Dual use technology programs

Lionel S. Johns

Office of Science and Technology Policy
Executive Office of the President
Washington, DC 20500

Mr. Chairman, ladies and gentlemen, thank you for inviting me to join you here today as the keynote speaker of the Infrared Technology Conference. I am pleased to have this opportunity to present to you the Clinton Administration's commitment to American industrial competitiveness through a strategic focus on resarch and development and to dual-use technologies in particular. Working in partnership with industry, the dual-use approach is essential for giving our armed forces the world's best, most technically advanced military equipment at affordable cost. It offers valuable benefits to economic growth to both the defense and non-defense industries.

With the end of the cold war, our biggest national challenge is economic. We need to maintain and enhance our nation's competitiveness through building knowledge-intensive, wealth-creating industries. The Clinton Administration recognizes this and is committed to usign technology policy to nurture the nation's economic strength. The President has set a goal of shifting from a dominant role for military technologies in our Federal R&D investments to a roughly equal balance between military on the one hand and civilian and dual-use on the other. We have already made signifcant progress toward this goal.

While responding to the economic challenge, we must also meet our continuing military needs. We live in a world that still contains threats to our interests and our security. Research, development, and procurement policies that emphasize commercial and military integration are the best way to meet both economic and defense challenges. The synergy between military and commercial technology allows both the civilian and military technologies to be shaped with the same investment of public money.

But this approach requires a change in the way the Department of Defense acquires the technology to support its weapons systems. Superior technology was the basis for America's military advantage throughout the cold war, and remains an indispensable support today. However, to keep its technology edge, the Department of Defense must break down barriers built over the past two or three decades between the defense and civilian sectors. Because of the Department's cumbersome procurement system, many firms have refused to do any business at all with the Defense Department. Five of the top ten U.S. semiconductor producers refuse defense business because of the way they are required to maintain cost and pricing information. Many firms that do business with DoD eithe r wall off defense business or do no commerical work at all.

We can no longer afford to rely on an isolated defense industrial base. First, in an era of declining defense budgets, it is simply too expensive. The military pays ten dollars for computer chips that are almost identical to commercial chips available for one dollar. The difference is due largely to overhead caused by DoD's special requirements. Second, in many cases, technologies embedded in defense products often have fallen years behind their opposite numbers in the commercial world, especially in fast-

 0-8194-1593-6/94/$6.00

moving fields such as electronics, software, and communication.

To get the most out of shrinking dollars, DoD must buy as much as possible from commercial manufacturers who, under the discipline of the market, must give their customers good value in high quality, reliable products embodying the best and latest technologies at competitive prices. Some defense needs are special and will always remain so; there is no commercial market for stealth airplanes. On the other hand, sometimes DoD needs can only be met by commercial producers -- and that can lead to impasse. During the Gulf War, the Air Force placed an emergency order for 6,000 Motorola commercial radio receivers. But because Motorola's commercial unit did not have the record-keeping systems required to show te Pentagon that it was getting the lowest available price, the deal stalled. The impasse was broken only when the Japanese government bought the radios and donated them to our Army.

The Administration is taking two steps toward moving DoD technology from an isolated industrial base. Most important is procurement reform. We are working with Congress to cut away the thicket of procurement laws and regulations that keep DoD from doing business with commercial firms. Second, DoD is enlarging and focusing its investment in dual use R&D. By targeting initiatives in such things as information technology, advanced manufacturing, and areas in which foreign dependence is a real problem, DoD is helping to ensure that commercial firms in this country can supply the superior technologies that maintain our military edge. In the past, commercial industries have benefited from spin-offs from military R&D. The new goal is more explicitly to help U.S. industry retain the lead in those commercial technologies that are critical to military capabilities. This can't be done in isolation, however. To really be effective, the dual-use strategy needs to be part of this Administration's overall science and technology strategy.

The President's strategy on science and technolgoy was first publicized in a White Paper released in February 1993 entitled, "Technology for America's Economic Growth: A New Direction to Build Economic Strength." The White Paper set a clear strategy and agenda for the Administration. One of the consequences of this strategic statement was the announcement by the President in November 1993 of the National Science and Technology Council. This new council is intended to improve strategic coordination of research and development throughout the government, expand partnerships with the private sector, ensure leadership in fundamental research and increase focus on new relevant national goals. The council is chaired by the President and supported by the Office of Science and Technology Policy. The National Science and Technology Council replaces the Federal Coordinating Council on Science, Engineering, and Technology, the National Critical Materials Council, and the National Space Council. It will also be advised by the private sector through the President's Committee of Advisors on Science and Technology.

