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Teleprompter Script for Mr. Stephen Welby, Director, Tactical
Technology Office**

Technology Limited Only By Imagination

» **STEPHEN WELBY:**

As you know by now, 2008 marks the 50th anniversary of DARPA and from the beginning the Tactical Technical Office and our predecessor organizations have been working to develop advanced technology and systems for our military, limited only by our imaginations.

The nature of military engagements has changed dramatically during the past five decades.

Nevertheless, the TTO mission remains relevant and focused: providing the warfighter with the critical platforms and systems to dominate the future fight – no matter where or when it takes place.

As you will see, we did just that in helping to equip today's soldiers for the current conflict, The technology introduced by TTO over the past 18 months is simply amazing.

More important, however, is the acute need to continually look out to the future to develop the systems our soldiers will need to succeed against any adversary in the years ahead.

Our soldiers, airmen, sailors and marines operate in battle spaces more complex than ever.

That's why it's so important for us to continue soliciting the future needs of the Army, Air Force, Navy and Marines, and the combatant commanders.

By leveraging some of the world's best scientific and engineering minds, we're clearly defining the frontiers of modern combat.

Today and tomorrow, TTO programs are developing, integrating and demonstrating the advanced technologies and systems that will deliver new, unprecedented capabilities to U.S. warfighters.

What differentiates TTO from other offices within DARPA is our consistent focus on demonstrating and prototyping advanced systems.

We seek to take new concepts, new designs, exotic materials, advanced propulsion, novel energetics, and new sensors and combine them into system prototypes that demonstrate transformational ways to apply military power.

These include prototypes and systems for advanced air, land and sea military platforms.

The TTO office also focuses on tactical multipliers – technologies like high-energy lasers, advanced robotics and weapons systems that provide our soldiers with overwhelming advantages.

Let's take a brief look at some of the battlefield innovations introduced over the past half century that emerged from the imagination of TTO.

From Vietnam to the Gulf War to the conflict in Bosnia, to the current conflict and beyond, these technologies have changed the rules of the game.

As you can see, we've enjoyed an impressive run over the past half-century enabling advanced warfighting systems and platforms, and the legacy of the Tactical Technology Office continues to inspire our team today.

Now let's quickly look at our office's more recent "firsts" that will further revolutionize the battle space in the near future:

Earlier this year, the DARPA Unmanned Ground Combat Vehicle completed autonomous navigation testing at Fort Bliss, Texas.

This mobile, unmanned vehicle traveled more than 250 kilometers on its own, including two 20 kilometer runs without operator intervention at speeds averaging more than 7 miles per hour over near impassable terrain.

These runs set new speed and distance records for unrehearsed, autonomous navigation for vehicles this size.

Warfighter protection is another top priority of our office.

That's why we're especially pleased with the success of the Boomerang acoustic gun shot detection system recently introduced into the field in Iraq.

Our Boomerang system has been used extensively in various combat operations and received high praise from soldiers who can now quickly identify where enemy fire is coming from.

The capability is being used for both vehicle convoy protection and to secure fixed sites and facilities.

Our new Crosshairs sensor system detects, localizes and responds to a range of threats, including bullets, RPGs, anti-tank missiles and direct-fired mortars.

It offers the potential to extend active defense capabilities at low cost to every military vehicle.

Static live fire tests of Crosshairs have been successfully completed.

Final military utility testing of the DARPA Micro Air Vehicle system also has been completed, with delivery to soldiers this year.

Backpackable and easy to operate, it offers soldiers “hover and stare” capabilities in restricted environments.

Two test flights of our hypersonic HyFly missile system will also be completed this year.

These flights will address our goal of demonstrating sustained Mach 6 flight of a scramjet powered missile, to achieve a critically needed long-range, high-speed strike capability against time-sensitive targets.

Earlier this year, DARPA completed testing of our Autonomous Airborne Refueling Demonstration system.

This technology enables unmanned, in-flight refueling of aircraft.

During the tests, the system successfully performed rendezvous, station keeping, separation and emergency override maneuvers.

Testing continues on our A160 Hummingbird long-endurance, unmanned rotorcraft.

This unmanned helicopter will support ground troops as a surveillance, targeting, communications or logistics platform.

It will demonstrate unprecedented endurance for a rotorcraft.

Our Oblique Flying Wing aircraft program continues to make progress, as well.

A series of low speed wind tunnel tests were completed earlier this year.

Engineers are currently focusing on overcoming challenges associated with the crafts' aerodynamics, controls and aerolasticity, with the goal of seeing this novel aircraft concept demonstrate high performance in both subsonic and supersonic flight.

Our goals for the Heliplane include demonstrating the hover performance of a helicopter and the forward flight efficiency and speed of a fixed-wing aircraft.

A demonstrator aircraft capable of vertical takeoff, 400 miles per hour cruising speed, and 1,000 mile range is under development, with significant testing and early design work completed in the last few

months.

And finally, the HELLADS program is focusing on the development of a revolutionary 150 kilowatt high-energy laser for use on tactical platforms.

