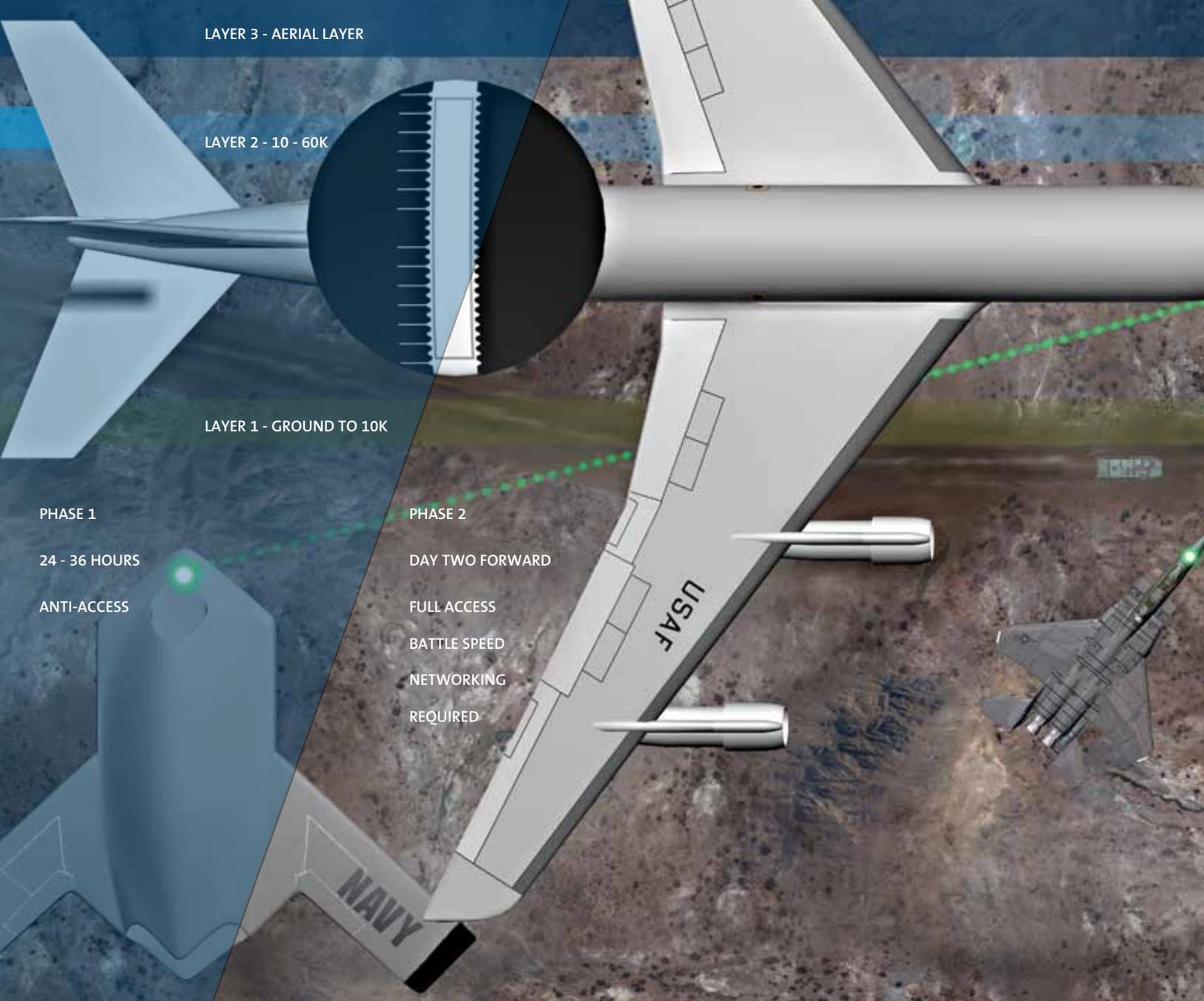TACTICAL TARGETING NETWORK TECHNOLOGY

Dynamic, robust waveform enabling NetCentric communications for today's warfighter.

