DoD STARBASE

ANNUAL REPORT 2002

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This report addresses the design, conduct, and effectiveness of the Department of Defense STARBASE Program as required by Title 10, United States Code Section 2193b(g).

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EXECUTIVE SUMMARY

This is the ninth year of the U.S. Department of Defense (DoD) STARBASE program. Throughout these years, DoD has established the program at 45 sites across the Nation to serve community youth and their teachers by providing training and experiential opportunities in mathematics, science, technology, goal setting, and drug demand reduction. The program emphasizes self-esteem building, team building, and knowledge skills in motivating students in hands-on, real-world problem solving. The program utilizes the human and physical resources of military service units who sponsor the program in partnership with local communities and their educational systems on their military bases. The program uses simulations, experiments, tours of military and local resources, classroom instruction, and hands-on applications.

The basic objective of DoD STARBASE is to raise the interest and improve the knowledge, skills, and attitudes of at-risk youth in mathematics, science, and technology. To accomplish this, 25 contact hours of instruction are used to apply these abilities to real-world situations, technological applications, and problem solving. In addition, the program encourages teachers to apply the curriculum and the materials in follow-up lessons to meet local and national science and mathematics standards. The partnerships established among the military, the community, school districts, industry, and local governments are essential to creating support systems, common goals, and commitment to this important objective.

Title 10, United States Code (USC) Section 2193b is the legislative authority for the DoD STARBASE program. It authorizes the establishment of Academies across the country and requires the submission of an annual report. This document is in response to that requirement.

Over the past several years, many STARBASE Academies have operated under different schedules for their program year. Some used the Federal fiscal year, others used the calendar year, and still others used the school year as the basis for their fiscal and operating program. The 2002 program year was a transition year to one system for all STARBASE academies. The federal fiscal year is now the operating standard. While there is some carryover in reporting this past year in the old systems, we have adjusted the report accordingly. This will sometimes require explanations in the report description. If there are exceptions or adjustments, they will be so noted. Future reports will not require these adjustments.

Over the nine-year period that DoD has sponsored the STARBASE program, it has grown in national prominence. At present, 28 States, the District of Columbia, and Puerto Rico are represented in the program. Additional local communities and military installations seek entry into this widely accepted program. The demand for entry and expansion is widespread and constant. In addition, several currently operating Academies are requesting expansion of their existing programs to new communities across their States. While demand is intense, attention is focused on quality control; building efficiencies and standardization in operation; monitoring compliance to Department of Defense Instruction (DODI) requirements; resource sharing; installation support; and strengthening the assessment process. This report will cover each of these activity areas. Many of these initiatives are guided by the introduction of the DODI requirements to help ensure that the intent of the DoD STARBASE sponsoring agency—the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD/RA)—and the Congressional oversight committee are complied with in future program operations. To reinforce standardization and compliance goals, installation and compliance visitation and audit programs

have been designed and implemented to assist new Academies in their startup activities and to support new and currently operating programs in ensuring their regulatory adherence to DODI guidelines.

The events of 9/11 had a direct effect on the operation of the program this year. Access to some of the military installations was initially restricted and then later resumed; some instructors and staff were activated; military volunteers were temporarily unavailable; upgrades of facilities were canceled or delayed; and the installation of some new Academies had to be rescheduled. Not all military installations were affected, but a significant number had some change in routine and procedure. For a period of time, some classes were cancelled or rescheduled/moved to another site or to the school itself. Access or tours were disrupted and schedules revised. Most of the STARBASE staff coped and found solutions in programming, but the events of 9/11 did reduce the number of classes, the number of students in the program, and the availability of base resources. The first half of the program year was the most affected, and the full execution of the program was just slowly coming back to normalcy in the second half. The STARBASE staff is making every effort to meet desired classroom and student quotas, as well as the desired quality and involvement of the military resources. Military personnel, Base Commanders, and volunteers have maintained their commitment, and their public and community relations activities remained very positive during this period. Schools and teachers were adaptive, and no loss of commitment or cooperation was noted.

While the primary goal of DoD STARBASE is to increase the knowledge, skills, and attitudes of students in math, science, and technology, there are several additional operational and program goals that provide challenges (this year and probably well into subsequent years). As the STARBASE program grows and demand increases, management of that growth requires careful attention to operational and administration considerations while retaining quality control and educational methodologies. The design, conduct, and effectiveness of the program are the overarching themes of this report. In addition to covering the growth and effectiveness of DoD STARBASE—along with DODI compliance adherence, student performance in testing, cost effectiveness of the program, positive attitudes of the program participants, and community responsiveness—there are several additional challenges addressed in the report: maintaining quality control and protecting core curriculum and methodologies; balancing local community and State requirements with STARBASE operating procedures and goals; establishing and maintaining economies of scale in operations and support systems; developing centralized training capabilities for Academy staff in new training methodologies, new functions, and operational procedures; building efficiencies in Academy installation; and involving Academy staff in future planning, review, and materials development.

Last year's recommendations were addressed in this year's program planning and in support system applications. DODI compliance implementation was reinforced by installation and compliance audit visitations. The Academies were well prepared for the visits and had proper documentation at the time of audit. During the interviews, Academy Staff were open and candid. Budget information and operational expenses were obtained. An analysis of cost information was conducted and the results are provided as part of this report. This information helped to establish some basic modalities in true cost of operation for each of the Academies. Each of last year's recommendations was reviewed in terms of its contribution toward upgrading the STARBASE product, for this year and for future operations.

This report presents a systematic view of the program from the perspective of several key STARBASE participants: the Base Commanders, the military service volunteers, the classroom teachers, and the students. While their views on the effectiveness of the program were universally positive, their responses on the program's impact on them personally and professionally were equally important. Each participant has a different view of the strengths of STARBASE. For example, students respond positively to the content and approach of the course material as well as in their attitudes and performance in math and science. Military Commanders, on the other hand, note the gain in community relations and the enthusiasm and involvement of their volunteer personnel in the program. Teachers, as professional educators, point to the positive changes in the students' attitudes towards math and science, and in their school performance. Military service volunteers indicate that their involvement in the program is useful, rewarding, and beneficial, particularly in the development of their skills in training environments and as reality-based experts. Greater detail on each of the key participant groups and their perspectives follow in this summary as well as in the report.

Several issues and operating considerations that will help in building future efficiencies have been identified in this year's report. Observations and recommendations are often displayed at the point of analysis, but they are also included in the recommendations section at the end of the report.

Previous reports have identified the nation's shortfalls in math and science, as well as the effect these shortfalls have on the economy, the quality of education and national security interests. National educational statistics indicate a sharp decline in the academic performance of our youth after the fourth grade. Essentially, that is why the program continues to focus on grades four through six, with particular attention on the fifth grade. There are also concerns that the United States migrates its technological edge to other countries (i.e., U.S. graduate and higher educational programs are heavily populated with foreign students who transfer these capabilities back to their countries of origin upon graduation). The etiology of the problem partially points to the primary grade levels of U.S. education. This is reflected in the performance of students in the fourth grade who are internationally competitive at that level but decline in subsequent years. STARBASE is directed toward helping to remedy that issue.

DoD STARBASE Operational Focus

The DoD STARBASE Academies operate their programs on Active, Guard, and Reserve military installations. Oversight responsibility for the program resides with the OASD/RA. At the local level, the DoD military components install and implement the DoD STARBASE programs by providing classroom facilities, personnel support, supplemental administrative support, access to military volunteers as tour guides and teachers aides, some oversight responsibilities on the DODI, and some minor operational support. The Academy teaching staff handles all teaching, scheduling, testing, office management, and program implementation activities.

Board of Directors

Each Academy is allowed to develop an advisory board that assists the Academy in community relations, funding, grant initiatives, public affairs, and access to community leaders. Several Academies have very active boards, and others are trying to maximize their involvement in the aforementioned activities. Boards do not get involved in operational oversight.

Public-Private Partnerships

STARBASE has a long history of establishing public-private partnerships to help support the program curriculum and goals. Many local Academies have benefited from these types of relationships, which have greatly helped to enhance their programs. Most recently, Parametric Technology Corporation (PTC), one of the world's largest software companies, agreed to donate its 3D software to Academies across the nation. The software will expose STARBASE participants to the world of current technology in engineering design.

Organizational and Functional Changes to Academy Staffing

The prototypical organizational arrangement of an Academy includes a Director, Deputy Director/Instructor, Program Instructor, and Office Manager/Administrative Assistant. This continues to be the dominant organizational arrangement; however, as Academies mature, differences emerge.

- The major change involves expanding instructor time. To accommodate this decision, several Academies have reduced the Office Manager's role to part-time or have eliminated the position entirely to pay for additional instructor capability. Some Academies have obtained outside funding for instructor expansion, and a few are moving toward part-time positions for all staff to add instructor numbers. When the Office Manager role is diminished, the staff takes on the added tasks. Some school systems have offered to fund an instructor position to expand the program, but this decision usually involves additional facilities that are not always available.
- Staff attrition remains relatively low. Staff loyalty and commitment to the program and its methodology remains high. Teachers must have credentials, teaching experience, and general certification upon hire. All have had background checks and most are fingerprinted upon position entry. Directors still voice concern about potential turnover of staff and some point to problems of salary administration and lack of Cost of Living Adjustment (COLA) as issues in maintaining the continuity of staff.
- Employee staffing protocols differ among the Academies. Navy programs utilize Federal employees. The National Guard is often structured under State employee umbrellas. Other programs use contractors or school system employees. Some have automatic step grades and COLA adjustments, while others (such as those under State systems) are dependent on annual consideration by State legislation. Of late, several States have frozen salaries and step grade considerations because of tax shortfall issues.
- The Navy programs are centrally managed. Budget resource allocations, installation processes, startups, documentation control, and administrative support are handled centrally. The other service commands are more diversified and locally managed by the Director, with some support from the base for budget and supplies. There are advantages and shortfalls to both arrangements, but each capitalizes on the advantages of the format.

DoD STARBASE Growth, and Student Composition

- The FY 2002 program has grown to 45 STARBASE Academies. The number of Academies has doubled from 4 years ago. Seven new Academies were funded in FY 2002. The new Academies are in various stages of development and operation because of delays resulting from the 9/11 episode. The new Academies are expected to be fully staffed and operational in the near future. Because of the delays, the staggered starts resulted in these Academies only partially fulfilling performance requirements during their initial year of operation.
- A focused and standardized installation program has been developed to increase the efficiencies of the startup process. This effort will continue into next year.
- Since its inception, DoD STARBASE has matriculated more than 250,000 students in the last 9 years. Adding the many supplemental outreach efforts and various summer programs probably doubles that number.
- In FY 2002, 1,362 STARBASE classes were held and 32,773 students served (supplemental programs excluded).
- The STARBASE program has grown in several dimensions. Besides the number of new Academy startups, almost all Academies now operate on a year-round schedule to accommodate additional classes and demand from the community. Most Academies also operate a special program during the summer for children of base personnel and classes for children with disabilities.
- Supplemental programs are also characteristic of growth. Although they are not included in the official numbers, they are extensive and often statewide. Oklahoma instituted a STARBASE-In-A-Box program that is transported directly to the schools with materials, curriculum, teacher guides, and other aids. Home study sessions and special programs abound. As these programs grow, so does the necessity for support systems and operational control. Managing growth and demand is a key challenge for the Academies and requires a great deal of discipline to maintain quality control and efficiencies while being responsive.
- Last year, 74.3% of the Academies operated within a 50-mile radius from the military installation. This year, it was reduced to slightly more than 71%. An interesting offset to the expansion is that the number of Academies operating within a 20-mile radius increased by 7%. Generally, the greater the distance from the military base, the more problems there are in obtaining maximum classroom time and timely start of classes during inclement weather. In addition, cost becomes a problem for school transportation. The differences from last year are minor, although outreach efforts by the Academies have increased.
- 20 to 35 students is the desired range in class size outlined in the DoDI guidelines. The average class size across the Academies is 24. This is slightly less than the average for last year. A few Academies have indicated that they are feeling the pressure of class size. Tax shortfalls in some States affect teacher hiring and school construction while other States have legislated smaller size classes. The latter condition presents logistical and transportation difficulties for the Academies.
- All Academies operate a fifth grade program. Nine Academies service four or more grades. Most Academies focus on three grades or less. Adding grades requires revisions in

curriculum, facilities, supplies, and materials, and pressure from the schools and communities to expand the grade levels is strong.

- The student population of STARBASE displays a great deal of diversity in ethnicity. While the Caucasian population represented more than half (54%) of the student body in 2001, it was 47% this year. The African American population was next with 27% of the total. The Hispanic population demonstrated a slight gain, with an increase of more than 3% to 14% overall. Asian, Native American, and multinational participants all resided at 5% or less. As new Academies are added, the racial composition will shift accordingly. All Academies report that they capture the at-risk children in their selection process.
- The gender distribution did not change from last year. Males are slightly higher in numbers at 51%. Only a few Academies displayed any disparity in the gender distribution.

Military and Educational System Support

- Military base and community partnership support services vary in type and breadth at each Academy, which has an effect on the quality and sophistication of the programs.
- The primary contributors, on an ongoing basis, are the military and the school systems. The educational systems generally provide transportation, teachers (as monitors), and a lunch program. A few schools provide additional support, but they are the exception. The military is the key facilities provider for such things as classrooms, utilities, computer support, custodial/maintenance services, security, some reproduction/printing, and some administrative services.
- In addition, the military encourages personnel to volunteer as mentors, teacher aids, tour guides, computer facilitators, and audio-visual and administrative support providers.
- The partnership and commitment of both the educational and military systems have been considerable and generous. STARBASE Directors consistently point to their Commander's enthusiasm and commitment to the program beyond the above-stated support services.

Views from Key STARBASE Participants

Several interested and contributing parties put the STARBASE program into operation and continue to maintain its basic integrity. Most of these groups continue their involvement, and this continued participation is essential to the program's success. For this report, we have selected only a few key groups: the Base Commanders, the military service volunteers, the classroom teachers, and the STARBASE students. Their views, opinions, and candid ratings of the program's impact on the students, the community, the military base, and on themselves were obtained. Information was gathered from interviews, surveys, questionnaires, and unsolicited comments. Participant responses were universally positive, but also provided valuable insight to what is working and what is effective.

Views from the Base Commanders

The Base Commanders are the key sponsors of the Academies that operate under their command system. They not only provide facilities, support services, and a wide variety of administrative activities, but also encourage voluntary participation of personnel. Without exception, the Commanders indicate that these activities provide equal returns in positive community relations and network relationships with community leaders, and also serve as a platform for volunteers in community affairs and training applications.

- Promoting a positive view of the military to the community was ranked as the number-one contribution the program makes to the military base. Increased public awareness of the role of the military in community service was ranked second, and providing a platform for involving parents, community leaders, teachers, and influentials with the military was ranked third. Media exposure and attention was another benefit identified by the Commanders. By far, positive community relations was considered by Commanders to be the greatest value to their base.
- Commanders indicated the benefits to their military personnel included several positive results such as training exposure, community service, pride in the task, and direct feedback to the volunteer by the students.
- Commanders voiced their concerns about the shortfalls in our educational process with such statements as "It's too bad mainstream education doesn't teach the basics as well as STARBASE…children leave the program with enthusiasm…an outstanding program."

Views from the Military Volunteers

Military volunteers are non-paid supporters of the STARBASE program who have direct contact with the students, teachers, and the content presentation of the program. They are in real terms, critical observers of the program dynamics, student responsiveness, and whether their time contributed to the effort was worthwhile.

- A sample of 92 volunteer respondents indicated a favorable and positive rating in all items that impacted them, the students, the community, and the military.
- Volunteers perceive the program time as a pay-off to them, since it develops their training skills and provides a sense of pride and challenge. They obtain direct positive reinforcement from the students and observe the change in student attitudes and achievements.
- Volunteers personalize the contribution the program makes to the community by bringing neighborhoods, communities and the military together to work on a very positive activity with the children: "The military does what cannot be accomplished by the school system and within the environment they provide."

Views from the Classroom Teachers

The participants' school sends classroom teachers to monitor the children and the program at the military base. Most of the teachers are strong advocates of the program and actively seek admittance to the program for all of their future classes. Their exposure over the years provides them with an understanding of the program's objectives, effectiveness, teaching methodologies, and impacts on their students.

- Many of the teachers use the STARBASE curriculum as follow-through when they return to the school system. Some become certified STARBASE instructors and get involved in outreach efforts.
- A sample of 116 classroom teachers from participant school systems rated the experience positively for themselves, their students, and the students' families. Teachers also noted improvements in the students' attitudes about school and themselves.
- Teachers with more STARBASE experience reported that their students talk about the program long after attending. They also indicated that STARBASE improves their students' understanding of math and science.
- Teachers with more military exposure were more likely to use STARBASE materials in their own classrooms, and consider the STARBASE instructors to be good role models. Teachers at the higher-grade levels also tended to use STARBASE materials in their classrooms.
- Teachers at different locations had different perceptions; however, the ratings on almost all dimensions of the program's impact on students, teachers, and the community were very positive and high.
- Teacher ratings on most of the factors were similar to student ratings. Both students and teachers assess the pro-social advantages to STARBASE that also include positive role models of the instructors and the military volunteers. The "can-do" and self-esteem attitudes were deemed exceptionally positive.

Views from the STARBASE Students

The pre/post survey of student attitudes was designed to obtain shifts in perceptions as a consequence of program participation. The results demonstrated that:

- Students had a very positive attitude toward almost all the dimensions surveyed as a result of their experience in STARBASE.
- The students entered the program with high expectations and looked forward to the experiences they expected on the military base and to meeting military personnel.
- Students displayed high ratings on pro-social attitudes—a positive attitude about the future and the assessment that they "learned a lot of things that they could use" were obtained as a consequence of completing the program. Similarly, innovation and the ability to develop new things emerged as highly rated perceptions students reported about themselves. In addition, self-realization and "making their dreams come true" are values promoted in the program's methodology.
- There were differences between boys and girls on the perception of themselves and the program. Girls expressed more positive responses to interpersonal items, while boys seemed

more positive about the military, math, and science. Both attitudinal positions are in alignment with the larger population. Girls were much higher in their responses to "I can make my dreams come true" and "I want to be like my STARBASE instructor" than the boys.

- The experience of being in the program brought the students to a higher and more positive perception of the military.
- Older students had lower attitudinal scores than the younger students; however, in the knowledge test, the older and higher-grade-level students had higher test scores. Scores for all students, however, were high.
- Location displayed differences in attitudinal scores. Academies emphasized different aspects of the curriculum and attitudinal values. This was a matter of degree, since ratings in these same perceptions were high.
- There were only minor variations in the positioning of attitudes by military service component. The general rankings were similar, with the Navy displaying the greatest differences.
- Overall, the shift in student attitudes was positive and enthusiastic. They came out of the program with a sense of personal skill to succeed in school and in social challenges.

DoD National Standardized Test

DoD developed a single DoD STARBASE standardized student assessment instrument to measure the change in knowledge, skills, and attitudes of the student population after participation in the STARBASE program. This is an assessment tool administered to a sample of students across all Academies on a pre/post application. The knowledge test focused on core curriculum items that all Academies are required to cover in the presentation.

- The initial results indicated very positive gains in knowledge and skills. This year's scores were appreciably higher than last year's and are probably a reflection of the Academy's attention to the core curriculum as outlined in the DODI.
- The testing instrument is still in revision. Several items have been changed as a result of Academy staff, consultant, and testing personnel input. Thirty-six fully operating Academies and 1,873 students were involved in this year's testing. A Spanish version was developed to respond to the language abilities of some of the students.
- The percentage of students who answered an item correctly increased significantly on almost all items. Pre-test scores had a mean of 18.44, and post-test scores increased to 22.67. This is an increase of slightly more than 4 points across the Academies.
- Academy location had the greatest variance in scores, which probably reflects the emphasis and intensity of coverage of core concepts.
- Girls demonstrated a slightly greater increase in test scores (4.40) than boys (4.06) in gap differences.
- Academy staff have made recommendations in selected items and suggestions for consideration in test administration. The desire to reduce testing time was the most frequently offered suggestion.

