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Teleprompter Script for Dr. Mark Davis, Deputy Director,  
Information Exploitation Office**

Space to the Trenches

» **MARK DAVIS:**

As you have just heard, our mission is to find the bad guys any where on the Planet, at any time, in any environment, to provide support to the warfighter.

Now let me put this all together in a vision of **Information Fusion** in support of our **expeditionary forces**.

With the rapid development of new sensors, high performance computing and netted communications, we finally have all of the tools to meet a 20 year elusive goal.

We plan to give combat troops, in a hostile and unfamiliar world, a rapid update on the threat position and its capabilities.

I will be outlining our early thoughts on this exciting new capability.

If you share our vision, and want to talk with us more, you can contact us through the IXO Broad Agency Announcement.

Today we bring all of the surveillance and reconnaissance data back to a central clearing house, analyze the data and send new information on a consistent ground picture back to the Tactical Operations Center.

This center is usually **not in the middle of the fight**, where the information will do the most good.

Most importantly the time it takes to collect the data, ship it back to a safe location and analyze it is too long to support the action on the ground.

To illustrate this important point, let's consider a **rapid reaction concept of operation**.

In today's world, an asymmetric threat can pop up anywhere on the globe, and our Expeditionary Forces need to move out immediately.

They need to get their orders as they transition to the remote geographic location.

Better still,  
they need a picture of what they will encounter when they get there.

Often the geography is a new region of the globe where we lack historical data on the terrain and the local population.

Commercial satellite based programs, as good as they are at providing worldwide images,  
will only give us a dated picture of the area.

And as you have just heard, IXO has projects to rapidly Model the Planet, with tools that provide an early strategy for entry into the theater.

These capabilities will allow the unit commander to **start the planning for entry** of the units.

But it doesn't give the details on buildings and obstacles -- and more importantly where the threats might be hiding.

The local combatants will be in small bands hidden in the trees, in the mountains or within the civilian population and structures.

We need the capability to observe, **track and inform our troops on these threats as soon as they land** in these hostile environments.

We may land on the beach, in a clearing or behind a mountain.

As the Prussian General von Moltke once said "No plan survives contact with the enemy."

It is essential that the units obtain an immediate understanding of the local situation, without giving away their tactics or objectives.

You have seen we are developing several sensors that allows us to see at night, see into and under the forests, and even see into buildings.

Our vision is to harness the power of these new sensors and fuse the sensor data with an assessment of threats on the ground.

With today's rapid development in processing capabilities, we can present a real time update to the troops.

The challenge is to discover and anticipate the adversary and give that information to our troops before the threat can react.

The expeditionary unit will immediately assess the local terrain and understand where their brethren are located.

This will be accomplished by methods that have been tried and true for small unit operation.

New technologies are being developed by the Army and Marines that allow them to conduct distributed operations in both rural and urban environments.

Our vision is to allow them to see beyond their immediate horizon – behind the hills, the forests and even behind the walls of the urban landscape.

Our new sensors will provide them an update to their maps, their plans or their coordination.

We will see sensors that can detect vehicles and troops under the trees and in other hide locations.

Most likely sensors will be flying on remotely piloted vehicles.

Some will be at high altitude to track threats from a distance.

Some are on low level vehicles to provide a close-in look to confirm location of the threats.

But we will not be able to immediately tell whether they are hostile or neutral threats.

By combining the sensors with the observation of troops on the ground, we will be able to discriminate threats from civilians or cue other sensors for further confirmation of the threat identity.

This fusion of data must provide each platoon or squad information that they can use to conduct their mission.

More importantly that information must be trusted and easily understood by the units on the ground.

So we see a soldier on the ground who can communicate by easy tools that says *“I am here, what threats have you seen within the last 10 minutes that may detract me from my objective, where did they come from, and should I engage them or avoid them”*.

Where does that communication go, and how do we present the actionable combat information to them with the least distraction from their mission?

We are developing that concept and the enabling technologies today.

We are developing fusion technology to allow stitching together layers of intelligence, surveillance and reconnaissance collections – from space to airborne to surface assets.

We will utilize the network centric warfare capability being developed by the Services.

Our challenge is to rapidly discover the new information and feed it back to the troops on the ground.

The inputs to the process include:

\* Satellites that are taking pictures over a very wide area.

That information can tell what has changed since the mission planning started and where critical units have moved within the past hours.

\* High altitude UAVs can loiter over a campaign for hours at a time, detect and track movements in a wide area and provide an update within several minutes.

High value threats can be tracked from known safe houses and remote bases, into the local area.

But the best this source will be able to provide a synoptic view for threat sector location.

\* It is the local troops on the ground and their organic sensing capabilities that will provide the detailed view -- 'up close and personal'.

We need to get their information collected and correlated with the synoptic view of the area.

By both processing and analyzing the data within the theater, we can get accurate and timely discovery of the rapidly changing environment.

Because we are relying on network communications between the units and the commander or coordinator, we need to limit the bandwidth of the communications.

One concept that has been of interest is to use one of the UAVs as a communications and command and control relay system to the troops on the ground.

If we collect the data from the high altitude sensors, receive the local situation from local eyes and ears on the ground, and rapidly fuse the information to determine the threat movement, the warfighter can be given rapid updates on the threat position and intent.

This drives us to more onboard processing, better data fusion algorithms, publish and subscribe use of the Global Information Grid, and application of intelligent processing agents to rapidly present the information to the warfighter.

In addition, we can utilize much of the technology DARPA developed on Command Post of the Future to provide a remote coordination and assistance to the troops in the fight, and keep their eyes on the target rather than down in the computer screen.

This vision drives us to the need for new data collection technologies, new exploitation algorithms, and information discovery technology to recognize threat patterns and locations.

It also utilizes the soldier radio more effectively by relieving it of high bandwidth communications over long distances.

Our vision for the future of Information Exploitation for the small units in the field is to provide a rapid update to the tactical scenario, based on fusion of high altitude sensing with local persistent observations to counter a rapidly evolving enemy.

The DARPA Information Exploitation Office is looking for your ideas and advanced concepts to make these visions a possibility.

If you have seen our vision during these past talks, and have recent technical advances that will help us bring the vision to reality, we have established the mechanism to work rapidly to Bridge The Gap.

What you will see on the screen now is our Web Portal to the Office Broad Agency Announcement.

Please send us White Papers on your well thought out suggestions.

We want to start the dialog to give the warfighter the best capability that the country can provide.

And now I'd like to ask the rest of the IXO team to join us on stage.