Rockwell
Collins

Building trust every day

LAYER 3 - AERIAL LAYER

LAYER 2 - 10 - 60K

LAYER 1 - GROUND TO 10K

PHASE 1

24 - 36 HOURS

ANTI-ACCESS

PHASE 2

DAY TWO FORWARD

FULL ACCESS

BATTLE SPEED

NETWORKING

REQUIRED

USAF

NAVY

Meeting the rapidly changing IP networking needs of today's irregular battlespace.

It's day two of the offensive. First strikes by stealth fighters, bombers and UCAVs have been a success. The enemy's infrastructure is destroyed. With their communications cut off, the remaining pockets of enemy forces are left to fight on their own.

This lack of enemy coordination makes extremely fast, flexible and reliable IP networking communications between U.S. and coalition forces even more valuable to commanders to ensure our forces capture and control the irregular battlespace.

While in many instances satellite communications (SATCOM) has become the go-to remote networking and communications delivery technology, the question is: what do you do if the satellite goes down?

In today's irregular battlespace, knowledge and the effective communication of that knowledge is often the warfighter's greatest resource. Our forces cannot afford to be disconnected from valuable information.

Today's military commanders need a reliable, masterless, ad hoc, line-of-sight IP networking solution that can handle the vast amounts of data critical to establishing a clear and maintainable advantage over the enemy.

"N-UCAS experience with TTNT has totally changed our understanding of what we need and what capability is available."

NAVAIR presentation to AFCEA International

TTNT's high throughput enables large amounts of voice, video and data to be shared at Mach 8 speeds among aircraft, UASs and ground forces.

TTNT. The low latency IP-based waveform that delivers the fastest mesh network to the tactical edge.

Rockwell Collins Tactical Targeting Network Technology (TTNT) is a Joint Tactical Radio System (JTRS) modern networking waveform. TTNT delivers signal in space spectral efficiency enabling low latency, on-demand ad hoc IP networking between aircraft, ships, weapons and ground forces.

In short, TTNT creates a secure meshed network that can deliver megabits of voice, video and data at speeds up to Mach 8, without the advanced planning required in Time Division Multiple Access (TDMA)-based options while eliminating the single-point vulnerability of SATCOM systems.

TTNT enables secure wireless network connectivity that requires no pre-planning. Advanced transceiver technology links TTNT nodes dynamically and allows for rapid addition and subtraction of platform participants while maintaining tactical edge network stability.

TTNT enabled aircraft, UCAVs, UASs, ships and ground vehicles automatically enter onto the network whenever they come within line-of-sight range of another TTNT enabled node.

This masterless self-healing networking capability ensures that even if a platform node is lost or leaves the area, the network remains active for all the other users.

The bottom line is TTNT is a proven and mature system that has the unmatched capability to instantly and accurately share vast amounts of secure voice, video and data throughout the entire battlespace. It is the flexible and reliable information sharing that commanders need to optimize advantages and make quick strike decisions.

Speed kills – the enemy.