Academy Administrative Testing

Many of the Academies have developed and used testing over the life of their programs. These are localized tests developed by the specific Academy to be administered and used with their students on a pre/post basis. These are not to be confused with the DoD standardized tests that are administered to all of the Academies on an annual basis.

- The local testing programs demonstrate a significant increase in knowledge and skills as a consequence of STARBASE participation by the students. There was an average 30% increase between the pre- and post-test. The local test is limited to describing only the experience of the specific Academy.
- Not all Academies develop or utilize their own tests. Many of the newer Academies use the national test only.
- Each testing system has utility for program design, reformatting curricula, and program emphasis. Both tests show demonstrative positive results in student performance.

DODI and Compliance

- The purpose of the DODI is to obtain consistency of program objectives, policy, and procedures in realizing DoD goals and objectives. Quality control and standardization in program approach, core curriculum, and basic methodologies were elements of concern for both DoD staff and Academy personnel. Diversity in many operational issues and exploration of local resources were encouraged.
- The compliance audit visitation program with the fully operational Academies demonstrated that the Academies, for the most part, were well organized and in full compliance with the DODI. Minor technical issues were identified and corrective action taken. The audit process triggered a well-prepared and fully documented presentation during the visitations.
- Property audits were, for the most part, organized and conducted by a local Base and/or the United States Property and Fiscal Officer (USP&FO) or his/her counterpart. Full documentation and tagging were on file.
- Most of the Academies indicated that the DODI was reasonable and manageable, and not intrusive on their ability to promote exploration of their local capabilities. Most perceived the DODI as a protective device for the core curriculum, key methodologies, and “best practices” in educational delivery.
- Selected areas showed some strain to maintain the boundaries in the guidelines. For example, class size is becoming a problem in some areas because of tax shortfalls by the State and local areas. An inability to hire teachers and build classrooms is resulting in larger class sizes. Twenty-five hours of class time proves difficult for some classes to cover the core curriculum. Academy staff constantly seek ways to maximize experiential applications in their presentations, and they recognize the need to examine and develop more ways to display the basic concepts more efficiently.
- Standardization of selected key areas of curriculum, methodologies and basic concepts provides the basis for managing ease of materials sharing and transportability to all Academies, as well as providing a focus for Academy-wide testing and assessment.

Program Costs

Several new initiatives were introduced to this year's assessment to obtain information on program cost of operation, cost modalities, and costs across military and Academy sites. In addition, DODI requested that all Academies move toward a federal fiscal year funding and budget schedule. This year was a transition year for several Academies, and budget management reports reflect that transition. The data collection also uncovered several systems that were managed by the State, governing agency, the Academy, or contracting agencies—each with its own reporting and documentation system. Resolving differences in cost analysis became a challenge. In spite of this, the financial bookkeeping by the Academies, for the most part, was detailed and did report operating expenses. The following information is based on fully operating Academies; since newly or recently installed Academies do not provide a comparative base for analysis.

- DoD covers more than 90% of the total budget of all the Academies. Less than 10% is obtained through outside sources.
- The median average cost of an Academy is $261,476, and Academies service (on average) approximately 1035 students per program year at an average cost of $270.10 per student.
- Operating costs are heavily concentrated on STARBASE staff salaries and benefits at 83% of budget, with 6% directed toward expendable supplies. The remaining budget categories—such as communication, transportation and maintenance—are all less than 3% each.
- Most of the Academies in FY 2002 operated on less than $350 per student. The range varies from $147.27 to $439.37 per student. Location, local command support, and maturity of the program's operation account for the differences.
- Analysis indicates that as Academies age, costs drop and student and class numbers increase, which results in demonstrable cost efficiencies. The dramatic differences come at 4-plus years of operation. Since so many new Academies have been operating for a much shorter period of time, we can anticipate increased efficiencies in the near term.
- Service commands demonstrate variances in the use of their operating budgets. Salary costs display the widest variances, and the older Academies are generally the sites that have acquired the greatest amount of non-DoD funds.
- Non-DoD funds are often earmarked for new equipment, upgrading of facilities, materials development, and even adding instructor capability.
- The Navy centralizes its operation and staffing employment is tied to Government positions with full benefits. The National Guard is generally within the State systems and has varying benefits and more limited salary administration advantages. With centralization, there are some operational advantages. Similarly, the decentralized, Director-managed system has several advantages as well. Both exploit their operating systems to maximize operational efficiencies, and future analysis will explore the advantages and shortfalls of each system for the program as a whole.

Initiative on Last Year's Recommendations

- Academy staff indicated that a Web/bulletin board capability was an essential item towards improving the transportability and timeliness of sharing useful information and "lessons learned" across the Academies. Operational manuals, training aids, scheduling requirements, research tools, etc. were but a few of the key items identified as important documents. A Web site to support distribution of resource materials, best practices, and other informational requirements was field-tested for feasibility and usefulness, with positive results. Permanent installation of the Web site is being reviewed to determine the proper platform, costs, and range of activity it will support. Similarly, a bulletin board was tested to provide reliable information exchange and announcements.
- Another STARBASE Director/Staff Conference in the early months of 2003 is being considered for this year's program to review program progress, protocols, and common issues for future planning; to share experiences; to review new methodologies/practices; and to plan new visitations for the future. Directors have indicated that the conference is an essential part of the program for sharing ideas and common concerns, and for staying informed about key aspects of the program.
- The visitation program designed to assist new Academies in their installation process proved valuable and insightful to understanding expectations, requirements, and best practices. Both Directors and staff felt that the earlier the visitations in the installation process, the more useful.
- A comprehensive site compliance visitation audit was conducted on the majority of the Academies to determine compliance with DODI requirements for policy, practices, and standards. Most of the Academies were in total compliance; a few required minor corrective actions that were implemented in a short period of time.
- There has been very little turnover of STARBASE personnel during this program year. Most of the losses were related to voluntary reduction of the Administrative Assistant (Office Manager) role to increase instructor capability; a few others were related to relocation and changes in leadership of the Academy. Turnover does not appear to be an issue of discontent with the position or commitment to the program; however, several Academies are concerned about the restrictions and lack of adjustment in salary administration.
- Assessment instruments were expanded to include Base Commanders' and military service volunteers' views of the program's impact on them, their environment, and their missions. In addition, detailed information was obtained through desk audits and survey instruments on budget management to obtain cost modalities and appropriate expenditures. Cost differences across service commands, sites, and regional attributes were obtained. Property audits were also conducted, when necessary, on all non-expendable items with a value greater than $500.
- Feedback on standardized tests on student performance will include applications of the results to materials development and curriculum applications.

Recommendations

Last year's recommendations focused on quality control, compliance, developing support services, and obtaining better and more reliable information on operational costs. Thus, standardization, compliance, assessment, exchanging best practices and materials, and budget management initiatives were emphasized. Support for the installation of new Academies was also promoted as an essential activity. This year's recommendations are partially a result and continuation of many of last years' agenda items:

- Review, revise, and expand technical aids and materials to assist new Academies in the installation process for effective and timely startup for operational readiness.
- Examine and recommend techniques and methodologies to build training efficiencies and enhancements in the core curriculum areas to support experiential applications.
- Continue the compliance and orientation visitations and audits for those Academies not included in last year's canvas, to assist new Academies and to clarify compliance requirements and expectations.
- Consider and explore the development and installation of a centralized training capability that will allow Academies to obtain economies of scale and operational efficiencies by building and coordinating sharing and operational support systems that transport lessons learned, best practices, and training materials to all Academies.
- Involve STARBASE staff in the design, development, and review of materials, instructional techniques and operational tools to maximize acceptability and installation of the techniques.
- Consider the design and development of materials and a program to assist Academies in identifying the role, function, and utility of a Board of Directors.
- Examine the role of the Academy Director (range of function and activity) with a view toward determining the support activity and materials that will assist them in their responsibilities.
- Review and reorganize the Director's Conference to maximize the sharing of materials, introducing new materials and techniques, issues management, and staff involvement in presentations.
- Review and install the proper platform and venue of the DoD Web site and the bulletin board to respond to Academy demand for a network system to share materials, communicate across Academies, and upgrade operational applications.
- Consider streamlining and revisiting the budget planning and financial reporting system to reduce paperwork requirements, and standardize documentation requirements.
- Review, revisit, and update memorandums of understanding with partners and have copies on file at each Academy.
- Continue to develop third party partnerships with public/private corporations to help design, develop, and provide software that is easily transportable throughout the Academies.

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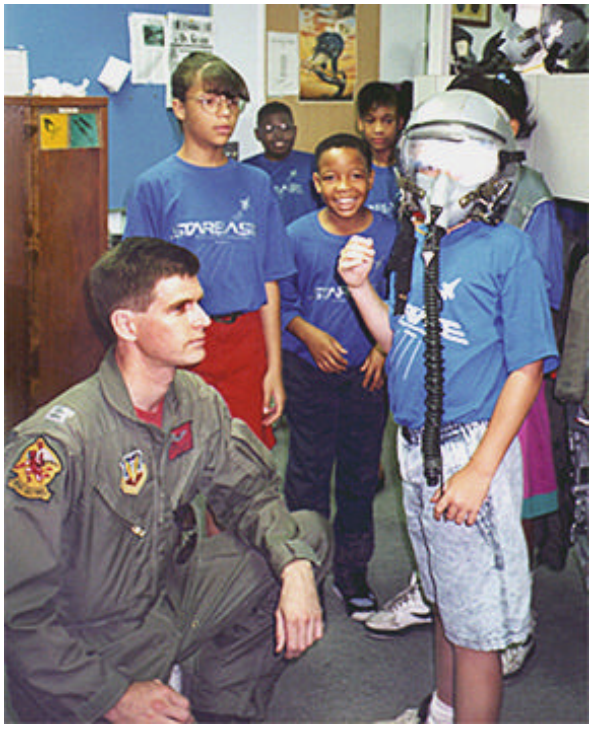
INTRODUCTION



The DoD STARBASE program has been in operation for less than a decade and during that period it has matriculated more than 250,000 students from its 45 military-base-operated Academies in 28 States, the District of Columbia, and Puerto Rico. Adding those students reached through supplemental programs increases the number to approximately 500,000 students. This report will address the program's extraordinary growth and acceptance by the communities in which the program operates; describe its basic operating principles and objectives; highlight the results of the assessment process, testing, and auditing; examine cost efficiencies; and assess the impact the program has upon the participants, the military, and the communities it serves.

Numerous reports have identified the nation's shortfalls in math and science[1], as well as the effect these shortfalls have on the economy[2], the quality of education and national security interests[3]. STARBASE is directed toward addressing these issues.

DoD has supported the STARBASE program for 9 years of its operation. After an initial demonstration year, with one Academy operating under a grant from the Kellogg Foundation, the program started modestly with DoD support at a few military bases, with local community support to provide training and experiential opportunities in mathematics, science, technology, personal goal setting, and drug demand reduction to at-risk youth. Over the next several years, the program grew in national prominence and acceptance. In FY 2000, the National Defense Authorization Act provided legislative authority under Section 2193b of Title 10, United States Code, which helped to expand the program nationwide. Subsequently, demand from other communities and military commanders prompted the expansion of the program to additional sites. This resulted in the planning and installation of seven new Academies to the DoD STARBASE program in FY 2002.

The demand for additional sites is compounded by requests for currently operating Academies to expand their existing operation to contiguous communities and, in some cases, statewide. Pressure is also exerted to broaden the program to other grade levels. The demand is multifaceted

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[1] *Before It's Too Late: A report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century*; U.S. Department of Education, Washington, DC, 2000.
[2] *U.S. Competitiveness 2001: Strengths, Vulnerabilities and Long-Term Priorities*; Council on Competitiveness; Washington, DC, 2001.
[3] *Road Map for National Security: Imperative for Change*; The Phase III Report of the U.S. Commission on National Security/21st Century; Washington, DC, 2001.

in that local community educational systems, military personnel, and community leaders see the program's value in reaching several desirable goals within their own operating systems. The goals of DoD STARBASE to promote increased knowledge, skill, and aptitude in math, science and technology, drug demand reduction, and personal goal setting, along with community service, are not obtained easily through traditional methods found in the school systems. Within this recognized need and demand is DoD STARBASE's greatest challenge: how will the program respond to the demand for growth in a timely, cost-effective, and empirically validated manner while retaining the quality and operating methodologies of the program. Design, program integrity, and effectiveness are the overarching themes of this report. While the report covers program growth and effectiveness, community acceptance/responsiveness, standardized testing, and assessment, several other challenges are also addressed:

- Maintaining quality control and protecting core curriculum and methodologies as the program is expanded to new site environments, different military service commands, key participants, and local resources and capabilities.
- Balancing the local community and state requirements with STARBASE operating procedures and program goals.
- Establishing economies of scale and efficiencies in operation by building and coordinating sharing and operational support systems for maximizing lessons learned, best practices, and training materials.
- Focusing on generalized training support programs and materials for STARBASE staff to assist in new Academy installation support, program development of new materials and their application, the Academy Director's role and function, board utilization and functions of the Board of Directors, funds and grant acquisitions, and managing demand for growth.
- Examining ways in which training efficiencies can be enhanced in the core curriculum area so that experiential applications are maintained and expanded within the time allotted in the program.
- Providing staff and participants, upon entry into the program, disclosure on the advantages and shortfalls of sponsoring agency practices in salary administration, budget management, and other administrative procedures so there is a better understanding of the documentation and operational requirements.

There are additional challenges addressed in the body of the report. The DODI requirements sent to each of the Academies provide some of the guidelines to meet these challenges in ensuring basic program standards and protecting the integrity of DoD design and program approach. As the report will demonstrate, the Academies generally meet the DoD guidelines and position themselves as protective guardians of the core curriculum and the STARBASE methodology. In many ways, the STARBASE staff has proven resilient and innovative in developing solutions and plans of action to meet those challenges once they are articulated and recognized.

Last year's report presented a number of recommendations for this year's operation. Many of those recommendations focused on referencing the DODI guidelines; enhancing the sharing and exchange of materials and problem-solving; expanding the mentoring and communication support system; and obtaining more reliable and complete operating and budget information to establish cost modalities. Those recommendations were designed to further develop a standardized, quality product that could be easily transported and installed at additional sites; and

also to provide the guidance and resources that would allow the DoD STARBASE program to realize its original objectives. This report will provide an update on each of the recommendations presented in last year's annual report.

It takes several interested and contributing parties to put the DoD STARBASE program into operation. Many of these individuals continue their involvement over the life of the program, and their continued participation is essential to the program's current and future success. Beyond the DoD STARBASE sponsoring agency—the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD/RA)—and the annual Congressional Committees' review and support, the program involves the local military service components and their command structure, local sponsoring committees and their school systems, participant schools, teachers and students, Base Commanders, military service volunteers, STARBASE board members and community leaders, student participants, and the STARBASE staff. This is a large participation base. Much of it is voluntary and involves time, commitment, and active support. As part of the assessment process, data was obtained on the views, opinions, and candid ratings of the program's impact on the students, community involvement, military/community relations, and selected program objectives from a sample representation of participants. This process involved standard interviews, questionnaires, and attitude surveys. Participant group views presented in the report include those from Base Commanders, teachers, students, military service volunteers, and STARBASE Directors.

The strengths of STARBASE are demonstrated from the perspective of each of the participants. While military personnel, students, educators, staff, and community leaders have deep commitment to the program, each has a unique experience and perspective of the program's impact upon them and the areas in which they operate. Students respond favorably to the content and approach of the course material, and their attitudes and performance in math and science shift to the positive. Military commanders note the gains in community relations and the enthusiasm of their volunteer personnel in the activity. STARBASE staff see themselves as part of a closely-knit, broader community of educators and readily share and borrow materials, best practices, and lessons learned from their sister Academies to enhance value to the program, retain quality, and provide a low-cost operation. Their creativity and innovation in the delivery and methods used in the program are transported throughout the system. These views and perspectives are described and documented in the report.

Several issues and operating considerations that may help in building future efficiencies have been identified in the analysis. These observations and recommendations are presented throughout the report, as well as more systematically at the conclusion of this report for consideration by the program managers.

The annual report is organized into five basic parts: the first section is the Executive Summary, which provides an abbreviated review of the report's findings, observations, and recommendations. The second section describes the program's history, mission and goals, key program elements, organization, growth, and the participant population. The third section presents the research assessment and analysis activities and outlines the research approach, assessment instruments, analysis, results, and findings. The fourth section provides an overview of the study's recommendations and conclusions for program planners, key participants, and decision-makers. Finally, the fifth section includes all of the supporting elements in the study, with a glossary of terms, statistical tables and charts, research instruments, formulas, and other study tools.

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PROGRAM HISTORY AND MISSION

As previously mentioned, the DoD STARBASE program has grown into a national program that operates in 28 States, the District of Columbia, and Puerto Rico. It is now located at 45 sites. The program started 12 years ago when there were few projects of remedial action in the math/science arena in the existing educational system. The deficiencies and shortfalls in math and science at that time were documented and given wide public awareness in the National Educational Report Card[4] (1991). The program was conceptualized and developed when Barbara Kosack, retired Brigadier General Dave Ahrendt, retired Lieutenant Colonel Richard Racosky, and the Mount Clemens School District, submitted a grant application to the Kellogg Foundation to develop and test the efficacy of the "STARS" program.

The original STARS program was a 1-week summer program in partnership with local schools and the military that contained many of the basic concepts and curriculum approaches that presently operate in today's DoD STARBASE. STARS focused on fourth, fifth, and sixth grade students. The response to and results of the pilot program were exceptionally positive, and partnership linkage between military and local educational systems migrated to other sites around the country. In 1993, DoD funds were made available for the Air National Guard to start a school-year program, and DoD STARBASE was formally launched. Since that period, other military service components such as the Navy, the Marine Corps and the Air Force have become sponsors.

The mission and goal of the DoD STARBASE program is to raise the interest and improve the knowledge, skills, and aptitudes of at-risk youth in math, science, technology and personal goal setting by exposing them to the technological environments, training, and positive role models found on military bases and installations. Drug demand and substance abuse reduction is also incorporated into the educational curriculum. Any school district, public or private school, alternative educational provider, individual or group of home schooling families may apply to participate in the DoD STARBASE program under the willing sponsorship of a nearby military installation.

[4] *Before It's Too Late: A report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century*; U.S. Department of Education, Washington, DC, 2000.

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PROGRAM OVERVIEW

PARTICIPANT ELIGIBILITY AND GRADE LEVEL EMPHASIS

DoD STARBASE Academies, in coordination with local school administrators and other alternative education providers, actively encourage participation by all youth, including:

- Youth who are historically under-represented in math, science, and technology
- Youth who live in inner cities or rural locations
- Youth with disabilities
- Youth who have socio-economic disadvantages
- Youth with low academic performance

To accomplish the above, DoD traditionally and purposely targets students who are most in need of the program's ability to upgrade their skills in math and science. Soliciting and describing the characteristics of the target population to the community decision makers of those schools determined to have the desired demographics is a key element in selecting the participant school systems. Students who reflect low socio-economic status, single parent households, and those who qualify for the reduced lunch program are considered. The STARBASE Academies actively seek out and focus on these and other factors in their selection of participant school systems. This method captures the desired students through the process of negotiating with schools and making the desired selection criteria the basis of participation prior to obtaining a memorandum of understanding with the participant school system.

DoD STARBASE focuses on grades four through six. The entire class is selected for the program, and schools transport the classes from the targeted area to the military base for program instruction. There are two schedules used in the program: a 4-day or 5-day contact schedule. The 4-day schedule usually involves 20 hours of instruction, while the 5-day schedule generally involves 25 classroom hours. The majority of the students fall within the targeted and desired population under this procedure.

