

## **THE SPECIAL CHALLENGE OF REACHING CHILDREN**

In addition to the obvious challenges of reaching adults with NASA's overall message, as well as specific program or project messages, reaching children presents some special challenges.

For one thing, children need personal attention. To feel involved and motivated, they need to be allowed to encounter and participate in the space program in their everyday lives. They need to understand in a personal way how space exploration relates to them. They need to have ideas broken into digestible, child-sized chunks and presented as concretely as possible.

They need ways to share ideas and experiences with the adults and other children already in their lives, so they understand that space science and technology are normal parts of life, tangible and attainable . . . not intimidating abstractions they hear about only on the evening news, hovering totally beyond their reach.

## **INVITING THEM INTO THE SPACE PLACE**

In an entrepreneurial spirit, the approach we, the outreach team, has taken has been twofold: develop a highly desirable suite of attractive (and, by the way, educational) products designed to appeal to children; then negotiate relationships with existing channels for dissemination of these products.

We call this suite of products "The Space Place." The products include:

- an activity-based web site for kids (<http://spaceplace.jpl.nasa.gov>)
- articles describing activities for teachers to do with the students in the classroom
- event-related news articles written for kids
- display materials
- structured program and project-related activities and contests
- a collectible Space Place card game, with mission description cards that can stand alone.

Distribution channels, detailed later, currently include

- The Internet (visitors to web site)
- Publications of the International Technology Education Association
- Over 100 partner museums, planetariums, and libraries
- Boys & Girls Clubs of America
- Weekly Reader, 4<sup>th</sup> grade edition
- Los Angeles Times

## THE ARCHITECTURE OF THE SPACE PLACE



Initially, The Space Place existed only in cyberspace. It started as a web site with a “by children, for children” look and feel. It describes and illustrates activities for kids (target age range 7-12) to do either by themselves, with a friend or two, or with an adult. The activities are not designed for classroom use. Rather the site is intended to be a “place” a child can take ownership of and have fun with, and by the way maybe learn something interesting in the process.

Initial activities were related to and sponsored by missions in the New Millennium Program (e.g., Deep Space 1, Deep Space 2, Space Technology 3, Space Technology 4/Champollion [not funded], Earth-Observing 1). One by one, other non-NMP projects became involved. With the participation of each additional project, a new activity or “fun

fact” module enriched the content and breadth of The Space Place. The number of daily visitors climbed steadily as The Space Place began to gain recognition, web awards, and links from a number of children’s sites, educational sites, and astronomy-related sites.

In addition to the NMP missions, others currently represented on The Space Place include:

- ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer)
- Deep Space Network
- Galileo
- Keck Interferometer
- MUSES/CN (Nanorover to an asteroid)
- Shuttle Radar Topography Mission (SRTM)
- Space Interferometry Mission
- Space VLBI Program
- TOPEX/Poseidon
- Voyager
- X2000 (Deep Space Systems Technology)
- Urbie Tactical Mobile Robot
- Wide Field and Planetary Camera (Hubble Space Telescope)
- Chandra X-ray Observatory

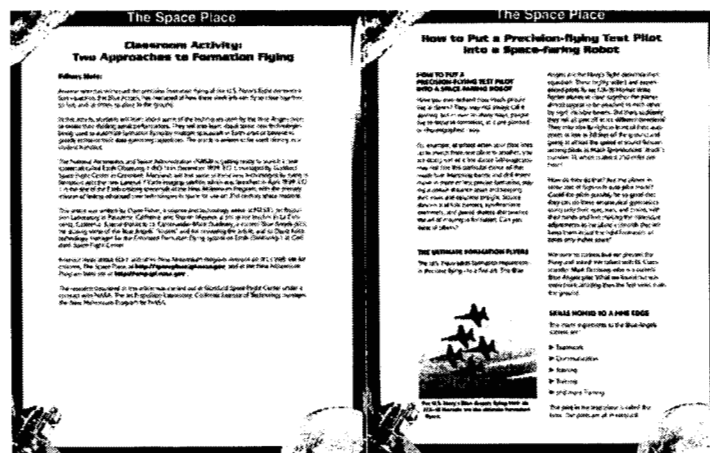
The Space Place effort is no longer confined to missions performed at JPL. It is open to any and all NASA missions. It receives an average of 500+ visits per day, totaling over 300,000 since its inception in February 1998. Demographic data collected via a voluntary visitor form indicates that 70% of the audience is under 12 years of age, and another 8% between 13 and 18 years. Also, we have found that 75% of the audience access the site from home (rather than school, library, or other venue).