A full-scale “unit cell” laser module passed its design review earlier this year.

You will hear about DARPA’s space work in the next session of this conference, but I do want to point out two areas where TTO has made significant strides in the last year.

Our Falcon program will enable low-cost, small launch systems.

These new systems will enable an affordable and responsive launch capability for payloads in the 1000-pound range, reducing launch costs by more than 50 percent.

With the first flight of the Space-X falcon booster, and critical drop test and static firings on the Air Launch rocket concept, we are well on the way to opening up affordable access to low earth orbit.

And our Orbital Express program is a two-spacecraft servicing demonstration.

Earlier this year, it was successfully launched into space and completed a three-month demonstration of autonomous rendezvous...

on-orbit refueling...

and autonomous on-orbit component replacement...

fully demonstrating the feasibility of on-orbit servicing.

As you can see,
these are exciting times for our office, but there is little time to rest on our laurels, considering the determination and fortitude of our potential adversaries.

We must continually focus on the future to exploit advanced technology to even better equip U.S. warfighters to do their jobs.

What does this mean?

Simply put, four key objectives have been set in front of the Tactical Technology Office for the coming years – key systems challenges that, when addressed, will further enhance the war-fighting capabilities of the men and women in our armed services.

First, we must develop technologies and systems that enable us to “get there faster”.

In other words,
technology and systems must be developed which deliver appropriate U.S. military power worldwide on a virtually instantaneous basis – before the adversary has time to prepare or react.

Imagine technologies that would eliminate our current dependence on

forward-basing and having a presence in foreign countries.

Imagine systems that would provide our warfighters with on-demand access to all of our nation's combat capabilities wherever they engage an opponent.

Next, our military must "operate without restrictions".

In other words, we must do everything in our power to keep our forces out of harm's way.

Imagine DARPA technologies that would insure U.S. soldiers would survive and win on the modern battlefield of the future, wherever that may be.

Consider systems that will permit US forces to fight and win, resisting adversaries equipped with modern weapons and tactics, themselves.

Imagine the ability to maneuver at will, unconstrained by limits of unfamiliar terrain or lack of infrastructure on the battlefield.

We will need to be able to move freely in all environments – on land, at sea and in the air.

In the future, our military also must be able to "operate with persistence".

Imagine U.S. warfighters not only getting to a combat area fast, but also sustaining our military presence and superiority there indefinitely.

The DARPA-developed Global Hawk aircraft can currently loiter above a target for up to 35 hours at a time.

Imagine the ability to do so for weeks, months or years, providing an unblinking eye from above via an airborne vehicle.

Such a system would offer the advantages of a satellite, but without the challenges associated with orbital mechanics.

If we are going to accomplish this, we must enhance the fundamental limits of aircraft endurance.

Once this is accomplished, how do we exploit such endurance for future warfighters?

Advanced aircraft providing ongoing surveillance from above is one thing, but how about similar technologies for ground and sea operations?

The final objective for our organization moving forward is the development of technologies and systems that enable the delivery of tailored, precision effects.

Imagine the game-changing effect of directed-energy weapons scaled to megawatt levels.

Imagine lasers protecting aircraft by knocking surface-to-air missiles out of the sky.

Or next-generation close-air support, delivering precision from unmanned strike platforms?

They would always be on alert and always be available on-demand to U.S. warfighters

on the ground.

What I just described is our vision of the future of warfare but, I must reiterate, none of what I just described is unrealistic.

Our energetic and dedicated Program Managers are working today on various programs to meet the future objectives set forth by DARPA.

You'll be hearing from four of them next.

They will be sharing with you some of the new concepts and new opportunities emerging from the imaginations of TTO to get our warfighters there faster, to operate without restriction, with unprecedented persistence, and precision.

The challenge will be to integrate these individual technologies into end-to-end systems that can be used in a wide variety of battlefield settings, to provide our soldiers with unmatched strategic and tactical capabilities.

That is our first priority.

I now want to take just a minute to introduce the Tactical Technology Office's team of Program Managers.

They're all here at DARPA Tech and eager to meet with you to discuss their programs, challenges and opportunities to work together.

I encourage everyone to meet and talk further with our Program Managers.

There are plenty of formal and informal opportunities to do so throughout DARPA Tech.

Visit them at our exhibit in the main hall, stop them in the hotel or set up an impromptu-meeting with them.

Let me close by saying the legacy of the Tactical Technology Office has been fueled over the decades by the capacity of our imaginations.

Our ideas have manifested themselves into advanced technologies and systems that have distinguished the modern U.S. military from all others.

To assure that future generations of soldiers, airmen, sailors and marines are equipped to succeed whenever and wherever they are called upon, none of us in this room today can ever stop dreaming and asking the “What if” questions.

We owe this to the brave men and women who defend our country each day.

Thank you.

I now want to introduce our next speaker, Tom Bussing.

He joined the Tactical Technology Office just last month, and will talk about some ideas on “getting there faster,” Tom...