OPERATIONAL AND ORGANIZATIONAL DESCRIPTION OF THE PROGRAM

DoD STARBASE Academies, on average, delivered approximately 36 classes per Academy, down from the average of 47 last year. The number of classes was affected by 9/11 events, which closed some of the bases for a period; and the startup of seven new sites that were not fully operational. To further confuse the description of the expected numbers, the Academies were put on a fiscal year operation this year for reporting and funding purposes. Consequently, the development of reliable modalities of classes per site, student numbers, and cost per unit will remain "on a variance" until next year, when all of the Academies are operating with the same definition. We anticipate that the number of classes per site will be much higher once these issues are resolved. This speculation is further supported by the trend for the Academies to move toward a year-round operation rather than using the traditional school year calendar. Under the DODI guidelines, the minimum number of classroom hours per Academy is 700 per year. Almost all of the Academies can reach that number (even in this year of unexpected interruptions) and most operate well above that number. The most frequently used instruction format is 25 classroom contact hours of instructions spread over five days. A few Academies organize their programs around a 4-day program.

The DoD STARBASE Academies operate their programs on Active, Guard, and Reserve military installations. Oversight responsibility for the program resides with the OASD/RA. This office approves the DoD component's plans for implementing each Academy's program by managing the funding allocation process; developing and implementing the regulatory guidelines of the program; monitoring each program's compliance to the regulations; assessing its performance and effectiveness in achieving program goals; overseeing the development and production of the Annual Report; and providing administrative oversight as deemed necessary.

At the local level, the DoD military components install and implement the DoD STARBASE programs by providing classroom facilities, personnel support, supplemental administrative support, access to military volunteers as tour guides and teachers aides, some oversight responsibilities on the DODI, and some minor operational support. The Academy teaching staff handles all teaching, scheduling, testing, office management, and program implementation activities. Each Academy is allowed to develop an advisory board that assists the Academy in community relations, funding, grant initiatives, public affairs, and access to community leaders. Several Academies have very active boards, and several others are trying to maximize their involvement in the aforementioned activities. Boards do not get involved in operational oversight. Most Academies have extensive military and civilian volunteers who serve in several support activities managed by the Academy staff (e.g., tour guides, teacher/instructor aides, mentors, assistants to special projects, and expert presenters on technology utilization).

A few Academies have "not-for-profit" organizational relationships and often are composed of military, civil, corporate, and educational leaders of the community. These leaders may be part of the board, or the board itself, and perform key functions such as fundraising, public relations, dissemination initiatives, and expanding and enhancing partnerships between the Academy and business and educational agencies. Most serve in an advisory capacity and some serve as the organizational umbrella for the Academy.

Public-Private Partnerships

STARBASE has a long history of establishing public-private partnerships to help support the program curriculum and goals. Many local Academies have benefited from these types of relationships, which have greatly helped to enhance their programs. Most recently, Parametric Technology Corporation (PTC), one of the world's largest software companies, agreed to donate its 3D engineering software to Academies across the nation. The software will expose STARBASE participants to the world of current technology in engineering design.

Board of Directors

An activity area that was presented by many of the Directors during the site visitation meetings dealt with the role and function of the Board of Directors. While many of the Academies have Boards, several do not. For those who utilize a Board, the Board's roles, functions, and activity level varies from site to site. Some Boards are very active while others meet but once a year. Some are involved in several areas of activity and have committee functions. Some are exclusively composed of military representatives, and a few have no military representative at all. There is no prototype in form or function at this phase of the program. Several of the STARBASE Directors have expressed a view that having a board is an important and often underutilized element in their operation. Some of the Directors have observed that a few Academies have used their Boards for funds acquisition and in community outreach. Most use a Board's involvement to facilitate public relations, grant promotion, community outreach, resource acquisition, networking, and general advisory activities. For those Academies that do not have Boards and those that are relatively inactive, there are the questions of "How do I organize a Board?" "Who should be on it?" "What activities should they be involved in?" "How are the more successful Academies in Board utilization managing the activity?" This common concern is an expression and desire for guidance and training on the topic.

There are also concerns regarding Board composition and function. There are some who feel that it is inappropriate to have non-military personnel involved in certain overview functions in a base-supported program, although most Base Commanders have indicated that they experience very positive inroads in community relationships with the activity. In addition, there are concerns about how much authority/control the Board should have in program operations. This is not an issue with most, since the experience has been that Boards perceive themselves as advisors and resources, and not as STARBASE managers. In most cases, the Directors feel the advisory and resource function lies in assisting the program in community acceptance, funding, grants assistance, and resource identification/acquisition, and that these activities are invaluable capabilities that would help the program operate more efficiently. Most Directors feel that it is an area not fully exploited nor fully utilized, and they indicate a desire to examine and discuss it in more detail.

DoD STARBASE Academy Staffing

The structure and composition of STARBASE Academy staffing is undergoing change. The prototypical Academy employs four full-time, paid staff members, including a Director, Deputy Director/Program Instructor, Program Instructor, and Office Manager/Administrative Assistant.

The DoD budget allocations to each Academy are based on the prototype staffing and a set of standardized operational support requirements, with minor adjustments for regional and military service command support. For the new sites, staffing and startup generally follow this format, but as programs mature, differences start to emerge. Some of the older, more mature programs have obtained additional funding from outside sources and, for the most part, these funds expand instructor capabilities if the funds are ongoing. If funding is temporary or earmarked, it goes toward material development or operational support.

STARBASE is described as a classroom, experiential, and hands-on application program. As such, it requires an intensive instructor-load capability. This is well understood by STARBASE staff and those who are familiar with its operation. In most cases, the two instructors are assisted

by volunteers (military or civilian) and/or teacher aides. Directors are often called upon to substitute when instructors are ill or when turnover occurs. There are occasions when office managers, who have instructor credentials, have filled in, but this is an exception rather than a rule. Instructors are generally required to have formal educational degrees, training experience, and math/science credentials. Most are certified and have several years of teaching experience. Background checks and fingerprint processing are fairly universal. The Academies' affiliate relationships vary from Academy to Academy. Some are Federal Government employees, others are State employees, and still others are contractors or part of the local educational system. There are guidelines provided by DoD to each of the sponsoring employers to provide equivalency salaries to each position, but adherence to these recommendations are not always followed at the point of entry to the sponsorship role. Most Academies currently enjoy highly trained, fully credentialed, experienced personnel who are deeply committed to the STARBASE concepts and methodologies. While some Directors indicate a concern about potential turnover and consider it one of their challenges, the program currently experiences a low turnover rate. Salary administration for State-employed staff is voiced as a concern for future turnover problems because of a lack of step increases, COLA adjustments, or statewide freezes on these positions. This condition is not considered an issue with Navy sponsorship due to Federal salary administration guidelines.

As indicated above, the major change to employee structure and function is the expansion in the instructor capabilities of the Academy. As a result, the Office Manager role is most often reduced in scope or incorporated into a part-time or full-time instructor position. The Office Manager functions are then taken over by other staff members. Local school systems may fund an instructor position so that the program can be expanded to additional classes or to another school system. There are also Academies that voluntarily put their staff on part-time status rather than full-time equivalency (FTE) so they can add another part-time instructor position. This gives the Academy flexibility in class scheduling, backup instructors, and more coverage to apply experiential applications. For the most part, the Academies follow the prototype in form and structure, but the movement for reorganization is toward maximizing the instructor capabilities of the Academy.

The Navy organized itself on a centralized basis, with a central operating manager who handles budgets, resources, installation selection and startups, documentation control, and general administrative support. The Academy Directors concentrate on educational delivery under this arrangement. The remaining Academies generally follow the prototype arrangements. The Air Force Reserve, and National Guard Academies have the greatest diversity in organizational arrangements and operational modes.

Staff is often supported by military and civilian volunteers. Military volunteers assist in providing briefings, demonstrations, tours, and general assistance to the instructors in experiential setups and administrative duties. They provide real-life examples of how they use math, science, technology, and personal skills in their daily work situations to solve problems and perform tasks.

PROGRAM GOALS

Over this past year, DoD STARBASE concentrated on improving and expanding the capabilities of the assessment process; promoted the transportability of lessons learned and materials exchange; built efficiencies and support in the installation of new Academies; identified and installed several new Academies in locations that possessed the recognizable needs of the targeted population with community and military base support; expanded the compliance audit process for DODI requirements; and obtained more reliable information on cost modalities.

Variances in operating procedures by the Academies on key DODI guidelines have dramatically reduced over this reporting period, while local resource utilization for instructional and experiential applications remained high and active. OASD/RA seeks to promote standardization and the protection of key basic concepts and methodologies, while at the same time encouraging maximum flexibility in utilizing local resources and capability.

Adherence to DODI requirements was reinforced by audit visitations to the Academies. Corrective action plans were used to bring the program back to the required position when anomalies were identified.

Orientation visitations to several new sites were obtained this year to provide assistance on installation practices, with positive responses to their usefulness. In addition, these visits helped to initiate early compliance practices to the DODI.

Several new assessment instruments were introduced this year, along with refinements to several of the existing tools. Expanding the range of participants who could provide valuable input to program impact and effectiveness involved military service volunteers and Base Commanders. Expanded data was also obtained on budget management to obtain true cost modalities at various phases of Academy operation and to compare regional and Academy differences.

A bulletin board for Academy activities and a Web site were piloted for their usability and support of material and best practices dissemination. Initial reaction has been positive, and continuation of the effort will be determined upon selection of the proper resource and content.

This year, seven new Academies were introduced to the program, which now reaches 45 sites in more than half the States, the District of Columbia, and Puerto Rico. The Navy has been the largest installer of new programs in the past two years.

The standard objectives of changing the attitudes and increasing the knowledge skills of the student participants are obviously of critical importance, as are community and military support. Each of these objectives has been systematically assessed and has demonstrated very positive gain.

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PROGRAM GROWTH

In less than a decade, DoD STARBASE has grown on several levels of operation. This past year, seven new sites were introduced, bringing the number of Academies to 45. Twenty-eight States, the District of Columbia, and Puerto Rico are represented, demonstrating the program's nationwide distribution. The number of Academy sites has more than doubled over the past 4 years. As of this report, more than 250,000 students have matriculated through the standardized, military-base-operated program, with probably another 250,000 served through STARBASE-initiated, supplemental programs such as Oklahoma's STARBASE-In-A-Box, summer sessions, and other school-delivered efforts.

The average number of classes per fully operating Academy goes beyond the required quota established by DODI. The number of students, in spite of the disruption in program operation due to base closings and lack of access to class facilities as a result of 9/11, is around 33,000 for FY 2002. Some Academies had more difficulty fielding their programs during the 9/11 crises because of staff activation, loss of volunteers, lack of access to the base, delays in facilities installation, and lack of resource availability. During this period, STARBASE staff became innovative and carried some of the programs to the school and other facilities, and operated on extended schedules to get the program back to normalcy. There was a significant loss of classes and student numbers during this time, but the Academies worked to bring the program up to operating efficiencies and the second half of the program year is bringing results in the expected numbers.

Growth is also illustrated by the fact that most Academies now operate on a year-round schedule. Previously, the norm was that Academies mirrored school schedules and the summer months were dedicated to upgrading curriculum, revising laboratory materials, conducting special classes, and scheduling vacation periods. Now the norm is to continue classes through the summer and respond to community demands for expanding capabilities. Most Academies also operate a special program for the children of military personnel during the summer, and others provide special programs for children with disabilities.

Supplementary outreach efforts are also characteristic of growth. Several Academies see the State as their community and have created special programs to reach the outer perimeters of the territory. Oklahoma has developed STARBASE-In-A-Box, with materials, curriculum, teacher guides, and special training and certification of teachers in STARBASE methodologies and practices. Some bring the program and military personnel to the schools and conduct the program and military tours from the local area. These programs, while not included in the official numbers reported for this study, are initiated by STARBASE staff and are beyond their normal obligations. Special programs to select audiences such as disabled or home study students have been initiated. Mentoring and extending the program to other grade levels is also characteristic of program growth, but is also in response to popularity and community demand for the program's availability.

Several States now have more than one site. The demand to award multiple sites in a State that sees the program's popularity and viability puts that option into the planning of the sponsoring agents.

As programs spread in geographic and organizational arrangements, the growth requires support systems management on several levels of operation to obtain economies of scale, quality control, reduction in duplication of efforts, transportability of lessons learned, material development, and general efficiencies in installation and startup. DoD has initiated orientation visitations, exchange systems, materials development support, and compliance audit procedures to accomplish the above.

PROGRAM SERVICE AREA

Slightly more than 71% of the STARBASE programs operate within a 50-mile radius of the military installation. This is less than last year (74.3%). Proximity to the program site is important due to transportation and class time logistics. Generally, the greater the distance, the more problems there are in obtaining maximum classroom time, particularly in those areas where weather conditions play an important role in timely starts. An encouraging figure this year is that 40% of the Academies service an area within a 20-mile radius, which is partially offset by an increase in service areas of 50 miles or more to almost 29% of Academies (3% increase over last year). Distance data is listed in Table 1, Program Service Area.

Rural programs generally have a distance problem. These are also the programs that school systems pressure for greater outreach efforts, creating greater distances for the students to travel. A few Academies are launching their operations with statewide service in mind. This creates the pressure of operating multiple sites to reduce the problem of transportation and time. Greater transportation distance places hardships on the cost of operation. The transportation provider is often the school system, which has budget limitations. Some rural areas have small classes, and when this is combined with distance there is pressure to “double-up” classes to justify the costs. Often, the school and the Academy have to work out a strategy that fits class size, class hours and equipment availability. While this is not a problem for the majority of the Academies, the issues of time, cost, and distance have an effect on the operation of programs within desired boundaries.

Table 1. Program Service Area

Service Area	Number of Academies	Percentage
20 Miles or Less	18	40.0%
20-50 Miles	14	31.1%
Statewide	9	20.0%
Other (More than 100 Miles)	4	8.9%
Total	45	100.0%

CLASS SIZE AND GRADE LEVELS

Class size is a reflection of DODI guidelines and school system policies, which in most cases are consistent with each other. The DoD STARBASE curriculum is heavily focused on experiential, hands-on applications whereby individual students apply experiments and problem solving in real-life applications. Sufficient equipment and materials are available to accomplish this objective, with supervision by the instructors to provide attention to the proper application and understanding. Class size is critical to that objective. The Academies make this criterion an

essential element to the school systems' selection of classes, as it is one of the children-at-risk criteria. The desired standard range is 20 to 35 students per class. There are a few States in which tax shortfalls and/or rigorous size standards have pushed a few of the classes to above or below the mark. For the most part, the Academies have accomplished that goal as reflected in the average size class of 24. Some States have suffered appreciable tax shortages, which has resulted in cutbacks in the number of teachers and new school construction, which in turn has resulted in larger classes (inconsistent with policy). The reverse is true in a few States dedicated to small class size and that affects the number of classes that STARBASE must reach to obtain sufficient numbers. In the latter case, these are instances in which programs can conduct two classes in one session by combining the classes.

Academies often find it difficult to refuse to admit a class from a participant school system because it has a few more students than the agreed-upon number. The Academies generally accept the additional students as long as the increase does not stretch the Academy beyond its capacity to effectively accommodate the class, compromise equipment availability, or compromise its own methodology. The Academies present their class size requirements to the participant schools at the point of program installation through an agreement outlined in a memorandum of understanding. Academy staff generally consider stretching the number of students beyond the desired class size range as dysfunctional and unproductive to STARBASE methodology. Size, for a few of the Academies, is increasingly becoming an issue for logistical as well as program conceptual applications. Given the high demand for the program, most of the Academies have some alternative choices to hold the line on the desired range. Most of the strain on class size is in the high range. Six Academies operate at the 30-plus average class size.

Grade level is guided by legislation of the STARBASE program, which states the grades K through 12 are eligible for involvement. At the present time, the program concentrates on grades four through six, with emphasis on the fifth grade. All operating programs currently have a fifth grade program. Thirteen Academies exclusively focus on the fifth grade, while nine Academies service four or more grades in their program offerings. Most Academies focus on three grades or less. The greater the range of grades, the greater the need to expand the curriculum and approaches to the material. The pressure by the school and the community to expand the grade levels is strong, and each Academy experiences that demand.

ETHNICITY

The ethnic composition of the student population demonstrated some minor shifting in its composition over the past year. For example, the Caucasian population was more than half of the student body in FY 2001 and this year displayed a loss of 7%. However, it remains the dominant ethnic group. The Hispanic group demonstrated a small gain (3%) increasing to 14% of the total student population. The Asian, Native American, and Multiracial populations (5% or less) remained relatively the same in the composition breakdown. The African American participants (27%) are in roughly the same proportion as last year. Program ethnicity is illustrated in Figure 1. As with previous years, the probability of minor shifting in ethnic composition will continue as new Academies are added to the program and reflect the ethnicity of the local areas. Without exception, each Academy indicates that the target population of at-risk children is obtained through the selection of classes that demonstrate the desired characteristics.

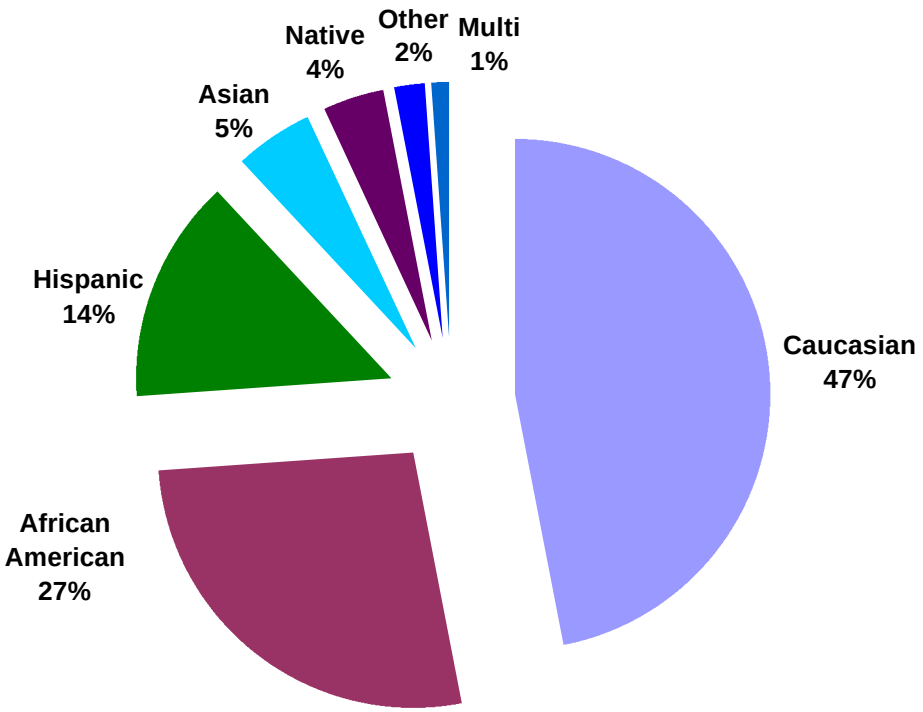

Figure 1. Program Ethnicity

GENDER

The distribution of male and female students remained relatively equal, with 51% male students and 49% female (see Figure 2). The stability of this distribution remained at relatively the same level as last year. Only Hartford, Connecticut had a disproportionate ratio of males to females (2 to 1); the rest of the Academies are relatively equal.

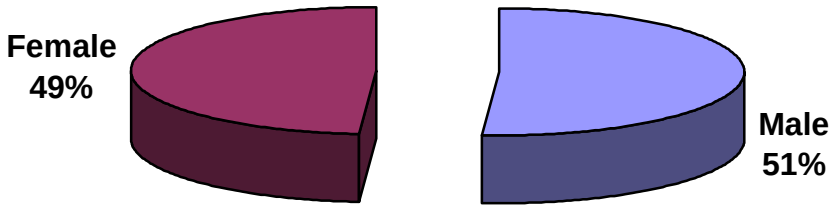

Figure 2. Gender Participation

SUPPORT SERVICES

MILITARY AND EDUCATIONAL SYSTEM SUPPORT

Each Academy is provided direct support services for the program from the military and the educational system. Occasionally, other outside private agencies and other governmental units provide grants, funds, and other services. However, the primary contributors, on an ongoing basis, are the military and the school systems. Traditionally, the educational system provides transportation services, teachers as monitors, and student lunches. Occasionally support involves minor reproduction services, some supplies, and media applications. The military is the key facilities provider with classrooms, utilities, computer support, custodial/maintenance services, security, and some administrative support and reproduction/printing capability. In personnel services, the military encourages volunteer involvement of its personnel as mentors, teacher aides, tour guides, speakers, computer facilitators, and audio-visual technicians. Some installations provide remodeling services for facilities. The range of military services and support is often a function of the size and complexity of the base and certainly Command interest in the program.