Signing up for an activity module on The Space Place web site is the initial “buy-in” necessary for a mission to gain the benefits of the other Space Place products and distribution channels. This course of events ensures that visitors to various parts of The Space Place encounter consistent content.

### THE EDUCATION CONNECTION

To help launch (so to speak) the web site and provide curriculum guidance, we partnered with the International Technology Education Association (ITEA). ITEA has around 6000 members, consisting of teachers of science and technology to children of primary grades through high school. It publishes two journals, *The Technology Teacher*, for teachers of middle- through high school, and *Technology and Children*, for teachers of the primary grades.

As part of this partnership, we produce and submit original curriculum support articles for publication in each of the 8 issues per year of *The Technology Teacher* and four articles per year for *Technology and Children*\*. Each of these articles describes a classroom activity related to space science and technology and to one or more of NASA’s missions or programs. These articles appear in a distinctive “The Space Place” border each issue, and always mention and provide the URL for The Space Place web site.



Sample page spread from a Space Place article published in ITEA's *The Technology Teacher*. This one compares formation flying as done by the Blue Angels with the technology used on EO-1.

\* Through an ITEA agreement with the Association of Elementary School Principals, an additional 5000 readers see these issues over the Internet.

## EXTENDING THE PARTNERSHIP

The next step has been to contact and form Space Place partnerships with local community education resources, including museums (science, air, children's, and art), planetariums, and libraries. Each museum, planetarium, or library partner agrees to transform a bulletin board or wall into "The Space Place" display and regularly update it. The outreach team initially sends the Space Place partner a set of distinctive Space Place borders to define the space, as well as various NASA posters, lithographs, emblems, and other relevant materials. After that, the partner receives quarterly shipments of the latest NASA materials. The partner agrees to supplement the display with such items as news clippings, children's art or writing, models, and relevant book recommendations.

The primary criterion for becoming a Space Place partner is to be situated in a small community. The intention is to offer the partnerships to communities that otherwise have little or no direct contact with the space program. Also, partners are scattered geographically to maximize the reach. Space Place partners are generally at least 150 miles apart.



*Exemplary Space Place Display at Daniel Boone Regional Library in Columbia, Missouri.*

Over 60 museums in 31 states and 43 libraries in 32 states are now Space Place partners. In all, 45 states are represented. We estimate total annual visitors to these facilities at over 18 million.

## JOINING THE CLUB

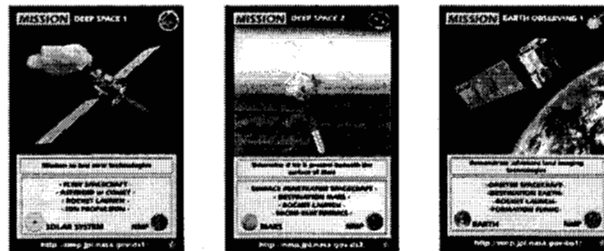
Patrons of Space Place partners also have the opportunity to participate in "Club Space Place." Four times per year, we create and provide the partners an activity to involve both children and adults. Activities are uniquely cross-disciplinary (as well as cross-generational), thus attracting non-traditional NASA audiences, such as those patronizing libraries and art museums.

The Club activity is described on a handout, which the activity director can photocopy and provide to participants during a structured, scheduled meeting of the Club. Activities have so far included:

- Making a beautiful model Saturn (to be suspended from ceiling or holiday tree) from an unwanted CD-ROM, a small styrofoam ball, glitter, and glue. Sponsored by the Cassini mission.

- An art contest to portray some aspects of one of the eight advanced new technologies to be flown and tested on Earth-Observing 1.
- Making an origami game that sends participants outside to identify specific objects in the summer night sky. (Wide Field and Planetary Camera project)
- A “Cosmic Poetry” contest, expressing the beauty and benefits of space technology. Sponsored by NMP.

For the contests, each partner organization selects a winner in each of three age categories, then grand prize winners are selected at JPL. The beautiful collectible Space Place card game is used as a prize for local winners.



*Sample mission cards from the collectible Space Place card game.*

Adding another approximately 2,500,000 individuals to the Space Place audience, the outreach team has partnered with the Boys & Girls Clubs of America (BGCA). They are also provided the Club Space Place curriculum four times per year. The material is distributed to the 3,000 local Club chapters via the BGCA’s intranet site.