TTNT's dynamic networking flexibility is only one of the many unique benefits it brings to today's irregular warfare scenario. This high-throughput, robust military waveform complements its flexibility with unparalleled transfer speeds so information latency is never an issue.
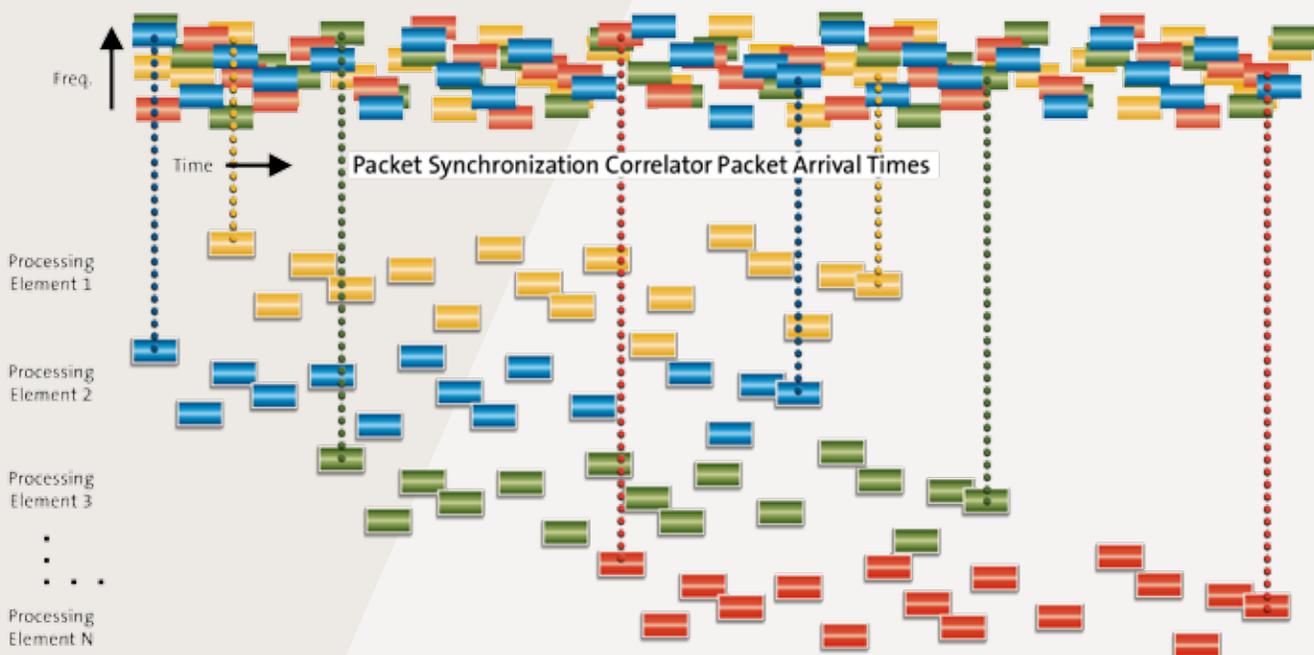
How fast is it? Doppler estimate supports TTNT data transfer closure rates at 4,800 knots – Mach 8 at sea level. Tests have also shown that at the strongest signal level data speeds of Mach 12 are achievable.