Tables 2 and 3 below demonstrate the scope and type of service provided by the two key service providers. The number of respondents in each table was obtained from Base Commander (28) surveys and STARBASE Directors on behalf of the school systems (44). Where the response on classroom facilities was less than 100% by the military, this indicated that a unit outside of that Base Commander's responsibility area provided classroom space, but the program was still sponsored by the Command. As for transportation costs, a few schools are dependent upon DoD funding for that service (usually a temporary condition) until annual budgets and allocations are made available by the school system.

Table 2. DoD STARBASE Program Site Support by Military

SUPPORT SERVICES PROVIDED BY MILITARY UNIT	NUMBER UNITS REPORTING	NUMBER PROVIDING SERVICE	TOTAL % PROVIDING SERVICE
Facilities	28	25	89%
All or some utilities	28	21	75%
LAN and computer support	28	23	92%
Printing/reproduction	28	9	32%
Custodial/maintenance services	28	16	57%
Administrative support	28	8	28%
Transportation	28	7	25%
Security	28	21	84%
Other	28	7	25%

Table 3. DoD STARBASE Program Site Support by School District

SUPPORT SERVICES PROVIDED BY SCHOOL DISTRICT	NUMBER SITES REPORTING	NUMBER PROVIDING SERVICE	TOTAL % PROVIDING SERVICE
Transportation	44	31	70%
Printing/reproduction	44	9	20%
Teachers as monitors	44	44	100%
Lunches	44	44	100%
Supplies	44	5	11%
Graphics	44	1	2%
Audio/visual	44	2	4%
Communications	44	1	2%
Computers	44	1	2%
Other	44	8	18%

Overall, military support of STARBASE is extensive and consistent. Each DoD STARBASE Director notes the active and overwhelming support by the Base Commander. In interviews and in surveys, Commanders have been cited for the generosity of their time, support, and interest in the program.

DoD STARBASE is presented as a military outreach program that also requires community and educational system support. It is a partnership of mutual responsibility. Curriculum, facilities, instructors, installation, and expandable resources are DoD and military installation responsibilities. Student availability, transportation, and meals are the province and responsibility of the educational system. Additional support systems beyond classroom and maintenance services are at the discretion of each Command based on their ability and willingness to extend their support. The Base Commander often exercises that discretion.

VIEWS FROM KEY STARBASE PARTICIPANTS

It takes several interested and contributing parties to put the DoD STARBASE program into operation. Most of these groups continue their involvement, and this continued participation is essential to the program's success. Beyond DoD STARBASE's sponsoring agency at OASD/RA and the annual Congressional Committees' review and support, the program involves the local military service components and their command structure; the local sponsoring communities and their school systems; the participant schools, teachers and classes; the Base Commanders and the military service volunteers; STARBASE Board members and community leaders; the student participants; and the STARBASE staff. It is a large participation base and much of it is voluntary and involves time, commitment, and support. As part of the DoD STARBASE assessment process, data was obtained on the views, opinions, and candid ratings of the program's impact on the students, community, and the military base from a sample representation of the STARBASE participants. This process involved structured interviews, questionnaires, and attitude surveys. The participant groups involved in this phase included:

- Base Commanders
- Military Service Volunteers
- Teachers
- Students
- STARBASE Directors/Staff

VIEWS FROM THE BASE COMMANDERS

Base Commanders are key sponsors of the Academies that operate under their command systems. They provide access to the military base, classroom space, support services, the availability and time of their personnel, and a wide variety of other supporting activities. Without exception, they indicate that this activity provides equal returns to the military base in positive community relations; building valuable relationships with community leaders; and providing many of their military personnel access to voluntary activities that enhance value to their training skills, but also contribute to the natural human resources of a future national security interest—our youth. Volunteerism by military personnel at almost all of the military bases is extensive, and a major portion of this is related to the Base Commander's interest and support.

Twenty-seven Base Commanders were asked to assess and rate the impact of the program on community relations, the benefits obtained by their military personnel, and the range of support services provided to the STARBASE program for the base. The results are as follows:

When asked to rank the most important contributions to military-community relations, the following activities in rank order were noted:

1. Promoted a positive view of the military to the community
2. Provided a foundation for involving community leaders, parents, teachers and other influential members of the military community
3. Increased public awareness of the role of the military in community services/affairs
4. Increased the number of articles, public affairs promotions, and media attention to the military's contribution to the students/community

5. Teaching children
6. Future involvement of working with youth
7. Adds value to motivating and training youth on key values/personal skills

Promoting a positive view of the military to the community was, by far, the most important contribution to military-community relations as perceived by the military commanders. This factor supported the mission goals of the base and received more than double the rank scoring of any of the other factors. Obviously, the Commanders understood the program's value to the community relations objectives of their command.

When asked about the benefits gained by military personnel as a consequence of their involvement in STARBASE, the following were noted by a large majority of the Commanders (ranked in order of personal benefits):

1. Volunteering to help with the program
2. Conducting tours of military facilities/functions
3. Taking pride in telling others about the STARBASE program
4. Teaching/training experience in the program

The benefits appear to be experiential for the military volunteers as much as it was for the students, as it gave the volunteers an opportunity to present the practical applications of the math/science skill areas. It also gave them access as trainers and as role models of real-life users of the content areas.

The range of services/facilities provided by the military involved:

- Facilities (classroom and offices)
- LAN and computer support
- All or some utilities
- Security
- Custodial/Maintenance service
- Printing/Reproduction
- Administrative support
- Transportation

The military is an active and continual supporter of the program well beyond the initial installation. Unit and Base Commanders are often very personally involved in the program's success, and more successful STARBASE programs often reflect the range and intensity of the Base Commander's involvement. One Commander displayed his concern about the shortfalls in our existing educational system by commenting, "It's too bad mainstream education doesn't teach the basics as well as STARBASE. Children leave the program with renewed enthusiasm toward learning, an outstanding program." Another Commander links the contribution with the military's role by stating, "STARBASE is a great program that helps and encourages our local youth while it also enhances our public relations with our community." This commitment to the program is further reflected in the downstream commitment by another Base Commander who indicates his support by stating, "This has become a very popular program with the local schools;

so much so, we have no remaining classroom availability. This program is so popular, we are going to try and establish another STARBASE in the southern part of our State."

VIEWS FROM THE MILITARY VOLUNTEERS

Military volunteers are supporters of the STARBASE program who have direct contact with the students, teachers and the content presentation of the program. They are, in real terms, critical observers of the program dynamics and student responsiveness, and they can assess whether their contribution of time was worthwhile. A sample of 92 volunteers was obtained from a cross-site selection of the Academies. The volunteers were asked to provide information about the amount of time committed to the program, the type of activity they were involved in; and the perceived value and impact of the program on them, the community, and the military. Some assessment was also obtained on the perceived popularity of the program in the volunteers' military and domestic communities.

Without exception, the military volunteers responded favorably and positively to all the items of impact to them, the community, the military, and the students. In a contextual sense, the comments by the volunteers focused a great deal on what they gained and obtained by being part of the program. About 10% of the volunteers are officers, a few are base civilians, and the majority are enlisted personnel. The average number of hours of volunteer time is around 25 hours per volunteer, with some dedicating hundreds of hours per program year. Their volunteer duties cover the breadth of the program and include roles such as guest speaker, tour guide, mentor, computer technology specialist, multimedia specialist, instructor aide, handyman, rocket launch facilitator, graduation speaker, and administrative aide.

The volunteers feel that the program influences the perception of the military in a number of ways that override media perception. Volunteers interact directly with the community and gain a better understanding of their mission, allowing them to serve others beyond themselves and beyond the breadth and scope of their duties. The diversity of job skills and careers in the military are exposed in this process by demonstrating math and science application in real-life environments. STARBASE also provides a venue for interacting with community members and displaying the contribution the military makes to the community. Volunteers indicate that the program provides a real-life experience, through the military, about how math and science is applied to various situations. Thus, perceptions grounded in reality and the program provides a positive platform for demonstrating the contribution volunteers and the military make to the community.

The comments by volunteers on the program's impact on them reflect pride, challenge, positive reinforcement from the students, and a way to contribute to something that obviously works to change student attitudes and understanding. STARBASE is a payoff for the volunteers' time; they can make a difference and develop their skills in training and presentation. Much of the reward is in the direct appreciation and excitement provided by the children in a program that the volunteers feel is not, and cannot, be replicated in the civilian community.

Feedback from the community and the military base is also very direct and immediate to the volunteer in reinforcement of the program's value. This feedback consists of; compliments, appreciative responses, public affairs releases, newspaper articles, and requests for more of the same; and that there is the comment that Teachers and educators report that the students are more interested in their studies and improve in their habits and performance. One of the volunteers expressed the notion that; "Schools can't provide the science courses they learn in the program [STARBASE]. These kids are allowed to expand their imagination, knowledge, and it may influence what they decide to do in the future." Another notes, "Many of us only touch the schools for a brief period of time, but STARBASE develops relationships and challenges children in ways that others cannot." It is interesting to note that the STARBASE program has no competitor in exposing students to experiential applications of math, science, and problem-solving in the real world. Volunteers and others note that the military environment provides the platform in a condensed fashion, while at the same time contributing to community service and providing a volunteer outlet for military personnel.

As for the program's impact on the community, the volunteers personalize community objectives by noting that STARBASE brings the neighborhoods, communities, and the military together through a positive interaction with the children. The community sees the immediate change in student performance and attitude, and sees the military as the agent of that change. The volunteers also note that STARBASE does what cannot be accomplished by the school system within the typical educational environment. It gives the military a way to demonstrate the commitment to community betterment that is incorporated in its basic mission.

VIEWS FROM THE TEACHERS

When students from the school systems arrive on the military base to attend the STARBASE program, their classroom teacher accompanies them from the school. Teachers primarily play a monitor role and attend each of the classes. For the most part, they do not involve themselves in the presentations. That function is relegated to the STARBASE instructor. However, they do get involved as test administrators and sometimes aid in the lab presentations. Most of the teachers have been involved in the program for several years and are very vocal about having their classes involved in subsequent years. Their exposure over the years has provided them with an understanding of the program's objectives, effectiveness, and the impact of the program on their students. Many use the curriculum as a follow-through when they go back to their school system or use it with other classes that have not been selected to participate in STARBASE. At some Academies, teachers become certified STARBASE instructors by taking a course at the local university for credit under STARBASE personnel, and they are also involved in outreach efforts in other communities not covered by the Academy's partnership agreements. Most of those outreach programs do not have base relationships or sponsorships and have limited access to the resources and involvement of military, but the teachers have developed a commitment to the program's effectiveness and use its methodology in other situations.

From this perspective, the views from teachers are especially important. They are professional educators, critical observers, knowledgeable about the methods and practices of the STARBASE program, and in some sense can be considered expert observers. It is with that foundation that the following presentation has particular merit.

The teacher survey was completed this year by 116 classroom teachers from participating school systems. Teachers rated the STARBASE experience positively for themselves, their students,

and the students' families. Teachers indicated that the usefulness of the STARBASE experience went beyond the STARBASE program itself, since they continued to use the curriculum back in their own classrooms. They also noted improvements in their students' attitudes about school and themselves.

Teachers completing the survey this year responded similarly to the teacher respondents last year. Four items have significantly lower ratings this year; these items dealt with science and teacher resources. However, the ratings for these items remained quite high considering this was a 7-point scale and the majority of the 32 items were above 6.00, with none lower than 5.58.

Teachers with more STARBASE experience reported that their students talked about STARBASE long after attending the program. In addition, those teachers who have had more classroom experience indicated that STARBASE improves their students' understanding of science and math applications. The more experienced teachers felt that participative learning in their classroom had improved and that they are more likely to use these resources in their core curriculum. An interesting element in the survey was that those teachers who had more military exposure were more likely to use STARBASE in their own classrooms and consider the STARBASE instructors to be good role models. Teachers at higher grade levels tend to use STARBASE resources and use them in their classrooms.

All of the survey items had statistically significant variations across locations. This variation could be explained by instructors giving different emphasis on elements of the core curriculum. In addition, some of the bases were closed to the program for a period after 9/11, which would add to the location difference in attitude and perception. This variation also occurred in the test scores across locations. In any case, the teachers' attitudes and perception of STARBASE's impact on students, the community, and on them were exceptionally positive. Teacher perceptions about the program seem to support student perceptions. As with the students, the teachers indicate that STARBASE offers positive pro-social advantages that include positive role models (STARBASE instructors and military volunteers), opportunities to build and maintain self esteem, and a "can-do" attitude. The teacher attitude survey results can be found in Appendix A, Rank Order Attitudes.

VIEWS FROM THE STUDENTS

The student attitude and perception survey was designed to obtain shifts as a consequence of participation in DoD STARBASE along the following dimensions:

- Attitudes towards math, science, and technology
- Attitudes towards the military, military personnel, military careers, and the military environment
- Community awareness, citizenship, and pro-social attitudes
- Effectiveness of STARBASE
- Impact of STARBASE

The Analysis focused on:

- Comparisons of pre verses post-program experience
- Gender comparisons
- Age and grade level comparisons
- Program strengths
- Comparisons based on prior experience with the military

The assessment data indicated that the students had very positive attitudes about their experience in STARBASE. Many of the responses were very positive for the 1,695 student respondents on the pre-program attitude instrument. The students appeared to enter the program with high expectations, as reflected in high ratings of "military people do lots of different things" and "I am enjoying coming to a military base." This probably reflects the adventure of embarking on a new experience at a military facility courtesy of the military. Students appeared eager and open to the experience. The 1,830 post-program student respondents (most were pre-program participants) presented an even greater response to pro-social attitudes. They were excited about the program on the last day and expressed a positive view of their futures. They also indicated that they "learned a lot of things I can use." Students also expressed positive attitudes regarding innovation and developing new things. There were variances across locations in STARBASE instructor questions for both the pre- and post-program populations. This was not unexpected, since the STARBASE approach is to focus students on self-realization and on making their own dreams come true. The rank order of the student attitudinal responses was relatively the same from the pre- to the post-program (see Table 4). There was a slight shift in six items, but a few of the items were affected by the introduction of three new items in the post-assessment instrument that focused on student program exposure.

Table 4. Ranking and Mean Scores of Student Attitudinal Responses

Pre Rank	Pre Mean	Item Stem	Post Rank	Post Mean
1	6.48	I think I can graduate from High School.	1	6.53
Post only	Post only	At STARBASE, I learned a lot of things that I can use.	Post only	6.51
2	6.36	You can learn a lot by trying things out.	3	6.49
3	6.31	I think about what I want to be when I grow up.	7	6.34
4	6.27	I like to make new things.	4	6.36
5	6.27	You can have fun working in a group.	6	6.34
6	6.27	You can accomplish a lot in a group.	8	6.34
7	6.21	Military people do lots of different things.	5	6.34
8	6.10	I am enjoying coming to a military base.	9	6.28
9	6.07	I like to think of new ways to use things.	10	6.19
10	6.03	Learning can be fun.	11	6.18
11	6.02	Military bases are cool.	12	6.16
12	5.91	I set goals for myself.	13	6.14
Post only	Post only	I would tell my friends to come to STARBASE.	Post only	6.07
13	5.87	I am good at following directions.	16	5.85
14	5.81	I can make my dreams come true.	15	6.07
15	5.66	I make good decisions.	17	5.76
16	5.55	Learning is easy for me.	19	5.58
17	5.52	I like science.	18	5.67
18	5.24	I like math.	21	5.34
19	5.24	I am good at science.	20	5.43
20	5.20	I am good at math.	22	5.32
21	4.28	I want to be like my STARBASE Instructor.	23	4.55
22	4.26	I think I could grow up to be a STARBASE Instructor	24	4.36
Post only	Post only	STARBASE is boring.	Post only	1.70

Gender Comparisons

This analysis assessed differences in perception expressed by boys and girls when they started and completed the program. Overall, the girls expressed more positive responses to the interpersonal items. This is not unexpected, since it is consistent with the pressures that girls are exposed to for social desirability found in the population at large. This is not atypical. Boys presented more positive attitudes regarding the military, math, and science, which is similarly not atypical with the larger population. The greatest gains in the gap scores (pre and post mean scores) were found in the girl's responses to "I can make my dreams come true" and "I want to be like my STARBASE instructor." The areas in which boys and girls were in agreement both before and after the program experience are listed in Table 5. On all the other items, the girls and boys were significantly different from each other in both applications of the instrument.

Table 5. Areas of Agreement for Boys and Girls

Areas of Agreement for Boys and Girls Before and After STARBASE
I like math.
I like science.
I am good at science.
Military people do lots of different things.
You can accomplish a lot in a group.
I like to make new things.
I like to think of new ways to use things.

Prior Experience with Military Personnel

Prior experience with military personnel and location had an impact on attitude patterns of the students. Pre-program responses had 14 items that were different based on prior military exposure. After the STARBASE exposure, the differences were reduced to half that number, which indicated the program brought the students close in line with each other on attitudinal issues. The rank order of items in attitudes of the students with prior exposure to the military were close to the population as a whole, with higher perceptions of the military and higher scores in self-actualization.

Age and Grade Comparisons

Age and grade differences were minor and did not present any particular theme other than older students had less positive attitudes than the population as a whole. This difference is partially due to the very high scores of younger students at the start of the program. In the knowledge test, there was a slightly higher score by the higher grade and age group. That finding was not unexpected.

Location Variations

As reported earlier, the attitude and knowledge test results were significantly different across locations (sites). Variations by location indicate differences in program emphasis, language, and curriculum intensity on basic concepts. While there are differences, they remain positive. Each Academy program does seem to emphasize different aspects of the curriculum and also selected attitudinal values. There may have been some effect by the loss of military base accessibility for some of the Academies during this period. Further assessments will increase or dispute that observation.

An interesting variation on this theme of location is that when sites are aggregated into regions, many of the differences found by Academy location are cancelled out. Thus, differences are location (Academy site)-specific. Regions were arranged into five broad categories: East, Southeast, Midwest, South and West. This suggests that specific Academies have emphasized different parts of the knowledge curriculum and also the attitudinal themes of the STARBASE approach; however, all of the results remain positive.

When Academies were arranged into the military service components, there were differences in the mean knowledge test, but less difference on attitudinal issues. The rank orders by military service component are displayed in Table 6.

Table 6. Rank Order of Student Post-Program Attitudinal Responses by Military Service Component

Item Stem	Total	Air Force Reserves	National Guard	Marine Corps	Navy
I think I can graduate from High School.	1	2	1	3	1
At STARBASE, I learned a lot of things that I can use.	2	1	3	1	2
You can learn a lot by trying things out.	3	4	2	2	3
I like to make new things.	4	6	4	6	9
Military people do lots of different things.	5	9	6	8	4
You can have fun working in a group.	6	7	7	7	6
I think about what I want to be when I grow up.	7	3	8	10	5
You can accomplish a lot in a group.	8	10	5	9	11
I am enjoying coming to a military base.	9	5	9	4	7
I like to think of new ways to use things.	10	11	10	5	13
Learning can be fun.	11	15	11	13	8
Military bases are cool.	12	12	12	12	10
I set goals for myself.	13	13	13	11	12
I would tell my friends to come to STARBASE.	14	14	15	15	14
I can make my dreams come true.	15	8	14	16	15
I am good at following directions.	16	17	16	14	16
I make good decisions.	17	16	17	17	17
I like science.	18	18	18	19	19
Learning is easy for me.	19	19	19	18	18
I am good at science.	20	21	20	22	21
I like math.	21	20	22	20	20
I am good at math.	22	22	21	21	22
I want to be like my STARBASE Instructor.	23	23	23	23	23
I think I could grow up to be a STARBASE Instructor.	24	24	24	24	24
STARBASE is boring.	25	25	25	25	25

Suggestions Derived from Attitudinal Clusters

The following indicators are attitudinal clusters grouped according to a targeted attitude; in other words, a grouping of attitudes will be found when the key targeted attitude is present. For the instructor, curriculum developer, or the program director, the analysis would be instructive for curriculum development, program planning, and materials development purposes. An example is presented in this report for illustrative purposes. A more detailed analysis will be forwarded to the Academy staff for their consideration and review.

