

TechTracS: NASA's Commercial Technology Management System

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In response to the Administration's technology policy, the National Performance Review and the needs of our nation's industries, NASA Administrator Daniel Goldin issued NASA's *Commercial Technology: Agenda for Change* in July 1994. The *Agenda for Change* outlines the national technology policy, Agency decisions made to implement the national policy, and the Agency's newly defined Commercial Technology Mission. This paper explains the mission and *TechTracS*, the program's commercial technology management system.

Since its inception, NASA has recognized that the technology it develops in the course of its missions has relevance to the general economy. Consequently, the Agency has maintained a technology utilization program to transfer this technology to industry, but this early program had at best a passive relationship with industry. NASA disseminated its technical information routinely and reacted to company inquiries as they came up. Serendipity was the "management system."

Today, economic development is an important national goal. Marketing NASA technologies, creating new business practices for entering into partnerships with industry, establishing and reporting metrics, creating and updating an electronic network to better serve our customers, and implementing a training program to educate NASA employees to effect change in our culture are the main elements of the new, proactive commercial technology program. Taken together, these activities represent a fundamental shift in how the Agency works with industry to commercialize its aeronautics and space technologies. No longer is NASA relying on serendipity. Rather, the Agency is actively working to move our knowledge from our programs and laboratories through companies to the marketplace.

The core process in this new way of doing business is "knowledge management." NASA civil servants, contractors and grantees frequently create new knowledge of technology during its aeronautics and space missions that has commercial value embedded in it. First capturing and then managing this knowledge are the most critical functions of the commercial technology offices at each field Center. Without control of our technical knowledge we are handicapped in our ability to maximize the number of NASA-industry collaborations. Conversely, having a complete database of all NASA technology investments, along with an assessment of the commercial potential of these technologies, will greatly enhance the process of matching NASA technologies with industry needs. Spurred on by NASA's 1995 Strategic Plan calling for a 100% inventory of NASA technology for commercial potential, a small team set out to develop this knowledge management system.

TechTracS Management Stages

The purpose of *TechTracS* is to identify and capture all NASA technologies with commercial potential into an off-the-shelf database application, and then track their progress. As such it is, in essence, an "asset management system" much like those found in successful corporations. This management system consists of four stages:

- The first is to develop an inventory of the Agency's entire technology portfolio and assess it for relevance to the commercial marketplace. NASA has already established an initial operating inventory database and is one of the first agencies to do so. The commercial assessment is the responsibility of each NASA associate administrator and is conducted by the field center managing the technology activity.

- Those technologies that are identified as having commercial potential will then be actively marketed to appropriate industries. This is the second stage. Making our technology inventory available over the Internet is a key step in this stage. Such valuable information is thus delivered quickly and evenly to all who seek it.
- The third stage is when a NASA-industry partnership is entered into for the purposes of commercializing the technology. The sum totals of NASA's contribution to these partnerships are tallied to show progress in the partnership requirements specified by the National Performance Review.
- The final stage is to track the technology's success or failure in the marketplace. While this system is initially aimed at leveraging NASA technologies into the marketplace, it can also be used to better leverage our technologies across NASA's internal missions as well as technologies across national initiatives involving multiple federal agencies.

In addition to these stages, *TechTracS* will track a number of other management processes such as patent execution, license negotiation and TechBriefs abstract preparations in order to assure complete transfer of NASA technology.

Assessment and Inventory

Technically, *TechTracS* is a distributed network of relational databases located at each NASA field Center and Headquarters. It is a client/server architecture that has user-friendly interfaces and is platform independent. It was developed for NASA by a small team at the Research Triangle Institute using ACI US' 4th Dimension™ client/server relational database. It is a virtual office that enables cooperative data management and services such as metrics analysis, Internet services, automated documents and letters, ad hoc reports, on-line clients, email services and multimedia capabilities.

The effectiveness of *TechTracS* is evident by NASA's success in meeting its strategic goal of

assessing 100 percent of its technologies for commercial potential. Working with the comptroller's office and the procurement office, we successfully merged their respective databases, each Center's technology database, and a newly developed partnership database into a single relational database in *TechTracS*. For the first time NASA's entire FY 1995 budget of \$14 billion was correlated with its procurements, technologies and partnerships (which account for nearly 90% of the Agency's budget).