Of course there's more to a network's value than absolute speed. You also have to measure its effectiveness by how much data it is moving at that speed. In an Airborne Tactical Edge scenario, TTNT's optimum throughput is 10 Mbps of system traffic at a range of 300 nm. That's enough coverage for an area the size of the entire state of Iowa.
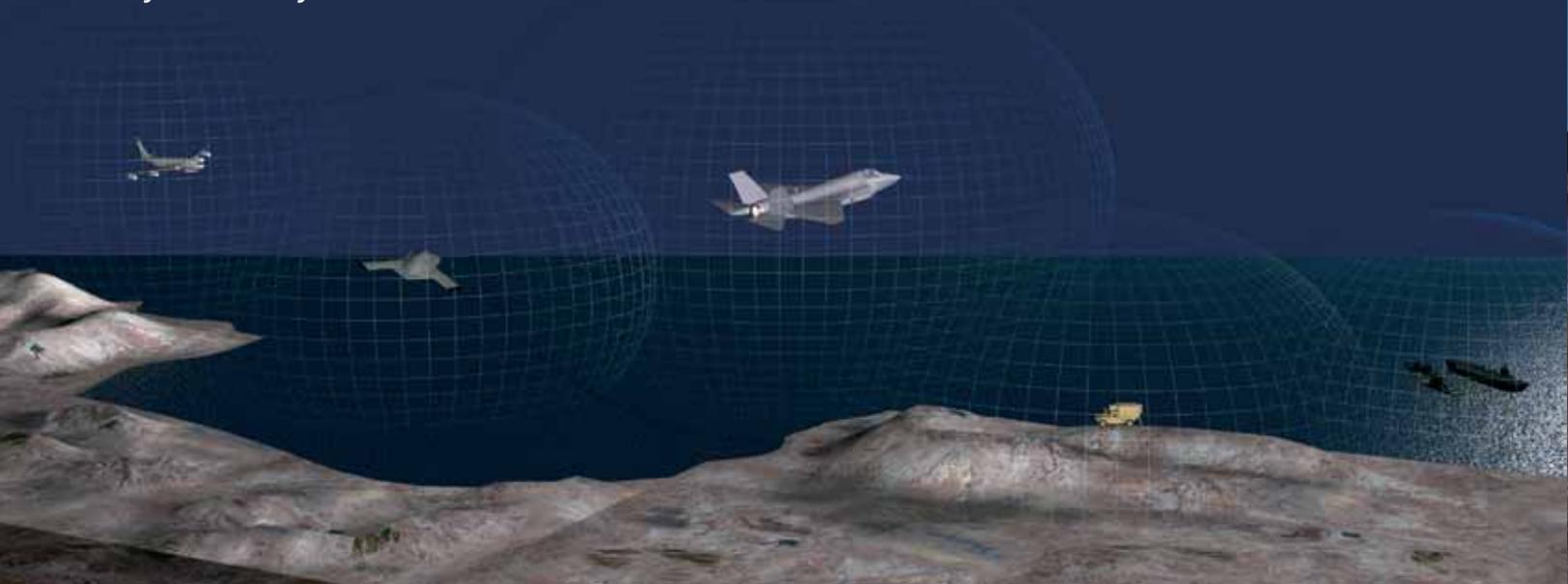
TTNT is not only fast, it delivers video, voice and data accurately. At the heart of this capability is its unique Statistical Priority-Based Multiple Access (SPMA) protocol. TTNT's SPMA maximizes data traffic flow by holding off the transmission of lower priority data until it is needed. This insures that critical information gets transmitted as quickly and as securely as possible. Plus, SPMA also optimizes the network's scalability – TTNT can provide ad hoc networking to more than 200 users at any given time.

Along with the peak performance of the network and stability of traffic offered to any given channel, SPMA also eliminates the burdensome complexity and latency inducing traffic overhead associated with dynamic TDMA type networks.

Multiple streams arrive with unique hopping patterns – *colors represent packets from different sources*

Freq.

Time

Packet Synchronization Correlator Packet Arrival Times

Processing Element 1

Processing Element 2

Processing Element 3

Processing Element N

Relay IP-based layered communication

Dynamic subnets instantly emerge, converge and communicate.

While TTNT is truly a "next-gen" ad hoc networking solution, its open communications architecture instantly morphs to integrate and complement other waveforms currently in use by U.S. and coalition forces including Link 16 and TDMA-based networks.

TTNT equipped aircraft, ships and ground vehicles will enjoy prompt, seamless access to all voice, video and data transmissions. When a familiar node enters the area, TTNT automatically includes it into the network with no action required by the system's operator.

"Exchanging sensor level data in real-time...That's a huge implication when the battle managers on an AWACS can see/use JSTARS sensor data...It could really change the way we employ C2."

AWACS operator during Empire Challenge exercises

To ensure real-time communications within today's dynamic battlespace, TTNT has been tested and proven to seamlessly integrate with a variety of aircraft, ships and ground vehicle platforms including:

> AWACS
> E-2C
> F/A-18
> F-15
> F-16
> B-52
> B-2
> XB-47
> Predator

> GlobalHawk
> Apache
> Black Hawk
> Aircraft carriers
> Cutters
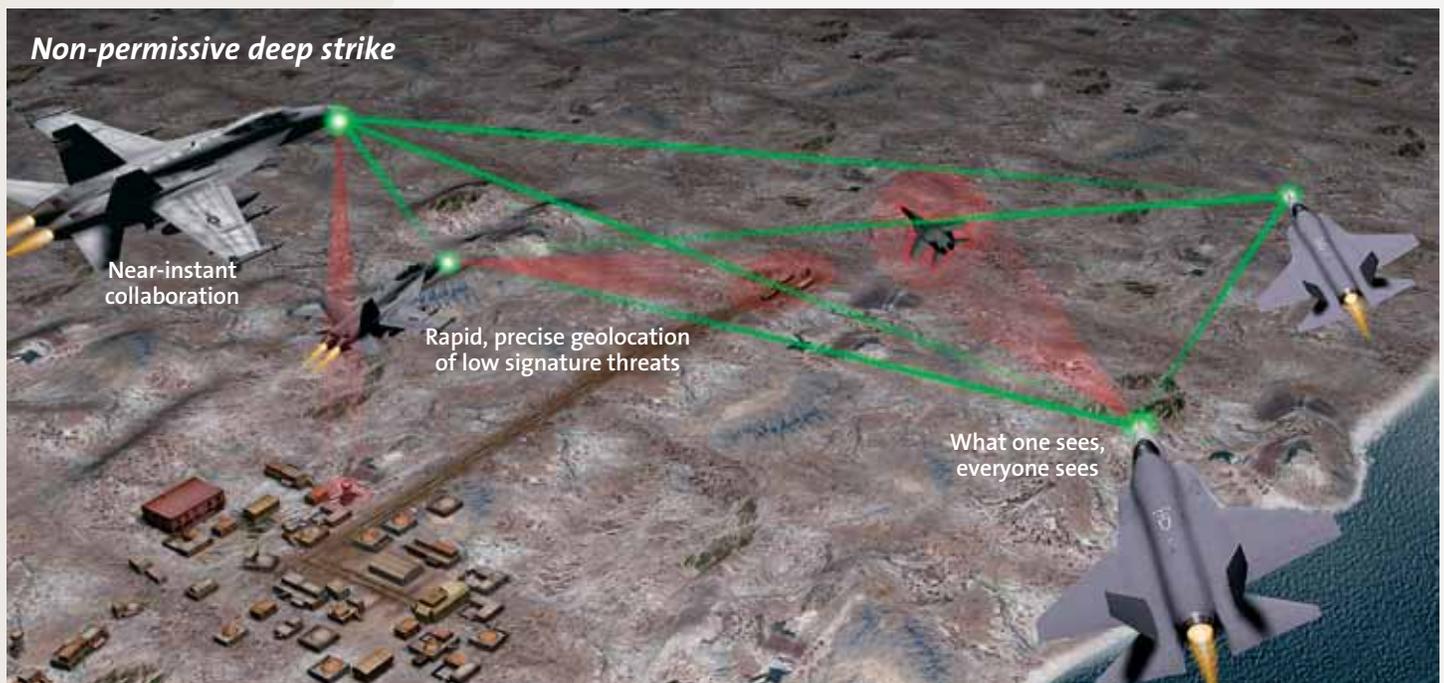> Humvee
> M-ATV
> And many others
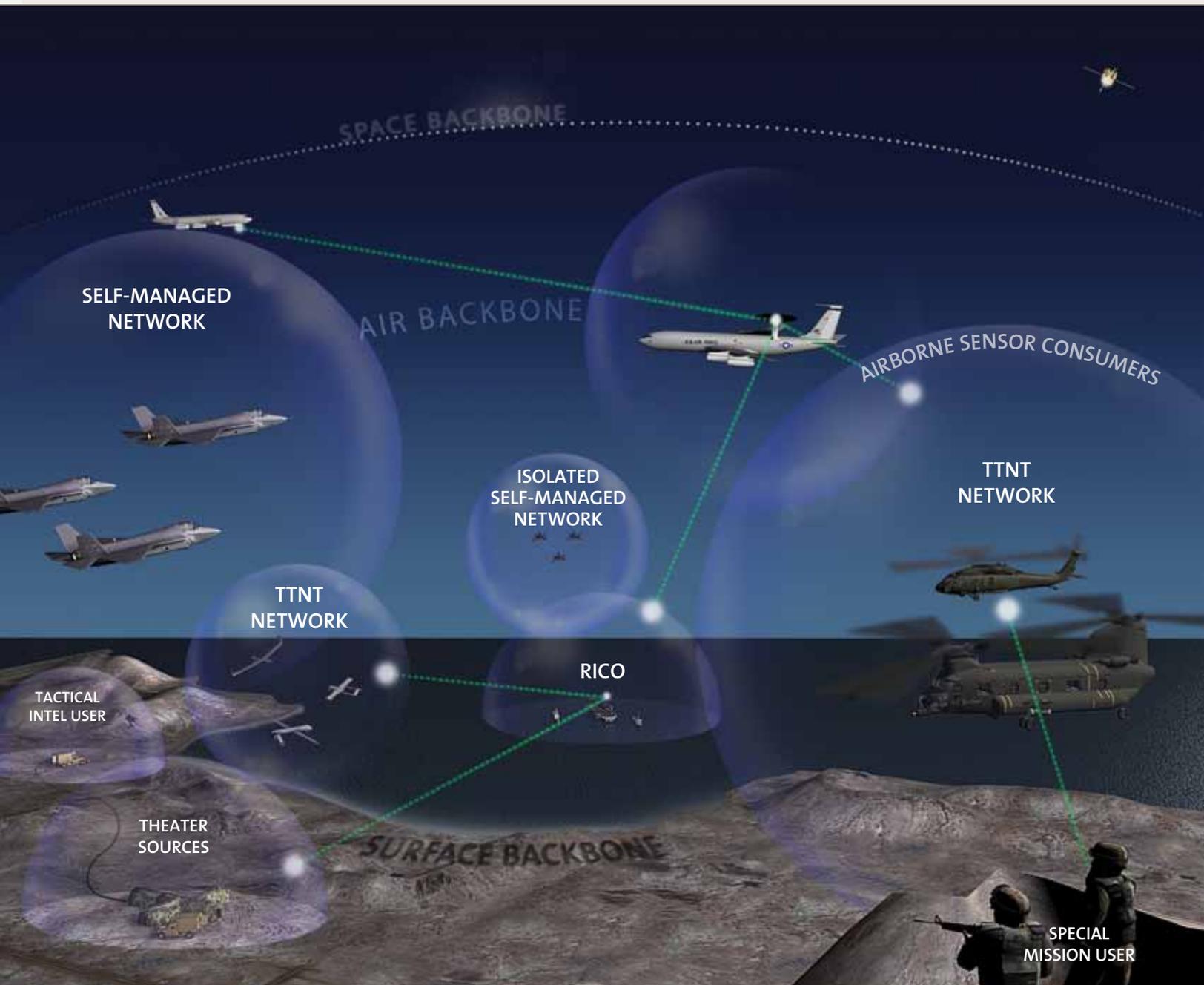
Multiple needs. One solution.

