

# Accelerating the transfer of military technology through accelerators and military-civilian integration

Many commercial technologies we use today can be traced to military from aircrafts to nuclear power, from semiconductors to computers. Duct tape was invented to protect ammunition cases from water during World War II. The internet grew out of a military research project. Navigation devices, such as Google Maps, rely on satellites created to guide fighter jets, warships and military forces. Global Positioning System (GPS) is based on network of satellites set up by the U.S. Department of Defense in the 1970s. Radars developed before World War II by military are now used in many civilian applications including air traffic control and weather forecasting. Invention of Jet engines and other aircraft technologies is now enabling the growth of Air travel. Drones which are becoming increasingly popular for surveillance and photography in commercial and civilian use can be traced to military.

However recently there has been declining trend in spinoffs. "Each year, the U.S. Air Force invests around \$4 billion into research and development of new technology for its fleet of planes and jets. Yet most of the sophisticated military innovations developed in their research labs rarely cross over to the commercial market," writes Alison Damast. In fact, the Air Force generates only a paltry \$60,000 a year in outside licensing fees, says Vincent Lewis, director of the Crotty Center for Entrepreneurial Leadership at the University of Dayton's School of Business Administration.

One reason of declining importance of spin-offs, is the

growing applicative nature of military research; only very small percentage of budget is spent on basic research which might be expected to further commercial technologies. In addition, many technologies developed for use in military systems are often too costly or sophisticated for commercial application. US DOD is looking to accelerate the technology transfer to commercial markets.

DOD has selected the Air Force Research Laboratory's Information Directorate to commercialize its command, control, communications, cyber and intelligence technologies that have been determined to be dual-use. These technologies, which have both civilian and military applications, will be available for license by New York-based entrepreneurs and existing aerospace, defense.

Chinese leader Xi has repeatedly stressed the importance of "military-civilian integration" as a core component of the country's military development strategy. "Through in-depth development of military-civilian integration, military technologies are gradually applied in civilian fields, making high-tech equipment available to commercial markets.

In December 2013, the European Council itself tasked the European Defence Agency and other bodies to better exploit civil-military synergies. The European council suggested "Desegmentation of civil and military research", by allowing funding to flow from one side to the other, major spin-offs between defence and civil research could be achieved. "It is worth remembering that few technologies are military or civil by nature, especially at low technological readiness.

## **Universities to help spur Air Force lab's tech transfer**

Miami University is teaming up with Dayton's Wright Brothers Institute to launch an accelerator that will make use of

patents owned by the U.S. Air Force. The Miami University-AFRL Research Technology Commercialization Accelerator will have access to the portfolio of more than 1,000 patents and patent applications held by the Air Force Research Lab.

The research included in the portfolio includes items that weren't used for defense purposes but could have potential for more widespread use. Miami will create and lead programming to connect that technology with entrepreneurs, funding and other resources to bring products to the market.

The university, which houses its own Institute for Entrepreneurship, will begin including patent review, technology exploration and potential business plan development in its entrepreneurship curriculum beginning in spring semester 2018.

The Wright Brothers Institute assists the Air Force Lab, which is headquartered at Wright-Patterson Air Force Base, with technology transfer, interaction with the community, workforce development and innovation including commercializing Air Force-developed technology.

Examples of technology developed by the Air Force Research lab include Polybenzimidazole fiber, which is used in firefighters' gear, space suits and welder's gloves. Technology developed at the lab has been adapted for civilian use in modern communications, electronics, manufacturing and medical research products.

The Air Force Lab has more than 5,700 researchers and scientists who work under a \$5 billion annual budget that includes more than \$550 million in spending in the state of Ohio. Of that, about \$12.5 million goes to academia

The Air Force Research Laboratory at Kirtland Air Force Base is aggressively stepping up its efforts to take new technologies to market with help from New Mexico universities. The three research universities University of

New Mexico, New Mexico State University and Northern New Mexico College will help train AFRL scientists, engineers and community-engagement professionals in technology commercialization. That will include patenting new innovation, pushing the most marketable inventions into the tech-transfer pipeline and seeking investors and entrepreneurs to take them to market.

The UNM Science and Technology Corp., the university's tech-transfer office, will play a central role in helping the Air Force lab. STC will launch a multi-pronged training program this fall for AFRL personnel, said STC President and CEO Lisa Kuuttilla.

It will include:

- Working with lab scientists and engineers to bring forward more potentially marketable inventions and collaborate with lab management to commercialize them.
- Instruction in market research to identify and seize on business opportunities.
- Direct outreach to investors and entrepreneurs.
- Centralizing all AFRL tech-transfer activity through a modern software system to track and manage commercialization from the earliest steps of invention disclosure to patenting, marketing and licensing.

AFRL is already transitioning its work into the new software system. "It provides backbone infrastructure for technology transfer," STC President and CEO Lisa Kuuttilla said. "Instead of having a thousand spreadsheets, everyone works off of one module."

## **Special Technology Acceleration Program that's helping the Air Force Research Lab find more lucrative commercial applications for their patented technology**

University of Dayton's School of Business Administration is seeking to accelerate the transfer of military technology to the civilian sector by introducing a new center for engineering and business students. Vincent Lewis, director of the Crotty Center for Entrepreneurial Leadership, says the center provides Dayton students with exclusive access to cutting-edge Air Force technology, as well as face or phone time with the inventor. If students come up with a viable idea, they'll have an opportunity to apply to the Air Force for a license for the invention that will allow them to take it to the consumer market.