For any given year NASA manages over 10,000 contracts, grants and cooperative agreements ranging across over 25,000 program areas. When combined, these create a matrix with more than 50,000 areas of unique work tasks which are then allocated to 10 field Centers and Headquarters. These 50,000 work areas represent an annual NASA investment of approximately \$12 billion. This entire structure and its set of relationships are modeled in *TechTracS*.

From July 1 to September 1, 1995, we assessed more than two-thirds of these 50,000 areas. In that time, 2,700 new technologies emerged and approximately 10 to 15 percent of these areas have been assessed as having commercial potential. More than \$600 million or about 5 percent our annual investment in these work areas qualify as technology partnerships.

This is the first time that a Federal agency has conducted such an extensive inventory of its programs and technologies for technology transfer. The initial results are impressive, but as we improve our reporting system and when both NASA staff and the public become more knowledgeable of it, we believe we will increase the annual number of new technologies created by a factor of three over the next five years. We also believe the percentage of our programs and technologies with commercial potential will increase to 25 percent over the next five years. Finally, by 1999 we expect to increase the amount of resources we invest annually in partnerships from 5 to 20 percent.

Partnerships and Tracking

TechTracS offers benefits beyond its enhancement of internal commercial technology management. It

makes possible customer services that heretofore were impossible to offer. First, and most importantly, companies now have an easy-to-use, searchable database to locate NASA technologies that may solve their problems, *wherever that knowledge may be*—at a NASA lab, a contractor facility, or a university. Making the human connection between the knowledge owner and the knowledge seeker is the first order of business in technology transfer. *TechTracS* accelerates this process.

The next step in technology commercialization is that a relationship must be established between NASA and the knowledge-seeking company. Once this relationship is established, relevant information regarding the new partnership is stored in *TechTracS*. The National Performance Review expects 10 to 20 percent of NASA's budget to be in R&D partnerships with industry. Because of *TechTracS*, the Agency is able to report accurately to the Administration its progress towards meeting this goal.

While partnerships are a measure of the relevance of NASA technology to the U.S. economy, they do not in and of themselves contribute to the economic well-being of the nation. Companies must take the NASA knowledge they acquire and apply it in a new or improved commercial process, product or service. For NASA, success occurs when the company makes new capital investments, creates new jobs, and/or sells new and improved commodities in the marketplace.

TechTracS is able to capture these "success stories." With immediate access to this data, NASA will be able to demonstrate to the Congress and the American people the relevance of its investment in aeronautics and space for advancements in science, technology, and contributions to the United States economy.

FY 1996 Goal: Training

With the assessment of NASA's entire investment base complete and ongoing, the next goal for the NASA team is to train individuals to take advantage of this system. Two strategies are being pursued:

- In partnership with NASA's executive training professionals, an internal training course is

being developed for NASA civil servants, contractors and grantees. This course will be part in a series of NASA training opportunities that instruct NASA managers, scientists and engineers on the importance of the Commercial Technology Mission, mechanisms for entering into partnerships with industry, *TechTracS*'s role in tying this all together, and how to use *TechTracS*'s information system.

- In partnership with the *TechTracS* industry team, a similar training course is being developed for companies most likely to benefit from NASA's technology transfer. Like its in-house counterpart, this course informs the participants of NASA's Commercial Technology Mission and partnership options. In addition, it will train these individuals on how to access the publicly available portions of *TechTracS* remotely so that they can seek information about NASA technologies on their own for their benefit or on behalf of a customer.

Industry training is key to the commercial exploitation of this information. No single individual, team, organization or network of organizations has enough knowledge to maximize the transfer and commercialization of NASA technology throughout the U.S. economy. The economy is simply too big and too complex. However, many individuals, joint teams, multiple organizations and even networks of organizations can maximize the transfer and commercialization of NASA technology throughout the U.S. economy together. *TechTracS* training is the empowering tool. Upon completion of this course the attendees will receive a NASA certificate attesting that they understand NASA's Commercial Technology Program and are skilled in using *TechTracS* to locate NASA commercial technology.

The continuing evolution of NASA's commercial technology management system can be a major factor in such industrial advances and economic development. Success stories will hopefully become commonplace. In analyzing those success stories, *TechTracS* should be able to illustrate the value and importance of placing the right technology knowledge into the right hands at the right time.