For the attitudinal response of "I can make my dreams come true," the drivers in attitudinal response follow:

I set goals for myself.

I think I can graduate from college.

You can learn a lot by trying things out.

Learning is easy for me.

I think about what I want to be when I grow up.

I am enjoying coming to a military base.

I am good at science.

You can accomplish a lot in a group.

You can have fun working in a group.

I think I could grow up to be a STARBASE instructor.

There were several drivers (clusters of significant attitudinal responses) tied to a targeted attitudinal response. They tend to trigger the related attitudinal position of the individual respondent. The above trigger driver is a key theme of the STARBASE philosophy, and certainly the clustered attitude response is supportive above many of the other response patterns.

Students are by far the most enthusiastic participants. Their attitudes toward the material (curriculum content); their demonstrated ability and perceived attitude in managing the basic concepts of the material and their application of these concepts in problem-solving; and their view toward the program, the military, their instructors, and their personal skills development become positive as a consequence of being involved in the program. Their overall assessment of their involvement in a hands-on learning experience results in their desire to recommend the program to others. They also indicate they would like to continue in the program. These attitudes are all related to the STARBASE experience. The students come out of the program with a strong sense and personal ability to succeed in several areas of school performance and in social challenges.

STUDENT ASSESSMENT

THE INSTRUMENT

DoD developed a single DoD STARBASE standardized student assessment instrument to measure the changes in knowledge, skills, and attitudes of the student population after participation in the STARBASE program. This assessment tool is administered across all Academies with a sample population of students on a pre/post application (at the point of program entry and at the completion of the program). Students are tested on core curriculum topics covered by all Academies in their presentations, plus several attitudinal items. Each Academy was assigned a specified number of students to test, since school-year schedules do not coincide with annual reporting in the program. A qualified independent testing firm was commissioned to design and refine the assessment instruments following acceptable and defensible standards of assessment experts. This is the third year of development and refinement. Initial results indicate very positive gains in knowledge, attitudes, and overall DoD STARBASE effectiveness. This year's scores were appreciably higher than last year's, which may partially reflect the amount of attention given to coverage of the core curriculum by the Academies and the STARBASE staff as outlined in the DODI.

The instrument was designed to obtain shifts in knowledge and attitude corresponding to student participation in DoD STARBASE. It includes:

- Knowledge items focused on core curriculum content
- Attitudes toward math, science, and technology
- Attitudes toward the military, military personnel, military courses, and military locations
- Community awareness, citizenship, and selected pro-social attitudes
- DoD STARBASE effectiveness
- DoD STARBASE impact

All survey instruments, including the standardized student test, were revised. Three of the knowledge items were deleted, and several items and response options were revised. Input for that process came from Academy staff, consultant input, and the testing firm. Additional items will be changed in next year's program as a result of input from these same sources and upon item analysis results by the testing firm. This year's test was given as a pre/post assessment to students in the first and last days of participation of the same class with the same course material. A pre- and post-program assessment of students under those conditions offers the greatest probability of tracking attitudinal and knowledge shifts.

Instrument Design

In the original developmental year, two versions of the knowledge test were piloted. The current test items have subsequently gone through two revisions, and one test is currently in operation. Item formats include true/false, multiple choice, and matching to graphic images in the knowledge test. A 7-point scale is used for the attitudinal test.

The standardized core curriculum was used as the guide for the knowledge portion of the questionnaire. Knowledge and opinion items were based on the sponsor's interests as outlined above, a review of the program's core curriculum, last year's survey responses, and a

compilation of program testimonials and local assessment tests used at the various Academies. Some of the items from those tests were used in the standardized tests upon review of style and content; others were from STARBASE worksheets. Remaining items were newly created by the testing firm and designed for style and readability. The test has administrator instructions to be used by the test administer/coordinator and STARBASE instructors. Scan form technology is applied for data collection. The instruments were designed to be easy to read for students with limited English reading ability, and a test was constructed in Spanish for the significantly large Hispanic population.

Challenges in Instrument Design

Developing a single, standardized assessment test for a wide range of abilities for fourth through sixth grades across the United States, the District of Columbia, and Puerto Rico poses a number of challenges to the test design. First, students enter the program with different fundamental knowledge (e.g., some students arrive with a working knowledge of gravity while others need to learn the concept). Secondly, there are many different school districts with different resources, curriculum, special needs, and student expectations. In addition, the selection and class assignment process for at-risk children may vary from community to community. The assessment process used in the pilot and subsequent revisions tries to estimate the middle ability level of the student population. The analysis of student performance on this assessment will provide the basis for developing multiple assessment instruments for testing various ability levels in the future.

A key challenge to the test designer of a single assessment instrument relates to the presentation of the curricula across Academies. The knowledge items for the current test were developed to use the standard core STARBASE curriculum. While there are key concepts common across the program, they may be presented at different depths, with different lab applications, and with different vocabularies. Attention to commonality in basic curriculum concepts and definitions is critical in developing knowledge tests at various ability levels. This is a key objective in standardized curriculum applications in each program year.

STUDY LOGISTICS

This year, several items in the student instruments were altered and three were removed. These changes were obtained from last year's instructor comments and an analysis of student responses to the items and their difficulty. The majority of students responded to most all of the items. The analysis indicated that there was a wide range of ability in the pre-test, which suggests that for some students, several of the items on STARBASE concepts were not new.

Student questionnaires were sent to 36 STARBASE Academies with instructions for administration. A Spanish version was available for the Hispanic students. STARBASE instructors administered the student questionnaires on the first and last days of the program for both the knowledge and attitude instruments. Completed questionnaires were returned to the researchers in Washington, D.C. and Chicago for processing and analysis. A total of 5,234 student questionnaires were returned. Of the returned questionnaires, there was pre- and post-program data for 1,873 students for this report; the remaining data will be used at a later date (when additional testing takes place in the second half of the year) and presented in next year's report.

Potential Implications of Methodology for Results

The present assessment data was obtained in late summer and through the autumn months, raising a few concerns. Student enthusiasm is usually high at the beginning of the school year. New teachers, classes, and classmates (and in some instances, new schools) are introduced. This could have the effect of inflating pre-test attitudinal item responses (less so for the knowledge items), but this brief snapshot in time is not representative of the full range of student experiences. STARBASE's impact would probably be greater on attitudinal measures later in the year. Students may be more attentive if their classroom teachers have more time to prepare them for the experience. The methodology for next year's report will incorporate the effect of classes held December through August.

Analysis Approach

The planned analysis involved:

- Pre- versus post-program comparisons
- Gender comparisons
- Age and grade level comparisons
- Identification of program strengths
- Identification of program development needs
- Discerning drivers of preferred outcomes

This report presents final results. Only students with pre- and post-program assessment data were included in the analysis. As previously indicated, there is a wide variance in the way the core curriculum is introduced to the students and in the intensity of the coverage across locations. This is reflected in the analysis. Students arrive with different expectations and knowledge, and experience different perceptions and knowledge application at the various locations. The analysis is designed to offer some insight about the strengths, needs, and opportunities from the perspective of the students in STARBASE. The results in this presentation deal with the effects on the total population. Individual site results will be given to each Academy at a later date for program review and planning considerations in curriculum redesign. The information on "drivers" can also be used to focus on program design and planning for preferred outcomes for the program as a whole. Future interest in assessing various ability levels would benefit from this baseline data.

Test Construction and Core Curriculum

The core curriculum was the basis for development of the test items, and 11 curriculum areas were covered in the student instrument. They included:

- Teamwork
- Properties and States of Matter
- Property of Air
- Bernoulli's Principle
- Aircraft Control Surfaces and Components
- Four Forces of Flight
- Newton's Laws of Motion
- Space Exploration
- Development, Innovation, and Use of Technology
- Avoiding Substance Abuse
- Goal Setting

In most cases, there were several items for each curriculum area, except for those that had overlapping applications of the same concept. See Appendix A for the relationship between the curriculum area and the item question. The complete test is in Appendix B.

RESULTS OF KNOWLEDGE TEST

STARBASE students demonstrated a significant increase in knowledge and application of key curriculum concepts across all areas. The percentage of students answering an item correctly increased significantly for almost all items. Pre-test scores had a mean of 18.44 and a post-test scores increased to 22.67, an increase of slightly more than 4 points. Table 7 presents the knowledge test item pre/post average scores.

While many of the 1,873 students who came into the program were tested with a basic knowledge of some of the concepts taught in STARBASE, there were a number of concepts completely new to the students. When the post-test was completed, the knowledge of concepts that were previously unknown significantly increased after the program. There was also a variation of test scores across site locations and military service components.

As for gender differences, girls showed a slightly greater increase in their knowledge test scores from the pre- to the post-program experience (+4.40 gap for girls, +4.06 for boys). This difference was similar to last year's testing results.

Table 7. Knowledge Test Item Pre/Post Average Scores

Test Item Stem	Pre-test % correct	Post-test % correct
A team works together to achieve a common goal	98	98
Using teamwork results in	95	97
Which of the following is NOT a team?	91	93
Which planet is the smallest of all planets and the farthest away from the sun?	91	95
Negative actions may make it harder for you to reach your goals	88	91
Which of the following can destroy an individual's dreams?	88	92
If you have something you want to do, or something you want to be in life, you should	86	93
Wing	85	93
Drinking alcohol may decrease our bodies' ability to do simple tasks	82	85
Cockpit	79	94
The Earth is the closest planet to the sun	78	85
Our Solar System consists of how many planets?	74	86
Matter does not take up space	71	82
Force that pulls an aircraft down	69	84
Elevator	66	81
Rudder	63	78
Produced by air flow over the wings and the angle of the wing into the wind	59	78
If you threw two balls of different weight using the same amount of force	58	77
Forward movement produced by a propeller, jet, or rocket engine	57	79
The development of something new or improvement of something already existing is	54	68
Slows the forward movement of an aircraft	53	76
Technology usually decreases in cost after many units are sold	48	63
To move an airplane's nose to the left, you would move the	43	53
If you are landing an airplane in a city that is 5,000 feet above sea level what will your altimeter read when you are on the ground?	41	52
Which of the following is NOT one of the three states of matter?	40	59
How thick is the earth's air?	26	58
One reason an airplane is able to gain lift is because the air moving across the top of the wing	25	44
Air presses down 15 pounds on every inch of our bodies. The reason we don't feel this is	23	64
What is Sir Isaac Newton's Law of Inertia?	22	60
The air is composed mostly of what element?	20	53

ACADEMY-ADMINISTERED TESTING

Academy-administered tests are locally developed tests designed by a specific Academy and administrated exclusively to its students on a pre/post basis. These tests are not to be confused with the DoD standardized tests that are administered to all of the Academies on an annual basis. Prior to DoD's development of the STARBASE-wide testing and assessment program, most of the Academies designed, developed, and administered their own local knowledge tests. These tests were designed to evaluate the effectiveness of their specific programs and the material reflected in their individualized curriculum. DoD's tests focus exclusively on the DoD STARBASE core curriculum. The Academy-administered tests were largely staff-developed. A few Academies obtained assistance and design features from local universities and colleges. Some Academies borrowed test items from sister Academies and then enhanced the test with a few items of their own. Many of these tests were refined and revised over the years to reflect the changes the Academies made in curriculum control and emphasis. Most used a pre/post test format. For the most part, in spite of some sharing, each Academy had its own testing program. As DoD introduced its STARBASE-wide standardized test, a few Academies dropped their individualized efforts; however, the majority continued to use their own testing program along with DoD's assessment instruments. The new sites usually do not develop duplicate tests as they enter the program. Given the number of Academies reporting continuation of localized tests (35 Academies in all), this report provides the results in the following chart describing the percentage rate of increase in performance from the pre-test to the post-test.

Figure 3 illustrates a significant increase in scores for tests administered by Academies using their individualized assessment instruments. Over the years, the scores consistently display an increase of more than 30% between the pre- and the post-assessment tests.

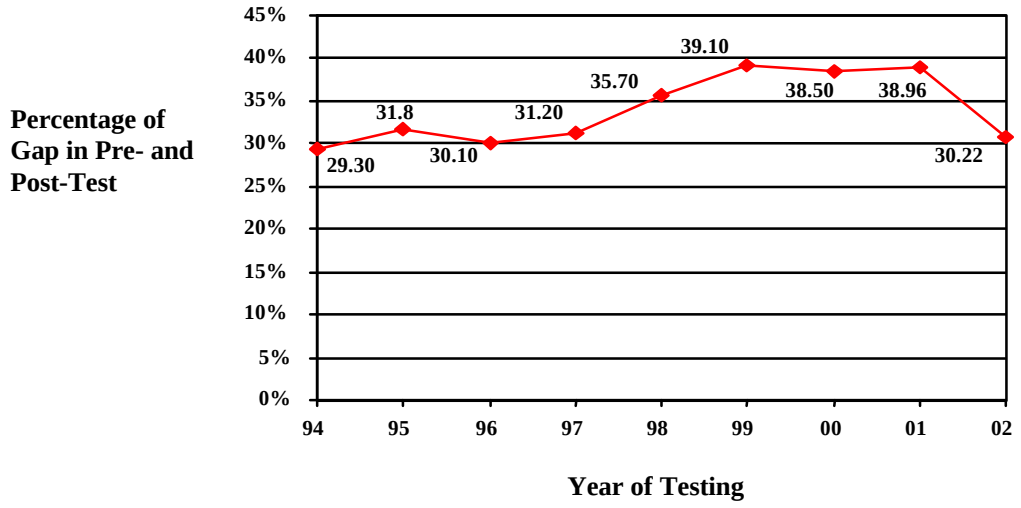

Figure 3. Rate of Increase for Academy-Administered Pre- and Post-Assessment Tests

This year, the percentage resided just above the 30% mark at 30.22%. While the local tests are not the same for all Academies, they demonstrate positive changes in performance. Figure 3 reflects the average rate of increase for all reporting Academies in the pre/post scores in FY 2002.

Unlike the local Academy tests, the DoD standardized test applies the same test items on the standard core curriculum to all of the Academies. The standardization and analysis of the test and its administration allows for comparability of test results and assessment of the national program's overall effectiveness across all Academies.

The national test results showed an increase of an average score of 4 points, while Academy-administered tests showed an average increase of 6.38 points. Both are positive. The national test is comparable across all Academies; the local test is limited to describing the specific Academy only.

In summary, the differences in the two tests are as follows:

- Local Academy testing focuses on increasing the effectiveness of the locally designed curriculum as well as the core curriculum; the national standardized test measures the core curriculum that all Academies are required to present.
- There are often significantly different emphases and materials presented at the local level, while the national test is indifferent to that diversity in material and focuses exclusively on the core curriculum as presented in the DODI.
- Local tests address local learning objectives that may reflect State and national testing systems; these discretionary items are not addressed in DoD's testing program.

Both tests have utility for the Academies in program design, effectiveness, and planning. A question then arises about having two test systems when time with the students is considered critical to covering program content. Recommendations on the national test will focus on building efficiencies in test construction and administration in the interim to reduce the time burden.

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COMPLIANCE

DODI REQUIREMENTS

Two years ago, OASD/RA published an instruction regulating the STARBASE program. This instruction is DODI 1025.7, September 14, 2000. The purpose of this instruction is to obtain consistency of program objectives, policy, and procedures in realizing DoD goals and objectives. In the earliest stages of the program's development, many of the STARBASE Academies started their operations without guidance on policy and procedures. While the Academies shared the same mission, curriculum, content, and basic methodology, diversity and differences in emphasis, operational procedures, and program delivery started to emerge. Minor variances in program activity crept into the program across the Academies. While similarities across STARBASE Academies were certainly greater than the differences, local emphasis tended to support individual variances. In addition, each Academy was encouraged to take advantage of local resources and capabilities available on the military bases and in the community. Unique and innovative curricula and methodologies emerged. Thus, differences emerged in time devoted to core curriculum, classroom hours, class size, and in operational procedures. Some of these differences had a negative effect on other Academies regarding transportability and acceptance of best practices, curriculum development, assessment procedures, and administrative protocols. It was upon these and several other elements that OASD/RA decided to protect key practices and procedures of the core program. At the same time, OASD/RA understood the advantages of utilizing the strengths and diversity of resources at the local level. The DODI, therefore, focused on key elements while supporting local diversity in other practices

The STARBASE DODI focused on class size, number of classroom hours, participant eligibility, core curriculum, military base location of program, and several other administrative and operational procedures. As a first step in the regulatory process, these instructions were sent to each Academy for review and self-compliance. In addition, the Academies were instructed to document any exceptions to the regulations, temporary or permanent, and to forward these to OASD/RA for consideration and guidance. The expectation, if no exceptions were granted, was that compliance would be achieved through a scheduled plan of action designed by the Academy, approved by OASD/RA, and implemented.

COMPLIANCE

Shortly after this step, OASD/RA implemented a compliance audit program whereby visitations by the DoD assessment team were scheduled with each of the Academies, and the STARBASE DODI was used as a basis to determine compliance through desk audits, review of documents and materials, and observation. Most of the visitations were initially scheduled for the older, fully operational Academies and then to the remaining Academies according to years in operation. Newly installed Academies would be audited in the subsequent years. The compliance visitations included property audits if the military base and/or the State-sponsoring agency had not conducted one within the past 3 years. Copies of local property audits were reviewed and filed. Most of the Academies had rigorous property audits, including tagging of equipment, annual visits, filed property lists, and operational definitions of dollar value. Most included any property valued at $500 or more, or if the property was deemed non-expendable. All of the

visited Academies had property lists, tagging identification, and property monetary values on file.

The Academy compliance visitations, as of this reporting period, indicated that most of the DoD STARBASE programs were in full compliance with DODI. Minor technical violations were noted, with corrective action outlined for full compliance within the program year. Over this past period, only one Academy required major restructuring and refocusing of its program, and this was largely due to an attempt by the Academy to incorporate a prior leadership program within the STARBASE model without success. The Academy felt that its prior commitments to the local community leadership program had precedence and was therefore terminated by OSD-RA.[5]. The compliance process, even with its flexibility, placed the protection and quality control of its STARBASE program in the forefront when corrective action could not be obtained.

Differences in operation across the Academies were noted, but none encroached on compliance requirements. While differences were expected, they were not as prevalent or dramatic as initially anticipated. Some Academies have extensive resources within the base or surrounding communities in which they operate, while others in remote areas have limited facilities and resources. The core program and guidelines are the operating modalities, and they are reachable within the scope of the Academy's national operation. Most of the Academies indicated that the STARBASE DODI was reasonable and manageable, and was not intrusive on their ability to deliver their programs. Most perceived the DODI requirements as a protective device for the core curriculum and the best-practices methodologies funding STARBASE's educational delivery.

During the visitations, emphasis was placed on adherence to the core curriculum, classroom hours, military base delivery, class size, participant eligibility, target population, and a number of administrative procedures. In addition, information was obtained on operational budgets, budget management, and cost modalities. As with prior years, most of the programs struggled to cover the curriculum within the allotted classroom hours.

In addition, the audit focused on the content coverage of the core material. Since the pre/post standardized test is based on the core curriculum, this is an important dimension of test validity and reliability. The linkage is obvious to most of the STARBASE staff; however, they do mention that testing, while necessary, takes away from instruction class time. Almost all of the Academies indicate their desire for more classroom time with the students, and therefore they are highly resistant to encroachments on classroom time. All seek solutions to build efficiencies in laboratory experiments and experiential involvement of the students in the material. Attention to these issues is of primary concern in future program development.

Compliance with the DODI on the core curriculum is important in that it supports the ability to establish a standardized testing instrument across the Academies on a common body of knowledge, conceptual applications, and problem solving. It is an important ingredient in the overall assessment of the program's ability to affect student performance.