The "application discovery" phase led students to selected four inventions for taking to market from the 12 Air Force technologies they were offered. These were a software security product the Air Force uses to prevent phishing and viruses on its computers; an adjustable seat cushion used to prevent fatigue in fighter pilots who need to sit in their seats for eight-hour-plus missions; microbial detection technology the Air Force uses to assess sanitary conditions for food prep when overseas or on a mission; and a superhydrophobic coating that repels water on the surfaces of planes when used in subzero temperatures.

Creativity abounded in the approaches the student teams took to the inventions, Roe says. For example, the team that chose the Air Force adjustable seat technology wanted to use it for long-haul truck drivers who, like fighter pilots, can become easily become fatigued because of lack of circulation in their lower extremities during multi-hour drives. Another team

wanted to use the water repellent coating in ski wax products, and to improve efficiency in the label-making industry.

“Ideation is the biggest challenge, especially for younger students who are 18 to 22 years old,” he says. “Many times in the ideation process, they are thinking relatively narrowly, coming up with ideas like ‘I’m going to start a mobile car cleaning service or a food truck,’ and it can be hard to get them to think beyond that. In this class, we were trying to get them past that by giving students a little push and asking them to look at these Air Force technologies and think of them as entrepreneurial opportunities.”

## **Furnace Technology Transfer Accelerator.**

In 2014, Arizona State University was awarded a \$1 million grant from the U.S. Department of Defense to create a new Pracademic Center of Excellence in Technology Transfer. The center is a collaboration led by ASU’s Entrepreneurship and Innovation Group, in association with Arizona Technology Enterprises (AzTE), ASU’s Security and Defense Systems Initiative and ASU’s W. P. Carey School of Business.

Technology transfer from federal government laboratories, especially for Department of Defense laboratories, has become an increasingly important strategic objective, said ASU. The new Pracademic Center of Excellence in Technology Transfer (PACE/T2) will play an important role in meeting the department’s strategy, plans, goals and metrics for substantially increasing transfer and commercialization of dual-use technologies developed in defense laboratories to the commercial marketplace.

The program has resulted in three Furnace regions. The original Furnace, based in Arizona, has fostered 14 new startup companies that have leveraged technologies from public universities and private health care groups. In addition to

the N.Y. Furnace, a separate Furnace will be conducted in San Diego to work with the Navy's SPAWAR Systems Center Pacific to commercialize the Navy's technology.

## **Chinese “military-civilian integration”**

The second China Military and Civilian Integration Expo was held in Beijing's National Convention Center. The three-day event provided an open platform for the exchange and integration of military and civilian technology.”Through in-depth development of military-civilian integration, military technologies are gradually applied in civilian fields, making high-tech equipment available to commercial markets. At the same time, we have also emphasized the importance of encouraging more civilian product suppliers to actively participate in the defense-building process,” said Dai Hao, Director-General of China's Institute of Command and Control.

Recently, The People's Liberation Army has declassified and made public more than 2,300 national defense patents,. The National Defense Intellectual Property Rights Bureau of the Central Military Commission's Equipment Development Department has declassified about 3,000 national defense patents and opened 2,346 of them to the public, according to PLA Daily.

It said it is the first time the PLA has declassified and made public military patents since it began to register such patents in 1985. The measure is intended to facilitate the transfer of military technologies to civilian industries to boost the coordinated development of the civilian and defense sectors, the report said.

A defense technology industry observer in Beijing, who wished to be identified as Wu, said that opening suitable defense patents to the public benefits businesses, as they can use these patents to save on their research spending.

“Military and defense contractors can also save research and development funds, because in the past, many defense technology researchers had no access to patent information that was submitted by other researchers, which led to them conducting research that had already been done,” Wu said.

## **India’s DRDO and FICCI ATAC program**

The DRDO – FICCI ATAC programme aims to create a commercial pathway to deliver technologies developed by DRDO for appropriate commercial markets for use in civilian products and services. This programme is first of its kind to be undertaken by DRDO in association with FICCI to actively spinout several of DRDO’s technologies for appropriate commercial markets both nationally and internationally. In the very first year of operation of the programme as many as 26 DRDO labs across India are participating and over 200 technologies are being assessed under this programme by FICCI.

The technologies that are currently assessed are from sectors as diverse as electronics, robotics, advanced computing and simulation, Avionics, optronics, precision engineering, special materials, engineering systems, instrumentation, acoustic technologies, life sciences, disaster management technologies, information systems, etc.

Under a unique process of technology assessment and commercialization, FICCI along with the IC2 Institute of Texas University has identified a few technologies which were initially only exposed to the defence sector. FICCI along with the IC2 institute is now exploring civilian applications for the same.

**The programme process comprises the following steps:**

**Technology Assessment:**



- High Level Quantitative and Qualitative Evaluations
- Extensive Interviews and Analysis
- QuickLook Scan

#### **Business Development:**

- Business Development Plan
- Identifying Business Partners
- Industry Interface via Visits, Calls and Follow-ups

#### **References and resources also include:**

- <http://poetsandquantsforundergrads.com/2016/10/11/millions-made-military-tech-prof-says/>
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