## **THE PAPER BLITZ**

The 4<sup>th</sup> grade edition of Weekly Reader is another Space Place partner. We provide four event-related articles per year for publication (circulation 600,000 families). These articles appear as a special feature framed in the distinctive Space Place border and highlight The Space Place web address. In exchange, Weekly Reader 4 provides a classroom subscription (30 copies each issue) to each of the Space Place partner libraries and museums.

In addition, as part of its California Classroom “Learning Link to . . .” feature, the Los Angeles Times each month publishes an event-related article we provide. These are identified as a “Learning Link to the Space Place,” and give The Space Place web address.

We are currently exploring other demographics that can extend the reach of The Space Place even farther, leveraging the existing products and resources. For example, we feel there is much potential in the grandparent generation to involve them in rewarding space technology related activities they can do with their grandchildren. We are thus exploring publications, web sites, and organizations that target that audience.



Weekly Reader 4 *Space Place* article on SRTM (*Shuttle Radar Topography Mission*), published November 5, 1999.



L.A. Times *California Classroom* "Learning Link to The Space Place" article on SRTM published February 16, 2000.

**KEEPING CHECK ON REALITY**

A number of professional advisors have been recruited to form the Space Place Advisory Council. The Council supports The Space Place suite of efforts by

- Helping us identify education needs and opportunities.
- Advising on space-science-related educational challenges.
- Providing informal linkages with professional affiliations and organization.
- Reviewing concepts for programs, activities, and materials.
- Consulting on specific areas of expertise.

At this time, some of these advisors are:

- Don Partain, Director, Golden Pond Planetarium, Golden Pond, Kentucky
- Judy Strong, Librarian, Savannah, Georgia
- Michele Hailey, Directory of Arts and Technology, Boys & Girls Clubs of America, Atlanta, Georgia
- Damond Benningfield, Executive Producer, StarDate Productions, Austin, Texas
- Ruth Netting, Technology Outreach, NASA Headquarters, Washington, D.C.

Regular telephone conferences give opportunities to brainstorm and discuss implementation strategies.

| Product                      | Space Place Audience Exposure Opportunities, per Year |                              |                               |               |                 |                          |
|------------------------------|---|------------------------------|-------------------------------|---------------|-----------------|--------------------------|
|                              | Website Visits  | Museums & Libraries Visitors | Club SP at Boys & Girls Clubs | ITEA Journals | Weekly Reader 4 | L.A. Times/latimes.com   |
| Web site activities          | 182,500   | —                            | —                             | —             | —               | —                        |
| Classroom activity articles  | —   | —                            | —                             | 72,000        | —               | —                        |
| Event articles               | —   | —                            | —                             | —             | 2,400,000       | 12,000,000 + online hits |
| Club activities/ Card game   | —   | —                            | 10,000,000                    | —             | —               | —                        |
| Space Place partner displays | —   | 18,000,000                   | —                             | —             | —               | —                        |
| <b>TOTAL = 42,654,000</b>    |   |                              |                               |               |                 |                          |

## WRAPPING IT UP

To summarize, The Space Place is a NASA space-science education program dedicated to fostering awareness and practical understanding of space and mission technologies among people of all ages in the USA. Its objectives are

- To make space science educational materials available and accessible to every child, young adult, and adult in America;
- To provide meaningful space science curriculum and activities;
- To advocate for space science education;
- To provide direct and factual space science content.

As additional “nodes” are added to The Space Place network, it becomes a stronger and more powerful educational outreach force. Each additional partner library or museum brings additional visitors to the web site. Most of them have their own web sites and include a link to The Space Place. Each article that appears in the L.A. Times or Weekly Reader 4 brings potentially thousands of visitors. The more the numbers grow, the more valuable an outreach tool The Space Place becomes, and the more attractive it is to missions wishing to get the widest and most positive exposure for their outreach dollar. The more missions, and the greater variety of missions, represented in The Space Place suite of products, the richer and more valuable becomes the content and the more cohesive the overall message.

As The Space Place grows and takes on momentum, it becomes an increasingly valuable infrastructure that can contribute much to the outreach goals of all low-cost planetary missions. So far, missions have participated in The Space Place as an add-on or afterthought to their overall outreach plans. We would like to encourage planners of all NASA missions to consider including participation in The Space Place program as a significant part of their outreach planning from mission startup.

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