The council has nine committees that are organized to focus on relevant national goals in science and technology, with membership and interests that in all cases cut across agency boundaries. Threee of the committeees that are especially concerned with develoment of dual-use technologies are the Committees on National Security Research and Development, the Committee on Civilian Industrial Technology Research and Development, and the Committee on Information and Communication Research and Development. Sub-Cabinet officials of the Departments of Defense, Energy, and Commerce are chairs and vice-chairs of these three committees. They can look at the dual-use issue through the lenses of both military and civilian goals. Other committees with strong dual-use intersts include the Committees on Education and Training, Transportation,

Fundamental Science and Engineering and Research, and Environment and Natural Resources Research.

One of the major initiatives of the Presidnet's science and technology strategy in the dual-use area is the Technology Reinvestment Project. This initiative is intended to stimulate the transition to a growing, integrated national industrial capability which provides the most advanced, affordable military systems and the most competitive commerical products. The project awards matching federal funds, on a competitive basis, to three types of activities: 1) industry-led consortia to develop technologies with the potential for commercialization within five years; 2) state and community-based manufacturing extension programs and other innovative mechanisms to deploy existing technology and best practices to small firms; and 3) college and university programs to educate and train manufacturing engineers and technicans.

The TRP is jointly executed by a multi-agency council, chaired by and including the Departments of Commerce, Energy, and Transportation, NASA, and the National Science Foundation. It is funded at $465 million in FY93, $554 million in FY94 and is at $625 million in the President's proposed budget for FY95.

Some 2850 proposals were submited in response to TRP's first solicitation, and were evaluated by 300 interagency representatives; 212 proposals were selected. These proposals represent partnerships representing 1631 organizations, 46 states, and the District of Columbia, and five foreign partners. Three quarters of the proposals include at least one defense and one commercial firm. In addition, small businesses and universities were well represented. Fifteen of the TRP awards are directly related to the photonics industry.

The second TRP competition was announced in April 1994. It is focused on seven technology develoment areas: high density data storage systems, object technology for rapid software development and delivery, interoperability test beds for the National Information Infrastructure, high definitions systems manufacturing, low cost electronic packaging, environmental sensors, and of speical interest to this audience, uncooled infrared sensors. The focused competition will be followed by a general competition to be announced this summer.

The TRP competition has already achieved significant results. First, the cooperation among the many Federal agencies has been outstanding. In addition, the program has encouraged meaningful and unique collaborations, including both vertically and horizontally integrated industrial teams as well as teams involving government, industry, and universities in association. There has also been a significant inclusion of small businesses.

Another dual-use strategy is the Technology Transfer Initiative Program in the Department of Energy. Under the National Competitiveness Technology Transfer Act of 1989, the Federal government's contractor-operated laboratories, including those of DoE, may enter into Cooperative Research and Development Agreements with U.S. industry. With the end of the cold war, the nuclear weapons mission is greatly altered and much reduced. No new nuclear weapons are being designed in the United States. However, the Department is still responsible for the safety and security of the nuclear stockpile, for dismantling of nuclear weapons, and for non-proliferation duties and verification of compliance with international agreements. The human talents and outstanding physical equipment in the DoE labs and production complex are valuable resources for both dual-use and civilian purposes. The Technology Transfer

Initiative Programs sets aside funding for the labs for these purposes.

Cooperative Research and Development Agreements have become the most popular means of working with the National labs. The recent development of a model CRADA is reducing the contract negotiation time and enhancing the number of technology transfer agreements. DoE's CRADAs with industry now amount to more than 300. Throughout the Federal government the level of technology transfer funding in FY94 is $551 million resulting in more than 2,700 CRADAs. The President's budget is proposing $865 million in FY95 for technology transfer.

For defense, the dual-use approach is vital. While not so central to commercial success, it is highly beneficial. DoD investments in dual-use technology are large -- over $2 billion a year, not counting funding of basic science. DoD investments can continue to play a pivotal role in creating new technologies and families of industries, as they did in the past for semiconductors and computers.

At the same time, it would be a mistake to rely on defense-oriented R&D alone to spur the advance of technologies important to civilian industry. In bringing our R&D portfolios into balance, the Administration is strongly supporting programs for partnerships with industry in the civilian sector, to advance risky new technologies that hold the promise of important benefits to society as a whole but do not offer a high enough return to individual returns to compensate for the risk.