Prior-generation networking solutions were created to meet the needs of very well planned out battle scenarios. Unfortunately, in today's world, our unstructured enemies don't give us the time it takes to plan their implementation and execution.

Whether in the air or on the ground, today's warfighter needs the capability to instantly react to dynamic scenarios that continually unfold in today's irregular battlespace.

Routine aerial patrol missions can quickly turn into coordinated attacks on emerging targets of opportunity. In those instances, all battlefield assets need to be connected with highly secure, real-time voice, video and data.

Aircraft to ground force interoperability

EPLRS
SINCGARS
SRW

Concept was proven during
JEFX 06

Gateways crossband
TTNT and ground forces
waveforms

WIN-T
WNW
CDL
SATCOM

End-to-end
IP construct supports
interoperability

Non-permissive deep strike

Near-instant
collaboration

Rapid, precise geolocation
of low signature threats
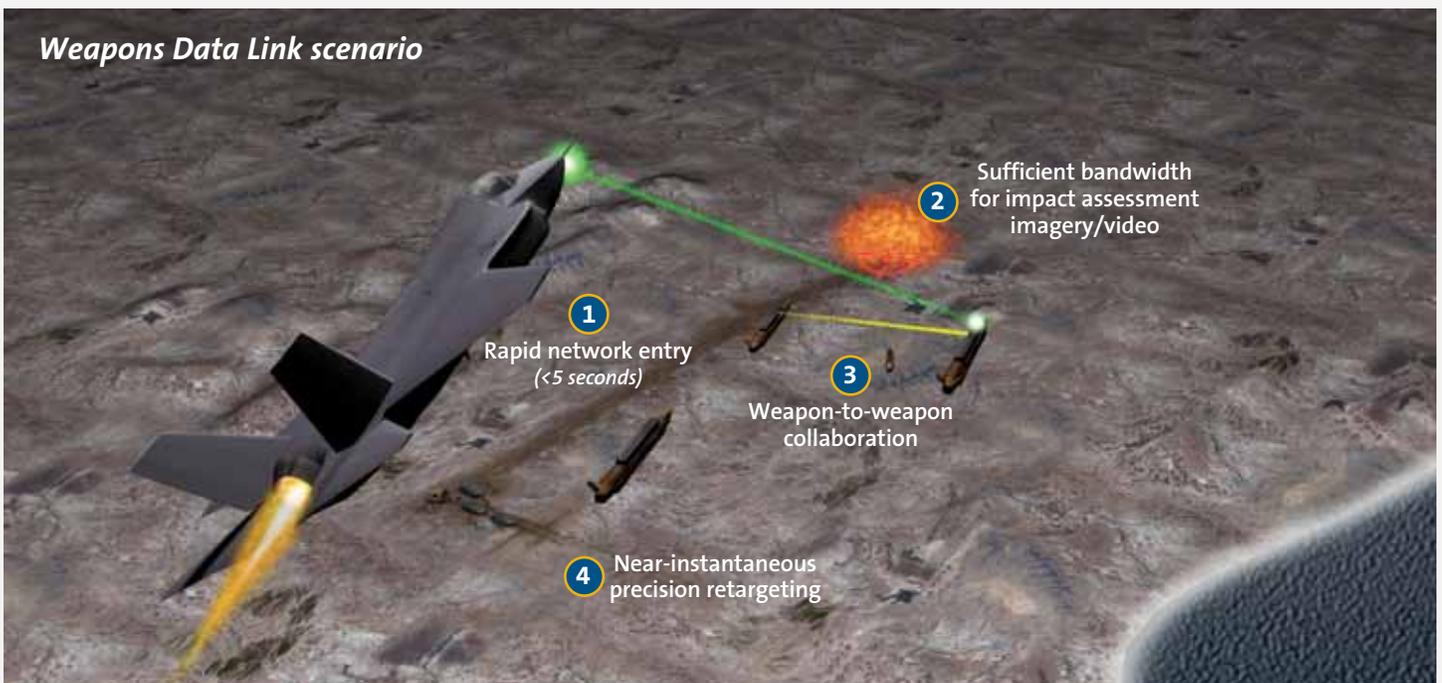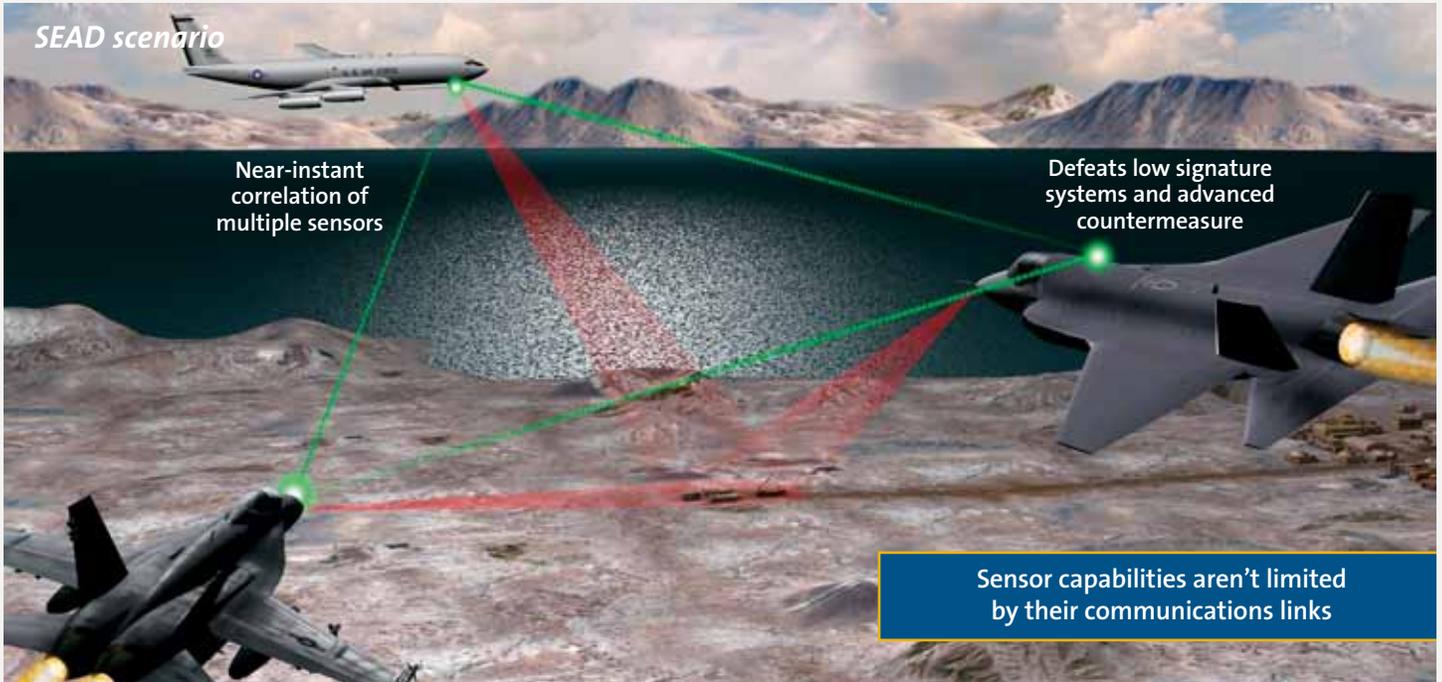
What one sees,
everyone sees