An area that is increasingly testing compliance is class size. While it is generally understood that class size has a significant effect on experiential learning, it is increasingly difficult to hold the size boundaries at several of the sites. Some States, because of tax shortfalls, violate their own

[5] Iowa was officially terminated at the end of FY 2002 in accordance with the November 21, 2001 OASD-RA Memorandum.

class size requirements because they do not have the resources for additional schools or for additional teachers, which results in crowded classrooms. Other States have reduced class size to such a level that they make it difficult to justify sending buses, at a high cost, for a dozen students to attend STARBASE. Both behaviors stress the ability of the Academies to maintain class size within the boundaries outlined in the DODI. As for the smaller-size classes, the Academies occasionally combine the classes into one STARBASE class. For the larger classes, they will tolerate a few students beyond the limits but remind the school systems to limit the number of classes that go beyond the boundaries. This issue will continue to emerge with class selection in a number of States. It may require the selection of new school systems in the future.

It is the objective of OASD/RA to keep the compliance issues focused on quality control and standardization to maximize the transportability of materials and lessons learned across the Academies; to position for total impact analysis; and to protect the integrity of the basic methodologies and core curriculum of the STARBASE program.

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FISCAL

PROGRAM COST ANALYSIS

Several new initiatives were introduced to this year's assessment to obtain additional information on cost of program operation and comparisons of program costs per unit across Academies and military service commands. The Director's survey requested broad operational cost data on salaries and benefits, communications, expendable supplies, transportation, equipment, facilities, and furnishings. In addition, information was also obtained on non-DoD funding/disposition to obtain a full picture of Academy budgets and expenditures. Planning budgets and actual expenditure documentation were also obtained during compliance visits. The compliance visits also allowed for question or itemizations of expenditures for clarification and validation. Most of the Academies had detailed financial reports on their operation, although there is no universal standard of reporting across the program. Since a significant number of Academies moved to a fiscal year funding and operational schedule this year, the presentation of their expenditures within a fiscal year explanation became somewhat problematic due to the amount of carryovers and outstanding billings that carried into the old calendar format. The following discussion tries to adjust for those differences in fiscal year format. Next year, all Academies will have a full year on the fiscal reporting arrangement.

One major objective of this phase of the analysis was to obtain basic modalities in the cost of operation. Local, regional, and sponsoring agency support affects the kind of expenditures that each Academy experiences. For the most part, DoD provides a basic operational funding plan after each Academy presents a planning budget through their command system prior to the allocation. There are slight variations in funding plans between the Academies based on multi-site responsibilities, location, and breadth of operation. The planning budgets generally follow the broad categories mentioned above and are designed to cover basic operating costs. At the time of program installation, there are additional funds for startup to upgrade facilities and to obtain computers and other equipment, and for expenditures that are unique requirements of the local area. Once installation is obtained, regular budgets follow. Overall, DoD is the primary funding agent for the Academies and is, for the majority of sites, the only funding source. Currently, DoD covers 90% of the total budgets for all the Academies, and almost that entire amount covers basic operating costs. Non-DoD funds, for many of the Academies, are generally not regular allocations but usually designated for a specific activity.

Cost of operation is important for future planning and equity of distribution issues. Most of the Academies indicate that they can operate within the DoD funding, but when they start to become responsive to increased community demand and develop outreach efforts, new classes, and specialized programs, they become stressed on monetary resources. Those programs that are pressed on those grounds are usually the Academies that seek non-DoD funding to cover those costs. Areas that are starting to emerge as funding stressors are equipment replacement (such as computers and audio-visual equipment), and salary administration increases for instructors and staff. As previously indicated, several Academies have started to reorganize themselves to manage personnel costs by dropping the Office Manager role and increasing instructor capability and/or putting some of the positions on a part-time basis. While there are efficiencies in cost per student due to the number of classes and student involvement, the costs of operation have a tendency to increase because of the cost of living, inflation, and salary increases. So far, these

increases have not had a negative effect on current delivery of programs, but could affect future initiatives.

The report on cost modalities in operating STARBASE Academies provides a wide array of analysis that will prove useful in describing program efficiencies, return on investment, and differences by region, service command, and site.

The results of the analysis of 29 operating Academies are presented in Table 8.

Table 8. DoD STARBASE Academy Average Annual Cost

Average Annual Cost	Average # Students Per Academy	Average Cost Per Student
$261,476	1035	$270.10

The average cost per Academy is $261,476 The average operating costs are heavily clustered on salaries and benefits at 83% of the budget, with expendable supplies (the second largest expenditure area) at roughly 6%. All of the remaining budget categories are less than 3% of the total.

The allocations given to each of the military service components by DoD are listed in Table 9.

Table 9. DoD STARBASE Cost Per Academy by Service Component

Military Unit	Average Cost Per Academy FY'02	Average Cost Per Student FY'02
Navy	$288,624	$315.41
Marine Corps	$250,000	$209.08
National Guard	$253,947	$263.75
Air Force Reserve	$253,333	$292.14

Costs by military service components vary across the Commands. While the average cost per Academy is determined by the number of sites, not all sites are in full operation. For purposes of establishing current operating averages of the units under examination, we have omitted those that are in startup or installation phases. Most of the Academies operate at less than $350 per student. The range varies from $147.27 to $439.37 per student. The average cost per student by military service component indicates the Marine Corps and National Guard operate at $209 and $264 respectively, while the Navy and Air Force Reserve operate at $315 and $292 respectively. Location, local Command support, and maturity of the program's operation account for some of these differences.

Analysis also indicates that as Academies age, the Academy costs drop and student and class numbers increase, which results in demonstrable cost efficiencies. As many of the new Academies reach the 4-plus years of operation, a dramatic decrease in costs per student and classes should follow. Since there has been a twofold increase in the number of new Academies over the past 4 years, we anticipate a similar drop in costs and an increase in student/class efficiencies in the next few years.

Service Commands use operating funds differently. The Navy has higher employee costs and centralizes its operating costs, which generally favors economies of scale in purchases. Salary administration also varies with service component. The National Guard demonstrates the greatest

amount of variance in salaries due to local State administration and sponsoring agencies. Salaries for STARBASE staff demonstrate wide variances across the Academies. The Navy is highly centralized in management of its Academies, while the National Guard and the Air Force Reserve are decentralized and operate at the local level. The latter two service components, along with the Marine Corps demonstrate more involvement in obtaining non-DoD funds. The National Guard units, especially the more mature ones, have accumulated more resources in additional operating funds.

These additional funds are used in a number of ways. Some are directed toward equipment, new materials development, upgrades in facilities or equipment, and even adding additional staff and instructor capability to support outreach efforts. The Directors of the National Guard units are very active in obtaining non-DoD funds for their operation and perceive this as an important function of their role. In this regard, the Guard, the Air Force Reserve, and the Marine Corps have used their Board of Directors to assist them in this activity.

The Navy, with its centrally managed operation, permits its Directors to focus almost exclusively on the delivery and development of their instructional programs. The differences between the operations show advantages to both systems, as well as different activities in which they operate. Discussions on the advantages and limitation of each will be examined in the future.

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RECOMMENDATIONS

This year's program started much as the previous year, with rapid growth, the installation of new Academies, the expansion of others, and the demand for expanded service to contiguous locations and other grade levels. Unfortunately, the events of 9/11 had an impact on the timely installation and startup of many of the programs and seriously disrupted many existing programs just at the start of the school year. Short-handed staff, fewer volunteers, reduced access to military bases, and a number of other issues were presented to the Academies as well as the military community, but the Academies made adjustments and focused on bringing the program as close to normalcy as possible. Numbers of classes and students were slightly reduced in existing Academies; startup of new Academies was delayed; and military resources were temporarily unavailable, but the majority of Academies focused on their commitments and normal practices.

The program focused on quality control, compliance, building support services, and obtaining better information about operational costs. Thus, standardization, compliance assessment, best practices, and budget management initiatives were emphasized. The interdependence of each of these activities helps to generate an understanding that initiatives, action plans, and support promote positive results from one to the other. For example, promoting support services that maximize the sharing of materials and exporting best practices has an impact on standardization and economies of scale, with potential results for cost control.

With the growth of new Academies and the startup of new installations, the need for supportive systems to gain advantages in economies of scale and sharing of materials becomes essential for reducing costs and standardizing practices. Transportability and acceptance of best practices or lessons learned is much easier when the platforms and practices are similar from Academy to Academy. This does not mean that each Academy does not possess its own uniqueness or discretions, but each holds those core practices that are considered unique to DoD STARBASE. It is with those factors in mind that the following recommendations are presented. They are derived from several sources: Academy Directors, staff, military personnel, survey responses, and common sense.

- Review the existing orientation visitation program with a view toward expanding and developing additional technical aids and materials to assist new Academies in expediting the installation process for effective and timely startup.
- Examine and recommend techniques and methodologies to build training efficiencies and enhancements in the core curriculum areas so that experiential applications are maintained and expanded upon within the classroom time available in the program.
- Continue the visitation programs, and compliance and orientation audits, to those Academies that were not included in this year's canvas because they were not in full operation in order to reinforce compliance to the DODI regulations; and to assist each of the Academies in identifying resources, lessons learned, and more detailed clarification on requirements and realistic expectations.
- Consider the development and installation of a centralized training capability that will establish economies of scale and efficiencies in operation by building and coordinating

sharing and operational support systems to maximize lessons learned, best practices, and training materials for each of the Academies.

- Involve representatives of the STARBASE Academies in the design, development, review, and installation/transportability of materials and instructional techniques to maximize acceptability and installation of the material.
- Design and develop materials to assist Academies in identifying, establishing and maximizing the use of a Board of Directors as advisors, facilitators, Federal funding strategists, and network builders to influentials in the community.
- Examine the Academy Director's role and function to assist him or her in the wide array of responsibilities of the position as the program matures and expands in its operation, such as outreach efforts, use of the Board, public relations, external funding, etc.
- Review and reorganize the Director's Conference to maximize the sharing of information, demonstrations of new materials and techniques, Academy staff presentations, and issue dialogues.
- Finalize the platform and venue of the DoD Web site and the bulletin board in response to Academy demand for its use in communications, materials availability, and networking.
- Consider streamlining and revisiting the budget planning and financial reporting system to reduce paperwork requirements, and standardize documentation requirements.
- Review, revisit, and update memorandum of understanding with partners and have copies on file at each Academy.
- Continue to develop third party partnerships with public/private corporations to help design, develop, and provide software that is easily transportable throughout the Academies.

CONCLUSIONS

Much has been accomplished this year in growth, infrastructure support, and program refinement. DoD STARBASE is now operating 45 sites in 28 States, the District of Columbia, and Puerto Rico, and can claim national prominence and acceptance. Several additional States and existing sites are requesting admittance to the program. A great deal has been said about quality control, standardization in key core elements of the program, and transportability. Several initiatives have been taken to accomplish these objectives such as compliance visits, orientation programs, resource sharing, and materials development. The continuation and expansion of those initiatives have been proposed and will probably be acted upon in FY 2003. It is important to note that most of the Academies conducted their own corrective action and are very active in protecting the core program's methodologies and basic approach on both the national level and in their local environments. Academy compliance audits were conducted with minimal corrective action required. Each Academy visited this year was well prepared for the audits with available documents, statistical data, budgets, and property listings and tags. However, scheduled audits do accomplish a prepared positioning of readiness. A continuation of compliance audits will move forward in those sites that were not in full operation last year. Property audits are generally performed by the local base operations or by the State USP&FO office and require periodic monitoring.

Orientation visits proved invaluable, and each site indicated their usefulness but also felt that an earlier visit would have been even more valuable. DoD proposed an upgrading of materials and startup aids to assist in that process. All new sites will be scheduled for visits early next year.

The recommended actions for next year focus heavily on expanded support service visits, such as upgrading the orientation visits; installing network systems; implementing a centralized training capability; building training methodologies; involving STARBASE Academy personnel in reviewing and developing materials and best practices; identifying applications of the Board of Directors and Academy Director; and the redesigning of the Director's Conference. All of these initiatives take advantage of the initiatives of standardization of the core elements of the program so that economies of scale and ease of transportability are obtained. The advantages to cost control are self-evident, since materials are not customized to each Academy, which helps to reduce redundancy and duplication.

Revisions in data collection and standardized tests will continue. Administration of testing efficiencies will be examined to reduce the time necessary to accomplish the task, an essential and necessary element of the program that requires attention by all STARBASE personnel.

Managing growth is always a challenge, but the above initiatives will help to accomplish that task and will place the program in a "ready" position for installation and operational mode. The cost-effectiveness of this approach is a key element of this objective.

The military, by nature of its infrastructure and concentrated resources, is an effective and unique way to provide a nationally based, training-ready, and personnel- committed community service program. The returns on investment are positive in community relations, positive student attitude, and behavioral benefits that include a human, real-life application of science and math to our future resource capability in national security.

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GLOSSARY

Adjusted Data: Data derived from the same Academies that were operating last year so that comparisons can be made concerning the internal growth of the program.

Alternative Education Provider: A public or private school designed for children who do not function well in the traditional school setting. This may include continuation high schools or schools that fall outside the categories of regular, special education, or vocational education.

At-Risk Youth: Students at risk are those who have characteristics that increase their chances of dropping out or falling behind in school. These characteristics may include being from a single-parent household, having an older sibling who dropped out of high school, changing schools two or more times other than the normal progression (e.g., from elementary to middle school), having C's or lower grades, being from a low socio-economic status family, or repeating an earlier grade.

Class: Within the context of a DoD STARBASE Academy, a class is a grouping of students. This group may not necessarily have been a homogenous entity prior to DoD STARBASE instruction; it may be a temporary grouping only for the purposes of assembling for the 20-hour minimum period of DoD STARBASE instruction.

Classroom Contact Hour: A period of 60 minutes, plus or minus 5 minutes, in which a DoD STARBASE Academy instructor is actively involved with students or in which a military member is demonstrating, displaying, or teaching an application of math, science, or technology to the students.

Disability: Physical, mental, or sensory impairments that render major life activities more difficult.

DoD Components: Those Department of Defense entities that have established or are in pursuit of establishing a DoD STARBASE academy, including the military departments, defense agencies, and defense field activities.

DoD Instruction (DODI): Document that implements policies, responsibilities, and procedures for executing the DoD STARBASE program.

DoD STARBASE Academy: A DoD educational entity that seeks to improve the knowledge and skills of students in kindergarten through 12th grade in mathematics, science, and technology, and follows the academy model described in DODI 1025.7. A DoD STARBASE Academy is not defined in terms of a geographic location.

DoD STARBASE Core Curriculum: The fixed course of study referenced in the DODI that must be taught by all DoD STARBASE Academies.

DoD STARBASE Program: The DoD STARBASE Program is authorized by Title 10 USC section 2193b as a DoD science, math, and technology education improvement program. The Office of the Assistant Secretary of Defense for Reserve Affairs administers policy and oversight; the DoD components execute the program at DoD STARBASE Academies. DoD STARBASE is funded by Congress as a Civil Military Program.

DoD STARBASE Site: The component of a DoD STARBASE Academy that performs instruction. Sites can be co-located at a DoD STARBASE Academy or geographically separated from the Academy.

Inner City Location: Central section of a city, which is usually older and more densely populated.

Median: A number such that half of the data is larger than it and half-smaller. If the itemized data are listed in order of size, the median is the middle number in the list.

Non-Profit Organization: A legal entity recognized or chartered by competent state authority and to which the Internal Revenue Service has given status as a 501c(3) tax-exempt educational organization.

Operational Academies: An academy that is processing students.

Program Year: Period of time defined by local school year.

Rural Location (as defined by the U.S. Census Bureau): The population and territory outside any urbanized area and the urban part of any place with a decennial census population of 2,500 or more.

Site: See STARBASE Academy

Socio-Economic Disadvantage: Used for economically deprived, poor, poverty stricken, or disadvantaged individuals or groups.

State: The 50 states of the United States of America, District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, and Guam.

USP&FO: United States Property and Fiscal Officer acts as on-site liaison between National Guard Bureau and the State National Guard for all contracted services and required budgetary authority.

Appendix A

SELECTED DOD STARBASE PROGRAM DATA

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Rank Order Attitudes..... A-5
Attitude Means for Pre-Post Student Survey: Items 1-25..... A-6
Percent of Correct Scores for Pre-Post Flight Test: Items 1-30 ..... A-7
Statistical/Mathematical Formulas..... A-8

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SUPPLEMENTAL PROGRAMS

ID	State/City	Summer School	One Day Workshop	Community Outreach	Teachers Training	Other
1	Alaska, Anchorage	●	●		●	
2	California, Sacramento					Summer Science Camp, Rocket Design
3	California, San Diego		●	●		Open Enrollment (spring, summer) & Graduates
4	Connecticut, Hartford	●		●	●	
5	DC, Washington				●	NAVSEA GWU Science/Engineer Intern Program
6	Florida, Jacksonville	●	●		●	
7	Florida, Pensacola/Whiting Field		●	●	●	Boy Scouts/Sea Cadets
8	Georgia, Atlanta	●		●	●	
9	Georgia, Warner Robins	●	●	●	●	
10	Hawaii, Pearl Harbor	●		●	●	
11	Illinois, Great Lakes*				●	
12	Iowa, Des Moines	●			●	Leadership Camp
13	Kansas, Topeka	●	●	●	●	
14	Kansas, Wichita	●	●	●	●	
15	Louisiana, Barksdale		●	●	●	Teachers/Student Teacher Workshops
16	Louisiana, New Orleans			●	●	Science/Teambuilding Camp, Kids A.T.
17	Maine, Bangor		●			Military Dependent Academies
18	Michigan, Detroit	●	●	●	●	
19	Michigan, Selfridge	●	●	●	●	
20	Minnesota, St Paul	●				
21	Mississippi, Gulfport	●	●	●	●	
22	Mississippi, Meridian*					
23	Nebraska, Lincoln*					
24	North Carolina, Charlotte	●	●	●	●	
25	Oklahoma, Oklahoma City	●		●	●	Off-Site State Outreach
26	Oklahoma, Tulsa	●		●	●	Off-Site State Outreach
27	Oregon, Klamath			●	●	
28	Oregon, Portland	●		●	●	
29	Pennsylvania, Boswell	●		●		Overnight Science Camp in the Summer
30	Pennsylvania, Pittsburgh*					

*FY'02 Start-Up Sites

Supplemental Programs continued

ID	State/City	Summer School	One Day Workshop	Community Outreach	Teachers Training	Other
31	Puerto Rico, Carolina					
32	Rhode Island, Newport*					
33	South Carolina, Beaufort	●	●	●		
34	South Carolina, Columbia	●	●	●		
35	South Dakota, Rapid City*					
36	South Dakota, Sioux Falls	●	●	●	●	
37	Texas, Houston	●				
38	Texas, San Antonio					
39	Vermont, South Burlington	●			●	
40	Vermont, Rutland	●			●	
41	Virginia, Norfolk	●	●		●	
42	West Virginia, Charleston			●		
43	West Virginia, Martinsburg*					
44	Washington, Bangor	●				
45	Wyoming, Cheyenne				●	Video Teleconference Lessons
TOTAL SUM		26	17	23	27	

