What I’m going to give you today is essentially an encapsulated information briefing on the Army MOUT ACTD. Just to recapitulate a little bit of what was said yesterday by Dr. Andrews, the objective of an ACTD is to transition items that have military utility into the hands of users.
I don’t even know that I want to talk about this slide after the past day and a half, but I will tell you that these are essentially the three premises upon which the conduct of the ACTD is based. We may have entered the information age, but that does not necessarily give us the advantage during MOUT that it gives us in other environments.
The four explosions are what we’re all about. We seek to improve the operational capabilities available to soldiers and Marines. There are two pieces to this.

I spend a lot of time on the systems focus, those systems that give us the technological edge that will make our soldiers and Marines more survivable and lethal in a MOUT environment. There are tactics, techniques, and procedures, however, that need to go with those systems when we put them in the hands of the user. That is in the spectrum of battalion and below, all the way down to instruction of the individual soldier or Marine.
There are essentially four areas of improvement that the ACTD seeks to address: C4I, engagement (which as an old cavalryman I would describe as lethality), mobility, and force protection (which is really survivability).
We have 32 requirements that we are looking at. They are based on 32 identified deficiencies. You see here how they are broken down. This is clear physical evidence that this is, in fact, a joint ACTD.
These are some of the things that we’re trying to provide for soldiers and Marines. We have done so with varying degrees of success. They include through-wall scanning, individual mobility tools, (mechanical breaching devices), and physical protection. I recently read about the catastrophic injuries that flying debris can cause during MOUT. So that’s something we need to look at. There is also a nonlethal portion of the ACTD. Nonlethal systems are being looked at in the joint nonlethal group. You see the squad radio up there. Combat ID is still a challenge. Intel collection with UAVs and UGVs, and we’ve looked at some other things out there that are off the shelf.
MOUT ACTD
MILITARY OPERATIONS IN URBAN TERRAIN
ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION

TECHNOLOGY CHALLENGES

• Small portable UAV and UGV suitable for employment at platoon/company capable of using interchangeable intelligence collecting payloads

• Soldier intercom able to operate in urban terrain with a “busy” electromagnetic spectrum

• Small hand held device able to see through walls

• Man-portable system to provide the ability to detect mines and booby traps in a MOUT environment

These are where we’re finding our challenges. The UAV and UGV business is currently a cottage industry. There’s an incredible variety of systems out there. We’re still looking at those. Understand, however, when you talk about Marines and light infantry soldiers, they have to carry many of these systems themselves. That’s a challenge when someone presents you with a 200-pound UGV. So portability is a big concern. It is progressing over time. Will it progress to the point where we come up with something that we’ll be able to give to units starting in September 2000? That remains to be seen. We still are in the midst of experimentation even as I speak. We’re going to have to come up with a soldier intercom that can be tailored to the available parts of the electromagnetic spectrum wherever soldiers or Marines are deployed. It also has to be powerful enough for people to communicate between buildings where there’s no line of sight, but not so powerful that they become a target as a result of their transmissions. A small, hand-held device able to see through walls? Probably not in my lifetime. There’s no question that some of these technologies will be available eventually. We just may be in a situa-
The City's Many Faces

...tion right now where we may have to accept partial solutions in order to achieve a degree of success.

I wanted to put up a slide that addresses our experimental timeline. The Marine Corps does something akin to this as well. We’re on the verge of starting Army Experiment 6 next month. The Marines are soon starting Marine Corps Experiment 4 also. We’re on parallel tracks as we look at our requirements. In July and September there will be joint experiments conducted that will provide an opportunity to look at the synergistic effect of all the winning systems together and how they contribute to the conduct of MOUT. We identify what requirements we’re going to look at during the experiments. We look at the doctrinal piece, what the operators need to know in order to use the systems. We have contractors who develop a degree of familiarity with the systems in order to present observations prior to issuing them to the soldiers participating in the experiment. We then actually conduct the experiment and do our reports. OPTEC is the Operational Test Evaluation Command. It’s the Army’s operational test and evaluation agency. They help us in this process. It makes sense because if any of these ever become systems worthy of acquisition, they’re going to be the guys looking at them.
MOUT ACTD
MILITARY OPERATIONS IN URBAN TERRAIN
ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION

