



Guest Editors' Introduction

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The Technology Transfer for Space Applications (TTSA) Initiative was introduced during a time when the Laboratory, having thoughtfully considered dramatic changes in the external business environment of the 1990s, was deeply engaged in strategic planning for the 21st century. This new initiative would focus on outreach, foster two-way technology transfer for space applications, spin off new companies, open the doors of our specialized space applications test facilities to the public, and establish new business methods at APL. The TTSA model emphasizes the expeditious transfer of advanced technologies to industry for the ultimate benefit of government sponsors and local economies. The new business paradigm in no way signals a change in APL's historical mission, but rather a broadening in its approach to achieve our public service mission, ever-careful to balance this outreach effort with our primary, long-standing trusted agent role for the government.

SUPPORTING TECHNOLOGY TRANSFER

Technology transfer—the formal transferring of new discoveries and innovations resulting from university scientific research programs to the industrial sector—is an important component of the federal R&D system and a driver in the evolution of new government-industry-research university/laboratory partnerships. The Bayh-Dole Act of 1980 created a mechanism for technology transfer by allowing research universities to patent technology derived from government-supported R&D and to license it to industry. This has resulted in an effective avenue for seeding government-funded research in the commercial market and in additional revenue streams for universities (see the articles by Suter et al. and Gray, this issue). The Association of University Technology Managers has noted the success of this effort, reporting that Bayh-Dole is directly responsible for approximately \$30 billion in economic return annually to research institutions.¹

Technology transfer was initially viewed as moving one way: from government to industry. In the 1990s, government sought to make this a two-way exchange by pursuing the use of commercial innovations in government systems and by sharing government-funded innovations with the private sector. In this win-win scenario, government clearly needed participants who could foster two-way technology transfer.

The APL TTSA model addresses this two-way technology transfer need. At its core is the Laboratory's desire to understand commercial technologies and to help transfer those technologies to government applications. The model allows APL to facilitate the fast-tracking of state-of-the-art technology for government applications, thus helping to bring new products to their programs quickly and cost-effectively using commercial techniques and products.

The government has long recognized that making the results of government-funded R&D available to the nation's business community can foster economic growth. The Bayh-Dole Act set basic public policy in this regard. By allowing research institutions to retain title to all inventions first developed under government funding and by encouraging the commercialization of technology through licensing agreements with private industry, the act creates an incentive for universities to market their innovations commercially and encourages industry to invest in their far-reaching technologies. Within the APL TTSA model, industry-laboratory technology transfer helps move new discoveries from the Laboratory to the marketplace faster and more efficiently, thereby reducing time to commercialization, generating capital for the university and the inventor, and fostering stronger ties to industry.

The first technology transferred under this new initiative was coupled with the launching of Syntonics LLC, a new high-tech small business spun out of the Laboratory (see Suter et al., this issue). APL licensed its advanced oscillator technology to Syntonics, which is actively marketing products (not available outside the government before now) to commercial customers.

Although Syntonics is the first such spin out company, the soundness of the TTSA concept has been demonstrated throughout Hopkins and the broader research university system as articulated by JHU president William R. Brody:

Prior to 1980, fewer than 250 patents were issued to U.S. universities each year, and discoveries were often not commercialized for the public's benefit. Today, U.S. universities are averaging about 1500 patents a year and the trend is accelerating. In 1997, JHU, including APL, performed \$725 million in federally funded science and medical research, making it the leading academic institution in the country in such expenditures—almost by a factor of 2. In 1998, we disclosed 228 inventions, filed for 214 patents, and received 76 by year's end. In 1999, we received more than \$5.5 million in license fees from Hopkins discoveries and another \$5 million in research funding from private companies related to license agreements. In 1998, 5 new start-up companies were established based solely upon Hopkins-discovered technology, bringing the current operational to 18.²

INTRODUCING THE TTSA INITIATIVE AT APL

In keeping with the public service mission of the Laboratory, the TTSA Initiative, managed by the

Space Department, was developed to specifically address the transfer of APL-developed space technologies, as well as to open underutilized but critical specialized space application facilities to industry. With its rich history, the Space Department has earned the reputation of providing innovative, diverse solutions to important problems in the development and application of space science, engineering, and technology.

At the core of the TTSA Initiative is APL's desire to further enhance our world-renowned R&D for our primary government sponsors, the DoD and NASA. The initiative provides for continuing support for government programs and support of complementary commercial space industry needs. Through the TTSA model we will identify candidate technologies not immediately obvious to a single government user or commercial enterprise for dual-use application.

The initiative has three primary technical focus areas: (1) transition of technology, (2) science and technology R&D, and (3) facilities and testing. Transition of technology focuses on existing and emerging dual-use, state-of-the-art technologies that are near-market ready. These technologies can be combined into industry applications to provide new system solutions for both government and commercial use. Through the licensing process, opportunities are provided to industry to add or expand product lines, while limiting risk and investment. Our government sponsors benefit by obtaining expeditious product solutions to national problems.

Science and technology R&D augments the transition of technology. Under certain conditions, industry can access APL's R&D resources to assist them in the application of licensed technology into their products and to facilitate their understanding of the challenges associated with new, emerging dual-use technologies and scientific problems.

The area of facilities and testing allows industry to use existing specialized space test and operations facilities for environmental testing, satellite communications, electronic parts engineering, and space qualification testing.

Through the TTSA Initiative, APL envisions a highly interactive relationship with the commercial space industry that fosters two-way technology transfer in furtherance of government needs and promotes economic development. As such, it enhances APL's public service mission and ensures its viability as a critical resource for its government sponsors well into the 21st century.

THIS TECHNICAL DIGEST ISSUE

This *Digest* issue highlights the technical focus areas of the TTSA Initiative and contemplates potential avenue of partnerships with industry. Critical technologies that are available or emerging for transfer, and the related R&D supporting them, are presented in the first four articles. Industry's use of our available

special test facilities, specifically for satellite communications, is discussed next. In the following two articles, APL's formal Technology Transfer Program is overviewed, as is the success story of our first commercial spin-off company. The closing article explains how the Laboratory has modified its business operations model to partner with industry in new and different ways, the challenges confronting us, and the progress of the new and innovative TTSA Initiative to date.

NOTES

¹From testimony given by T. F. Wiley to the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Science, Technology, and Space (15 Apr 1999).

²From a speech given by President Brody entitled "From Minds to Minefields: Negotiating the Demilitarized Zone Between Industry and Academia" (6 Apr 1999).

ACKNOWLEDGMENTS: We gratefully acknowledge the contributions of Ruth E. Nimmo of APL and Carolyn W. Stuver of the Flowers Group.

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