*FY'02 Start-Up Sites

RANK ORDER ATTITUDES

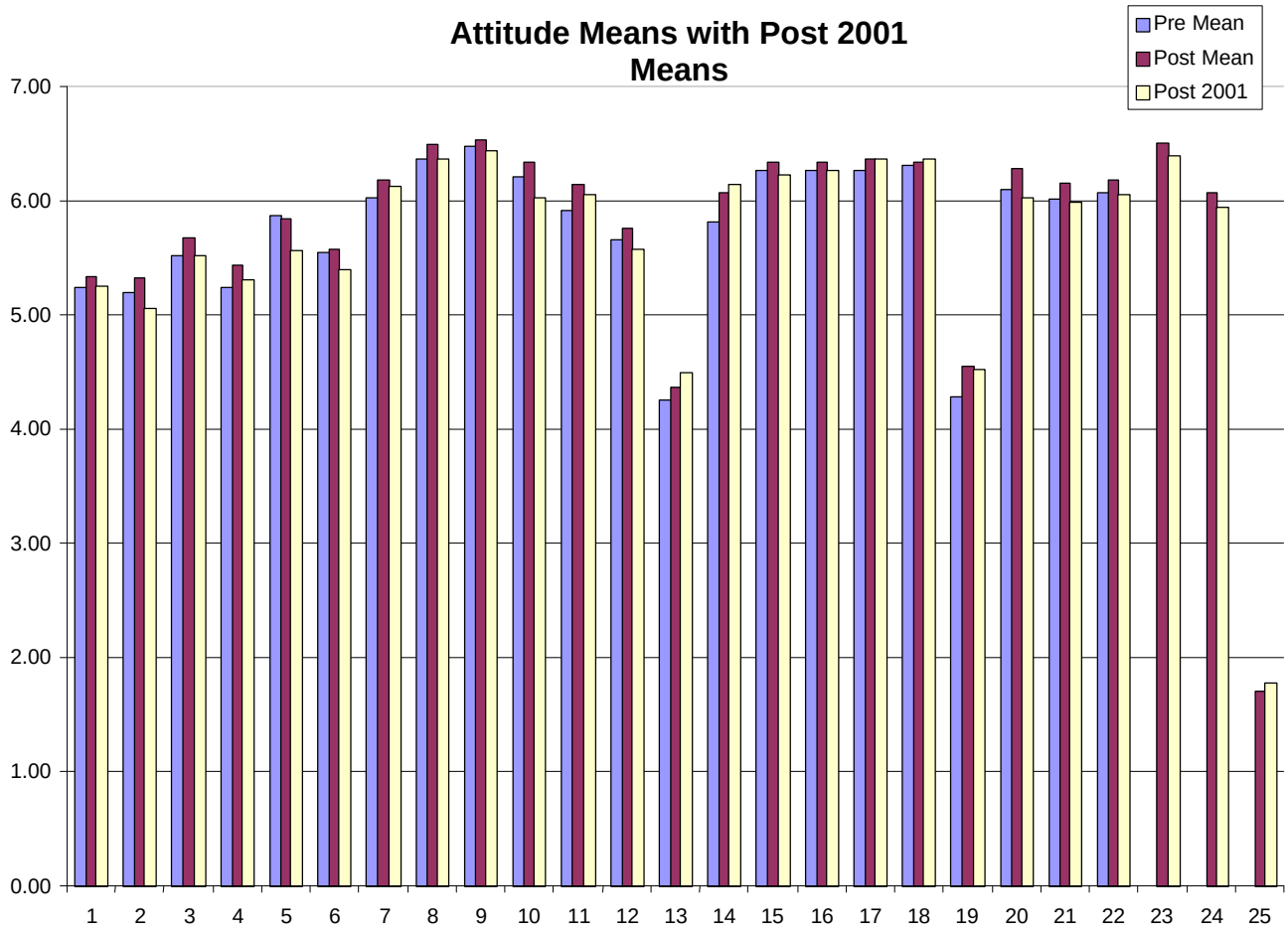
Teachers rated the STARBASE experience positively for themselves, their students, and their students' families. The teachers find the STARBASE experience useful beyond the STARBASE program and use the materials in their curriculum. They also notice improvements in their students' attitudes about school and themselves

Rank Ordered Attitudes

Survey Item	Mean	Std. Deviation
The children enjoy sharing their STARBASE experiences with others	6.77	0.58
The STARBASE instructors are good role models for the students	6.73	0.80
STARBASE reinforces many positive behaviors I try to teach my students	6.72	0.79
The students enjoyed being on a military base	6.69	0.74
The STARBASE curriculum supports our state standards	6.66	0.70
The students talk about STARBASE long after the program has ended	6.64	0.80
The students admire their STARBASE instructors	6.61	0.89
Parents are delighted that their children are participating in STARBASE	6.52	0.82
More interested in learning about science	6.40	0.95
STARBASE has helped improve the students understanding of science	6.37	0.84
My principal is a strong advocate of STARBASE	6.33	1.03
More comfortable with military personnel	6.12	1.03
STARBASE has helped improve the climate for participative learning in the classroom	6.06	1.03
I use the resources STARBASE provides to teachers	6.04	1.21
More excited about learning	6.03	1.02
STARBASE has helped to improve appreciation of how math can be applied to a variety of situations	6.01	1.01
More willing to try new things	5.98	1.05
I would like more STARBASE resources to take back to my classroom	5.98	1.47
More willing to cooperate with each other	5.97	0.95
More excited about their futures	5.96	1.01
Because of my participation in STARBASE, I am more comfortable with military personnel	5.96	1.49
More likely to encourage each other	5.94	1.02
More confident about what they can accomplish	5.91	1.00
Better at working in groups	5.90	1.07
My school board is very involved in supporting STARBASE	5.74	1.29
More interested in learning about math	5.73	1.13
I have included many STARBASE resources in my curriculum	5.71	1.42
More goal oriented	5.70	1.09
More comfortable making decisions	5.67	1.00
The students ask more questions about technology	5.60	1.22
Better at following directions	5.58	1.17

ATTITUDE MEANS FOR PRE-POST STUDENT SURVEY: ITEMS 1-25

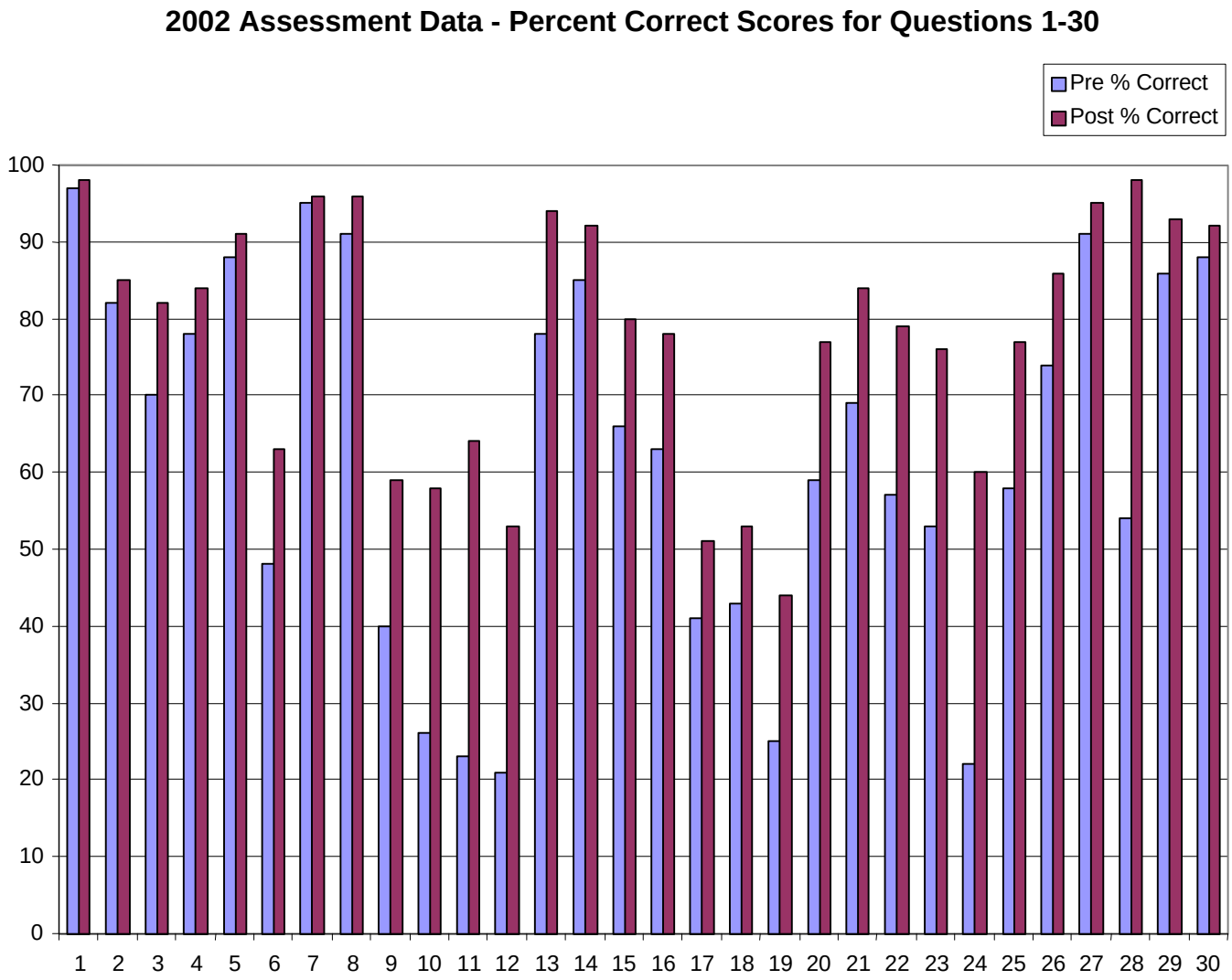
The graph below presents pre and post-program means for the 25 survey items. The items are listed in consecutive order as presented in the instruments. See the Appendix B for a copy of the student instrument. All of the means for the attitude items, pre and post, are high.



The ratings were based on a 7- point scale with seven being “Strongly Agree” and one being “Strongly Disagree”.

PERCENT OF CORRECT SCORES FOR PRE-POST FLIGHT TEST: ITEMS 1-30

The graph below presents pre and post-program means for the 30 knowledge items. The items are listed in consecutive order as presented in the instruments. See Appendix B for a copy of the student instrument. Many of the knowledge items show an increase in the percent answering correctly after the program.



STATISTICAL/MATHEMATICAL FORMULAS

The following provides a list of the statistical formulas that were used to calculate the data presented in this report.

1. Mean – average value of a variable
   Xbar = X/N
   X = the sum of all values of X
   N = the sample size

2. Standard deviation – measure of the average deviation of each score from the mean
   $s = [(x_i\text{-xbar})^2/n\text{-}1]^{1/2}$

   xbar = the sample mean (xbar is generally represented by an x with a bar or line over the top)
   n = the sample size.

3. t-test – tests the difference between two means
   $t = Xbar_1 – Xbar_2/s_{x1bar\text{-}x2bar}$
   $s_{x1bar\text{-}x2bar}$ = the standard deviation of the difference between the two variables

4. Pearson's Correlation – determines the relationship between two variables
   $r_{12} = [[(Y_1*Y_2) – (Y_1* Y_2)/N]/N\text{-}1]/s_{y1}s_{y2}$
   Y = the values of the variables
   s = the standard deviation of the variables

5. Regression Equation – determines what combination of variables can best predict the outcome for the dependent variable

   $Y = a + b_1*X_1 + b_2*X_2 + ... + b_p*X_p$
   Y= the predicted value of the dependent variable.
   a = the intercept (value of Y when X=0).
   b = the regression coefficients for the predictors.
   X = the value of the predictor variable

Appendix B

SURVEY INSTRUMENTS:

Teacher Survey B-3
Pre-Post Flight Questionnaire B-5
Base Commander Survey B-9
Military Volunteer Survey B-10

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TEACHER SURVEY

DoD STARBASE Teacher Survey

All information gathered by this survey is for developmental purposes. The information you provide will help us to continue to improve the STARBASE program. Please provide honest feedback about the various issues presented in this questionnaire. Completed questionnaires will be tallied by an agency outside of your school and outside of STARBASE. Individual responses will be strictly confidential and will not be released to your school or to any STARBASE representative. We are collecting information from all of the STARBASE programs. This survey contains a total of 31 questions and should take less than 10 minutes to complete. If you have any questions about this process please contact Renetta Lane at (703) 329-5904 or renetta.lane@mantech-stc.com. Please return this survey by September 30th to the address on the back page. Please do not fold.

Thank you.

The STARBASE location I work with is:_____ What grade do you teach? _____

Did you ever visit a military base prior to your current STARBASE involvement?

① **Never, this is my first STARBASE program**
② **Yes, for prior STARBASE programs only**
③ **Yes, for activities not related to STARBASE**
④ **Yes, for STARBASE and non-STARBASE activities**
⑤ **Other _____**

I have been involved with STARBASE for (# of months): _____

I have been a Teacher for (# of years): _____

Respond to the following statements by completely darkening the appropriate numbered circle next to each item.

After attending STARBASE, the students appear…

		Disagree				Agree
1.	… more interested in learning about math.	①	②	③	④	⑤
2.	… more interested in learning about science.	①	②	③	④	⑤
3.	… more willing to try new things.	①	②	③	④	⑤
4.	… better at following directions.	①	②	③	④	⑤
5.	… better at working in groups.	①	②	③	④	⑤
6.	… more confident about what they can accomplish.	①	②	③	④	⑤
7.	… more goal oriented.	①	②	③	④	⑤
8.	… more comfortable with military personnel.	①	②	③	④	⑤
9.	… more comfortable making decisions.	①	②	③	④	⑤
10.	… more excited about their futures.	①	②	③	④	⑤
11.	… more excited about learning.	①	②	③	④	⑤
12.	… more likely to encourage each other.	①	②	③	④	⑤
13.	… more willing to cooperate with each other.	①	②	③	④	⑤

Please go on to the next section

Please indicate your level of agreement with these statements.

		Disagree				Agree
1.	After STARBASE, the students ask more questions about technology.	①	②	③	④	⑤
2.	STARBASE has helped to improve the students' understanding of science.	①	②	③	④	⑤
3.	STARBASE has helped to improve appreciation of how math can be applied to a variety of situations.	①	②	③	④	⑤
4.	STARBASE has helped to improve the climate for participative learning in the classroom.	①	②	③	④	⑤
5.	Because of my participation in STARBASE, I am more comfortable with military personnel.	①	②	③	④	⑤
6.	The students talk about STARBASE long after the program has ended.	①	②	③	④	⑤
7.	STARBASE reinforces many of the positive behaviors I try to teach my students.	①	②	③	④	⑤
8.	I use the resources STARBASE provides to teachers.	①	②	③	④	⑤
9.	I would like more STARBASE resources to take back to my classroom.	①	②	③	④	⑤
10.	My principal is a strong advocate of STARBASE.	①	②	③	④	⑤
11.	My School Board is very involved in supporting STARBASE.	①	②	③	④	⑤
12.	The STARBASE Instructors are good role models for the students.	①	②	③	④	⑤
13.	I have included many STARBASE resources in my curriculum.	①	②	③	④	⑤
14.	The students admire their STARBASE Instructors.	①	②	③	④	⑤
15.	The STARBASE curriculum supports our state standards.	①	②	③	④	⑤
16.	The children enjoy sharing their STARBASE experiences with others.	①	②	③	④	⑤
17.	Parents are delighted that their children are participating in STARBASE.	①	②	③	④	⑤
18.	The students enjoyed being on a military base.	①	②	③	④	⑤

Thank You!

Please mail to: ManTech-STC
5904 Old Richmond Hwy, #600
Alexandria, VA 22303
Attn: Renetta Lane

PRE-POST FLIGHT QUESTIONNAIRE

Pre-Flight and Post-Flight Questionnaire

LAST 4-DIGITS OF PHONE NUMBER				
	0	0	0	0
	1	1	1	1
	2	2	2	2
	3	3	3	3
	4	4	4	4
	5	5	5	5
	6	6	6	6
	7	7	7	7
	8	8	8	8
	9	9	9	9

I am in grade: 1 2 3 4 5 6 7 8 9

I am age: 0 0 / 1 1 / 2 3 4 5 6 7 8 9

I am a: ○ Boy ○ Girl

I have met military people before coming to STARBASE. N No Y Yes

I know someone that went through STARBASE before. N No Y Yes

For each statement, fill in True if you agree or fill in False if you disagree.

True	False	
T	F	**1.** A team works together to achieve a common goal.
T	F	**2.** Drinking alcohol may decrease our bodies' ability to do simple tasks.
T	F	**3.** Matter does not take up space.
T	F	**4.** The Earth is the closest planet to the sun.
T	F	**5.** Negative actions may make it hard for you to reach your goals.
T	F	**6.** Technology usually decreases in cost after many units are sold.

7. Using teamwork results in . . .
- A sharing of work among the team.
- B one person doing all of the work.
- C a lot of wasted effort by team members.
- D poor quality of work being done.

8. Which of the following is NOT a team.
- A Fire Department
- B Police Force
- C McDonald's employees
- D Wal-Mart customers

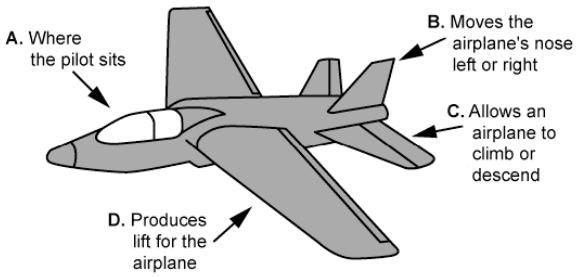
9. Which of the following is NOT one of the three states of matter?
- A air
- B gas
- C liquid
- D solid

10. How thick is the earth's air?
- Ⓐ 10 miles
- Ⓑ 50 miles
- Ⓒ 100 miles
- Ⓓ 200 miles

11. Air presses down 15 pounds on every inch of our bodies. The reason we don't feel this pressure is
- Ⓐ The atmosphere cushions the weight of the air.
- Ⓑ Our bodies push out 15 pounds on every inch to equalize the pressure.
- Ⓒ We are inside a building, so we don't feel it.
- Ⓓ The air is thinner closer to the ground than up in space.

12. The air is composed mostly of what element?
- Ⓐ hydrogen
- Ⓑ helium
- Ⓒ chlorine
- Ⓓ nitrogen

Match each airplane component with the letters from the diagram below.



A	B	C	D	
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**13.** Cockpit
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**14.** Wing
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**15.** Elevator
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**16.** Rudder

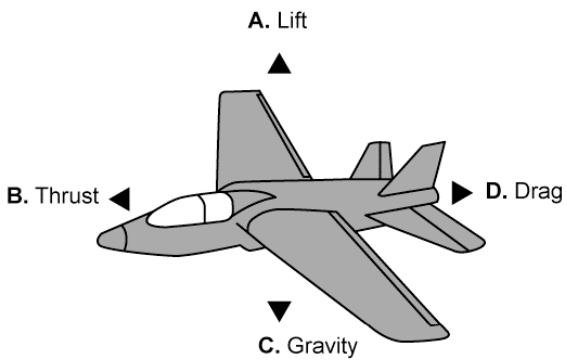
Select the best answer by filling in the appropriate circle.

17. If you are landing an airplane in a city that is 5,000 feet above sea level what will your altimeter read when you are on the ground?
- Ⓐ 0 feet
- Ⓑ 500 feet
- Ⓒ 5,000 feet
- Ⓓ 1,000 feet

18. To move an airplane's nose to the left, you would move the . . .
- Ⓐ rudder right
- Ⓑ rudder left
- Ⓒ left flap
- Ⓓ right flap

19. One reason an airplane is able to gain lift is because the air moving across the top of the wing
- Ⓐ exerts less pressure than the air moving along the bottom.
- Ⓑ exerts more pressure than the air moving along the bottom.
- Ⓒ exerts the same amount of pressure as air moving along the bottom.
- Ⓓ does not exert any pressure on the wing.

Match each force of flight with the letters from the picture below.



A	B	C	D	
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**20.** Produced by air flow over the wings and the angle of the wing into the wind.
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**21.** Force that pulls an aircraft down.
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**22.** Forward movement produced by a propeller, jet, or rocket engine.
Ⓐ	Ⓑ	Ⓒ	Ⓓ	**23.** Slows the forward movement of an aircraft.

24. What is Sir Isaac Newton's Law of Inertia?
- Ⓐ Unless acted upon by outside force, an object at rest will stay at rest and an object in motion will stay in motion.
- Ⓑ The more force given to an object, the more it will accelerate.
- Ⓒ The greater the mass of the object, the greater the force needed to accelerate it.
- Ⓓ For every action, there is an equal and opposite reaction.

25. If you threw two balls of different weight using the same amount of force the . . .
- Ⓐ heavier ball would go the farthest.
- Ⓑ lighter ball would go the farthest.
- Ⓒ two balls would go the same distance.
- Ⓓ heavier ball would go twice as far as the lighter ball.