A flagship civilian R&D partnership program for this Administration is the Advanced Technology Program, managed by the National Institute for Standards and Technology in the Department of Commerce. With the help of Congress, we have already built this important program to a level of $200 million per year, and have requested $450 million for FY95. Now that ATP is growing to a substantial size, NIST is establishing several programs in focused technology areas, to last five years with funding of about $30 to $40 million a year apiece. The technology areas were selected with massive industry input -- some 3,000 industry representatives attended forums and workshops, and over 500 papers were submitted with suggestions for focused technology areas. Next, proposals for individual projects in each area will be solicited; also, IST will continue to entertain proposals in all technology areas, as it has for the past four years in a smaller ATP. All proposals are competitively selected and cost-shared between industry and the government.

In this first round, the focused technology areas NIST selected were component-based software, low-cost processing of composite structural materials, DNA diagnostic tools, a national health information infrastructure, and computer-integrated manufacturing for electronics. Most of the selections have clear dual-use importance, although that was not a criterion for selection. This should be no surprise. Although thre is an obvious divergence in final products on the military and civilian sides of the economy, there is a growing convergence in the underlying technologies that support both. This is especially true in electonics, software, computers, telecommunications, and advanced materials.

Small businesses have been and continue to be significant contributors to the advancement of American technology both in the military and civilian sectors. In 1982 Congress passed the Small Business Innovation Development Act to encourage technology innovative research in small businesses. Specifically, the purpose of the Small Business Innovative Research program is to stimulate technology innovation, to encourage use small business to meet Federal research and development needs, to foster

and encourage participation by minority and disadvanted persons in technology innovation and to increase the commercialization of products and services resulting from Federal research and development assistance. Since it began in 1982, the SBIR program has made 25,000 awards with a total value of $3.2 billion.

Eleven agencies with budgets of at least $100 million in Federal R&D are participating. A percentage of their budgets are set aside for SBIR programs. The largest contributions to the program are made by the Department of Defense with approximately half of the total budget. The SBIR program is designed around three phases. Phase One is intended to determine the scientific merit and feasibility of ideas proposed for investigation with a typical period of six months. Historically, 10 to 20% of the proposal for Phase One received by the agencies have been funded. Phase Two is the principal research and development phase and is expected to deliver a well-defined product or process. The period of performance is typically two years. Phase Three is for the commercial application of the Phase Two results and is not funded by SBIR funds.

In October 1992 the program was re-authorized until FY 2001 and was significantly expanded. The set aside percentage is increased to 2% in FY95 and 2.5% in FY97. In addition, the Phase One award amount was increased to $100 thousand and the Phase Two award was increased to $750 thousand. Language was added to emphasize commercialization and dual-use technology and changes were made to encourage more small businesses to apply.

A new pilot program introduced by the SBIR re-authorization bill is the Small Businesss Technololgy Transfer program. This is modeled on the SBIR program in that it also consists of three phases and is funded by a percentage set aside. It is intended to increase cooperative arrangements between small business and non-profit research institutions such as universities. The work distribution is intended to be approximately evenly split betwen the two parties.

In addition to these ongoin programs the Administration has announced specific, interagency programs targeting particular industries that are candidates to produce dual-use products. One such program is the National Flat Panel Display Initiative. The flat panel display industry is expected to grow five fold to $20 billion by the end of the decade. The U.S., however, manufacturers only three percent of the flat panel displays produced in the world. As a consequence, the military is dependent on foreign suppliers who, as a rule, are not interested in modifying their products for military applications. If the Department of Defense had approached this problem the same way as in the past it would have creatd a defense supplier that could only deliver military grade flat panels wthat would be very expensive and that could not compete in teh commercial marketplace. The National Flat Panel Display Initiative is different. It will provide $587 million over five years on a competitive, cost-shared basis. Some of these R&D awards will be available only to companies that commit to commercial production of flat panel displays. This will help to jump start American companies into the commercial flat panel display business; they can then also supply military needs, which represent only five percent of the total American market. Thus, the Federal money is both an R&D investment and an incentive to companies to commit their own money to build the necessary production facilities.

With the end of the cold war the dual-use approach to technology and manufacturing development is becoming one of the best techniques for reintegrating the military and commercial industrial supplier base. Done properly, we will be bringing together the

best of both worlds to enhance American industry as we move ahead into the twenty-first century.