Close air support missions and aircraft from the U.S. and coalition forces need the ability to instantly share information about the target's location as well as the location of friendly forces and civilians.

With its flexible, open architecture and ability to work across a variety of currently fielded waveforms, TTNT gives U.S. and coalition forces the "on-the-fly" networking capability that delivers a coordinated view of the entire battlespace. That kind of reliable knowledge is key to enabling commanders to take full advantage of all airborne, shipborne and land-based assets.

> *"It instantly brings ATO/ACO/SPINS data/changes on board and parses them to our display.*
> *Pretty awesome to see kill boxes flash active and automatically update to your screen — this is a big deal..."*
>
> AWACS operator during Empire Challenge exercises

SEAD scenario

Near-instant correlation of multiple sensors

Defeats low signature systems and advanced countermeasure

Sensor capabilities aren't limited by their communications links

Weapons Data Link scenario

2 Sufficient bandwidth for impact assessment imagery/video

1 Rapid network entry *(<5 seconds)*

3 Weapon-to-weapon collaboration

4 Near-instantaneous precision retargeting

Building trust every day.

Rockwell Collins delivers smart communication and aviation electronic solutions to customers worldwide. Backed by a global network of service and support, we stand committed to putting technology and practical innovation to work for you whenever and wherever you need us. In this way, working together, we build trust. Every day.

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