26. Our Solar System consists of how many planets?
- Ⓐ 4
- Ⓑ 6
- Ⓒ 7
- Ⓓ 9

27. Which planet is the smallest of all planets and the farthest away from the sun?
- Ⓐ Mercury
- Ⓑ Pluto
- Ⓒ Saturn
- Ⓓ Earth

28. The development of something new or improvement of something already existing is
- Ⓐ gravity.
- Ⓑ inertia.
- Ⓒ technology.
- Ⓓ law.

29. If you have something you want to do, or something you want to be in life, you should
- Ⓐ wish for it really hard in order to make it come true.
- Ⓑ watch other people on TV to see how they do it.
- Ⓒ do something everyday that will help you reach your goal.
- Ⓓ wait for someone to give you what you want.

30. Which of the following can destroy an individual's dreams ?
- Ⓐ setting goals
- Ⓑ using illegal drugs
- Ⓒ obtaining an education
- Ⓓ practicing a skill

What is your opinion?

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	(?) Uncertain (4)	Slightly Agree (5)	Agree (6)	Strongly Agree (7)
1. I like math.	①	②	③	④	⑤	⑥	⑦
2. I am good at math.	①	②	③	④	⑤	⑥	⑦
3. I like science.	①	②	③	④	⑤	⑥	⑦
4. I am good at science.	①	②	③	④	⑤	⑥	⑦
5. I am good at following directions.	①	②	③	④	⑤	⑥	⑦
6. Learning is easy for me.	①	②	③	④	⑤	⑥	⑦
7. Learning can be fun.	①	②	③	④	⑤	⑥	⑦
8. You can learn a lot by trying things out.	①	②	③	④	⑤	⑥	⑦
9. I think I can graduate from High School.	①	②	③	④	⑤	⑥	⑦
10. Military people do lots of different things.	①	②	③	④	⑤	⑥	⑦
11. I set goals for myself.	①	②	③	④	⑤	⑥	⑦
12. I make good decisions.	①	②	③	④	⑤	⑥	⑦
13. I think I could grow up to be a STARBASE Instructor.	①	②	③	④	⑤	⑥	⑦
14. I can make my dreams come true.	①	②	③	④	⑤	⑥	⑦
15. You can accomplish a lot in a group.	①	②	③	④	⑤	⑥	⑦

What is your opinion?

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	(?) Uncertain (4)	Slightly Agree (5)	Agree (6)	Strongly Agree (7)
16. You can have fun working in a group.	1	2	3	4	5	6	7
17. I like to make a new things.	1	2	3	4	5	6	7
18. I think about what I want to be when I grow up.	1	2	3	4	5	6	7
19. I want to be like my STARBASE Instructor.	1	2	3	4	5	6	7
20. I am enjoying coming to a military base.	1	2	3	4	5	6	7
21. Military bases are cool.	1	2	3	4	5	6	7
22. I like to think of new ways to use things.	1	2	3	4	5	6	7

Post STARBASE

23. At STARBASE, I learned a lot of things that I can use.	1	2	3	4	5	6	7
24. I would tell my friends to come to STARBASE.	1	2	3	4	5	6	7
25. STARBASE is boring.	1	2	3	4	5	6	7

Thank You!

BASE COMMANDER SURVEY

DoD STARBASE Base Commander's Questionnaire

OVERVIEW

This brief questionnaire will add important information on the effectiveness of the DoD STARBASE program that will be documented in the Annual Report to Congress. Your cooperation and timely response is appreciated.

SURVEY

1. Please check the ways the STARBASE program has impacted your public/community relations (check all that apply).
   ___Increased public awareness of the role of the military in community services/affairs
   ___Promoted a positive view of the military to the community
   ___Provided a foundation for involving community leaders, parents, teachers, and other influential members of the military
   ___Increased the number of articles, public affairs promotions, and media attention to the military's contribution to the students/community
   ___No impact
   ___Other (specify)_____

2. In your view, which of the above has proved to be the most important to military/community relations?_____

3. Please check the benefits gained by members of your unit through involvement in STARBASE (check all that apply).
   ___Taking pride in telling others about the STARBASE program
   ___Volunteering to help with the program
   ___Teaching portions of the STARBASE program
   ___Conducting tours of the military facilities or functions
   ___Little or no benefit
   ___Other (specify)_____

4. Please check the support services provided by your military unit to the STARBASE program (check all that apply).
   ___Facilities (classrooms and offices)
   ___All or some utilities
   ___LAN and computer support
   ___Printing/reproduction
   ___Custodial/maintenance services
   ___Administrative support
   ___Transportation
   ___Security
   ___Other (specify)_____

5. Comments:_____

MILITARY VOLUNTEER SURVEY

DoD STARBASE Military Volunteer Questionnaire

OVERVIEW

This brief questionnaire will add important information on the effectiveness of the DoD STARBASE program that will be documented in the Annual Report to Congress. Your cooperation and timely response is appreciated.

SURVEY

Name (optional): _____

Rank: _____

Branch of service: _____

STARBASE site: _____

Volunteer activity: _____
(i.e. instructor, tour guide)

Estimated hours committed in FY02: _____

1. Does STARBASE influence the community's perception of the military?
   Yes __ No__ If yes, please explain. _____

   _____

2. How has your volunteer work with the STARBASE program effected you?
   _____

   _____

3. Is the military making a difference in the community through the STARBASE program?
   Yes__ No __ If yes, in what ways? _____

   _____

4. What feedback, if any, have you received about STARBASE from the community and/or other military personnel? _____

   _____

5. Comments:_____

   _____

Appendix C

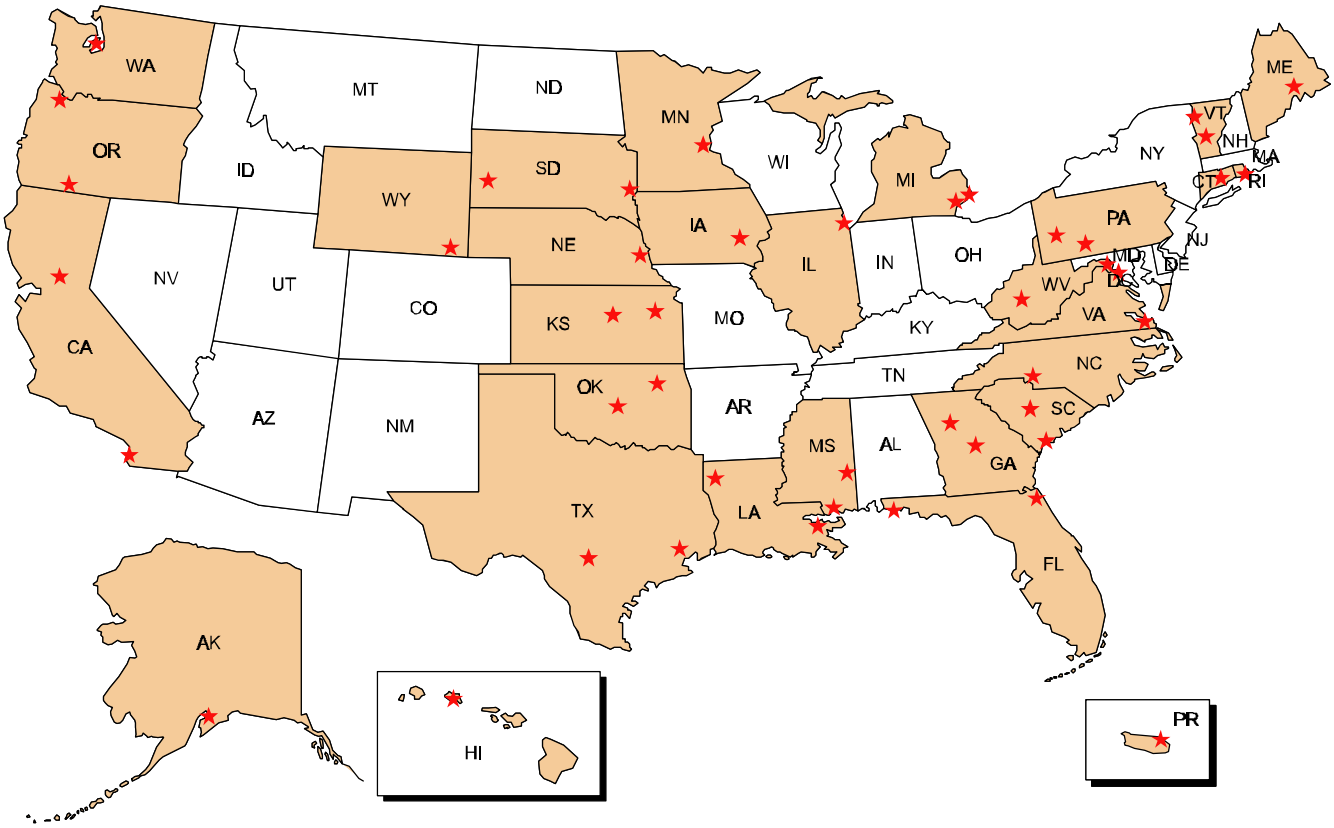
DIRECTORY OF DoD STARBASE ACADEMIES

STARBASE STATE/CITY	MILITARY INSTALLATION	STARBASE DIRECTOR	MAILING ADDRESS
Alaska, Anchorage	National Guard Training Site, Fort Richardson	Andrea Owdom aowdom@ngchak.org (907) 384-6351	STARBASE Alaska Alaska Military Youth Academy Camp Carroll Bldg 60730 P.O. BOX 5185 Fort Richardson, AK 99505
California, Sacramento	California Army National Guard Armory	Lt Col Tom Edwards castarbase@sbcglobal.net (916) 387-7405	STARBASE – California 8400 Okinawa St, Suite 1, Sacramento, CA 95828-0904
California, San Diego	Navy Fleet Training Center	Director Vacant: Contact: Steve Mustain Steven.mustain@cnet.navy.mil (850) 452-1001	STARBASE Atlantis – San Diego, Building 3411, Room 209 Fleet Training Center 3975 Norman Scott Road San Diego, CA 92136-5589
Connecticut, Hartford	Connecticut Air National Guard Base	Bob Gillanders Bobcms86@aol.com (860) 728-0090	STARBASE WARTHOG 269 Maxim Road Hartford, CT 06114
District of Columbia, Washington	Naval District of Washington	Judy Kalish Kalish.Judith@ndw.navy.mil (202) 433-0531	STARBASE DC 645 Rickover Street, SE #102 Washington Navy Yard, DC 20374-5001
Florida, Jacksonville	Florida Air National Guard Base	Sydney Watson starbasefl@aol.com (904) 741-3014	STARBASE Florida, Inc 14300 FANG Drive Jacksonville, FL 32218-7933
Florida, Pensacola	Naval Air Station Pensacola Naval Air Station Whiting Field	Donna Eichling deichling@aol.com (850) 452-8287	STARBASE Atlantis, Code 00K 6490 Saufley Field Road Pensacola, FL 32509-5241
Georgia, Atlanta	Dobbins Air Force Base	Bill Wells Bill.wells@ga.ngb.army.mil (678) 575-5905	STARBASE Georgia 1388 First Street Bldg 840 – Finch Building Dobbins AFB, GA 30069
Georgia, Warner Robins	Robins Air Force Base	Wesley Fondal Jr. mailto:wfondal@earthlink.net (478) 926-1769	STARBASE Robins 1941 Heritage Blvd. Robins AFB, GA 31098-2442
Hawaii, Pearl Harbor	Naval Submarine Training Center Pacific	Crystal Trujillo crystal.trujillo@cnet.navy.mil (808) 472-9965	STARBASE Hawaii Naval Submarine Training Center, Pacific, 1130 Bole Street Pearl Harbor, HI 96860
Illinois, Great Lakes	Naval Training Center	Patricia Church Patricia.Church@cnet.navy.mil (847) 688-2509	STARBASE Atlantis 2417 Paul Jones Street, Room 114, Bldg 837, Naval Station Great Lakes, IL 60088-2934
Iowa, Johnston*	Camp Dodge		
Kansas, Topeka Kansas, Wichita	Forbes Field Air National Guard Base McConnell Air Force Base	Jeff Gabriel Jeff.Gabriel@ks.ngb.army.mil (785) 274-1480	STARBASE Kansas State Defense Building 2800 SW Topeka Blvd. Topeka, KS 66611-1287
Louisiana, Barksdale AFB	Barksdale Air Force Base	Sheila Schencke sheila.schencke@barksdale.af.mil (318) 524-1320	STARBASE Louisiana 917 WG/STARBASE 1000 Davis Avenue East Barksdale AFB, LA 71110
Louisiana, New Orleans	Louisiana Military Department, Jackson Barracks	Cheryl Arbour arbourc@la-arng.ngb.army.mil (504) 278-6606	STARBASE – Pelican State Bldg 102C, Jackson Barracks, New Orleans, LA 70146
Maine, Bangor	Maine Air National Guard Base	Charles Parker charles.parker@mebngr.ang.af.mil (207) 990-7507	STARBASE Maine 105 Maineiac Ave, Suite 510 Bangor, ME 04401

* Iowa was officially terminated at the end of FY 2002 in accordance with the November 21, 2001 OASD-RA Memorandum.

STARBASE STATE/CITY	MILITARY INSTALLATION	STARBASE DIRECTOR	MAILING ADDRESS
Michigan, Detroit Michigan, Selfridge	Selfridge Air National Guard Base	Barbara Koscak mistarbase@aol.com (586) 307-4884	STARBASE One STARBASE Detroit PO Box 450082 Selfridge ANG Base, MI 48045-0082
Minnesota, St Paul	Minneapolis/St Paul Air National Guard Base	Kim Van Wie kvanwie@starbasemn.org (612) 713-2530	STARBASE MN Inc. C/o MN ANG 659 Mustang Ave St Paul, MN 55111-4128
Mississippi, Gulfport	Naval Construction Training Center	Shelley Bard Shelley.bard@cnet.navy.mil (228) 871-3735	STARABASE – Atlantis ET School, Bldg N-25, Rm 102 9549 Bainbridge Ace Norfolk VA 23511-2594
Mississippi, Meridian Mississippi, Choctaw Indian Reservation	Naval Air Station	Gordon Harman Gordon.Harman@cnet.navy.mil (601) 679-3809	STARBASE ATLANTIS 1155 Rosenbaum Ave, Bldg 266 Naval Air Station, Meridian, MS 39309
Nebraska, Lincoln	Nebraska National Guard Base	Chuck Lewis chuckndeblewis@earthlink.net (402) 309-1044	STARBASE Nebraska 6111 Rolling Hills Blvd Lincoln, NE 68512-1854
North Carolina, Charlotte	North Carolina Air National Guard	Barbara Miller starnc@bellsouth.net (704) 398-4819	STARBASE North Carolina 145th AW, 5225 Morris Field Dr Charlotte, NC 28208-5797
Oklahoma, Oklahoma City Oklahoma, Tulsa	Will Rogers Air National Guard Base Tulsa Air National Guard Base	Bill Scott Bill.scott@okang-tul.ang.af.mil (918) 833-7757	STARBASE Oklahoma, INC. 138 Fighter Wing 4200 N. 93rd East Ave Tulsa, OK 74115-1632
Oregon, Klamath Falls	Kingsley Field Air National Guard Base	Marsha Beardslee starbase@cdsnet.net (541) 885-6472	STARBASE Oregon 173 FW/STARBASE 302 Bong Street, Suite 19 Klamath Falls, OR 97603
Oregon, Portland	Jackson Army National Guard Armory Portland Air National Guard Base	Marilyn Sholian sholian@spiritone.com (503) 916-3142	STARBASE Oregon 8020 N.E. Tillamook Street Portland, OR 97213
Pennsylvania, Boswell	Johnstown US Marine Corp Base	Brandon Jones starbasepa@aol.com (814) 629-6516	STARBASE Pennsylvania 450 Boy Scout Road Boswell, PA 15531
Pennsylvania, Pittsburgh	Navy and Marine Corps Reserve Center	Earl Morse starbase.earl.morse@adelphia.net (412) 672-4890 x 135	STARBASE Atlantis N&MC Reserve Center 23 McKeesport Port Blvd North Versailles, PA 15137-2267
Puerto Rico, Carolina	Muniz Air National Guard Base	Idabell Matos starbase@coqui.net (787) 253-7502	STARBASE Puerto Rico Muniz ANG 200 Jose Santana Ave Carolina, PR 00979-1514
Rhode Island, Newport	Naval Station Newport RI	Vacant Contact: Steve Mustain Steven.mustain@cnet.navy.mil (850) 452-1001	
South Carolina, Beaufort	Marine Corps Air Station	Wendell Roberson robby@islc.net (843) 524-1320	STARBASE Beaufort Marine Corps Air Station, Bldg 660 P.O. Box 55013 Beaufort, SC 29904-5013
South Carolina, Columbia	McEntire Air National Guard Station	Jim Prater praterje@tag.scmd.state.sc.us (803) 576-1740	STARBASE Swamp Fox 1 National Guard Road Columbia, SC 29201
South Dakota, Rapid City	Camp Rapid, and Ellsworth Air Force Base	Judy Gorman starbase@sd.ngb.army.mil (605) 737-6083	STARBASE Black Hills Camp Rapid, Bldg 123 2823 West Main Rapid City, SD 57702-0273
South Dakota, Sioux Falls	South Dakota National Guard Joe Foss Field	Susan Garrett sdskyking@hotmail.com (605) 367-4930	STARBASE South Dakota 801 W. National Guard Drive Sioux Falls, SD 57104
Texas, Houston	Ellington Field, Houston TX	Gail Whittemore-Smith Gail.whittemore@txelli.ang.af.mil (281) 929-2034	STARBASE Texas 14657 Sneider St., Bldg 1055, Houston, TX 77034-5586

STARBASE STATE/CITY	MILITARY INSTALLATION	STARBASE DIRECTOR	MAILING ADDRESS
Texas, San Antonio	Lackland Air Force Base	Ron Jackson starbase@stic.net (210) 977-3708	STARBASE Kelly 203 Galaxy Road, Suite 112 Lackland AFB, TX 78236-0112
Vermont, Rutland Vermont, South Burlington	Rutland Armory Vermont Air National Guard Base	Douglas Gilman Douglas.gilman@vtburl.ang.af.mil (802) 660-5201	STARBASE Vermont Vermont ANG 105 NCO Drive SO Burlington, VT 05403-5873
Virginia, Norfolk	Navy Fleet Training Center	Gary McGowan Gary.mcgowan@cnet.navy.mil (757)445-5905	STARBASE - Atlantis Fleet Training Center, Bldg. N-30, Room 219 Code 00K2 9549 Bainbridge Ave Norfolk, VA 23511-2594
Washington, Bangor	Navy Trident Training Facility	Joseph Barrett Joseph.p.barrett@cnet.navy.mil (360) 315-2618	STARBASE - Atlantis Bangor 2000 Thresher Ave, Room D222 Code 00K4 Silver Dale, WA 98315-2000
West Virginia, Charleston	West Virginia Air National Guard Base	Dennis Christian Dennis.Christian@wv.ngb.army.mil (304) 561-6357	STARBASE West Virginia WV Starbase Academy 1701 Coonskin Drive Charleston, WV 25311
West Virginia, Martinsburg	West Virginia Air National Guard Base	Capt David Frush David.Frush@wvmart.ang.af.mil (304) 262-5501	STARBASE Martinsburg C/O 167th Airlift Wing 222 Saber Jet Blvd Martinsburg, WV 25401
Wyoming, Cheyenne	Wyoming Air National Guard Base	David Orr davido@starbasewy.org (307) 772-6161	STARBASE Wyoming 217 Dell Range Blvd Cheyenne, WY 82009-4792



FY 2002 DoD STARBASE LOCATIONS

- 45 STARBASE sites in 28 states, the District of Columbia, and Puerto Rico
- SD and MS provide STARBASE program to American Indians as part of DOD Outreach Initiative
- 7 new STARBASE programs were established: IL, MS, NE, PA, RI, SD, WV

AS OF 30 SEPTEMBER 2002