ID REGMTS FOR EXP
INSTALLATION RESOURCE REQUESTS
DIV III EXP. LAYDOWN BRIEFING
OPTEC ASSESMENT
INTERIM EXP REPORT SIGNED

E-36 WEEKS
(6 MOS)
E-13 WEEKS
E-6 WEEKS
E-DAY
E+21 DAYS
E+37 DAYS
E+45 DAYS

E-14 WEEKS
E-12 WEEKS
E-2 WEEKS
E+32 DAYS

DBBL RESOURCE CONFERENCE/AMMO FORCAST
"SHOW & TELL"
TRAINING AND DOCTRINE PRODUCTS COMPLETED
DATA REDUCTION DRAFT EXP REPORT COMPLETE
MOUT ACTD
MILITARY OPERATIONS IN URBAN TERRAIN
ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION

The Army and Marine Corps will continue to work together in the future in their joint efforts to better prepare men and women for future urban generations. Some of the near-term major events are shown here.
I’m not going to talk to you about the Marine Corps ACTD program. It really is very similar to that of the Army, and Major Offen did a great job talking about the process. What I am going to talk to you about today is the Urban Warrior AWE [advanced warfighting experiment] and some of its technologies. One thing I’d like to say is that holding conferences such as this is absolutely the right thing to do. We need to talk about these issues, to bring them to the table, to get the people such as General Delk who came forward with his experiences in Los Angeles and the other folks who have come forward with their experiences. We need such forums so that we can make progress in dealing with the urban environment.

Since the collapse of the Soviet Union it has taken the services 20 years to really focus on military ops in the urban environment. We have seen how our missions are migrating to the urban environment,
i.e., Somalia, Bosnia, Haiti, Kosovo, etc. We have always done basic MOUT training, but this has been done primarily at the company level and not in a combined arms manner. Our training facilities were just too small for MAGTF or brigade-level exercises. What we will not have the luxury to do in the future is spend 20 years educating and training our service members on MOUT and combat/HADR in the urban environment. We know that we are going to continue to send our men and women into harm’s way in the urban environment. We want to give them the best training, the best tactics, the best procedures, and the best doctrine that money can buy for our force. We’re doing it today. Just like LtCol Schattle said, we’re putting people into the urban environment everyday.

The establishment of the Urban Warrior experimental area of operations (EAO) took a great deal of time and effort. One of the things I’m hearing here, and I’m very pleased to hear, is that the JRB has come forward with a recommendation to get a joint urban training center. When you try to do something of this nature, you have to coordinate training sites, medical support, security, police, firefighters, communications systems, range control, and all those types of things you take for granted on a military base. It was an incredible undertaking. It took a huge number of man-hours and a lot of cooperation with city agencies, local, state, and national government officials, and so on and so forth. But those are the types of things we need to do if we’re going to put Marines and soldiers in harm’s way and urban environments around the world.

I want to give you Professor Allison’s history lesson, a little 101 about the Civil War. This is about the 1862 Battle of Fredericksburg. It seems that a Union commander by the name of Ambrose Burnside recommended a plan to take Richmond to President Lincoln, but what he’d have to do is go through Fredericksburg, an urban environment, to get there. The President told Burnside “I approve the plan. It will succeed if you move very rapidly, otherwise not.” Well, on November 17th, Burnside got one of his divisions right outside of the town. At that point the Confederates only have a small force in the city. Then things start to happen: a little bit of bad weather, then the river’s swollen, Burnside thinks he needs people, and so on and so forth. Eventually the Confederates and General Lee moved into the city. Almost a month later, the Union forces finally attack. By then, we’re looking at 122,000 Union forces outside the city of
Fredricksburg, but now there are 78,000 Confederates there. Burnside finally does attack on the 13th of December. The Union forces cross the river and sack Fredricksburg. The citizens run in panic, and at that point the Confederates begin to establish defenses at a place called Marye’s Heights in a sunken road. It is the high ground overlooking the city. The Union troops attack. There’s a wall in front of the Confederates and they proceed to slaughter Union troops. Nine thousand casualties on the Union side, a little over one thousand on the Confederate side. That was urban warfare in 1862. Now what do you think any of the casualties on the Union side might have said about their training for urban warfare, about their tactics, procedures, and technologies? They’d probably have had a lot to say. That’s what the War Fighting Lab is about. We’re not about fixing the strategic problems that were talked about yesterday. We’re not even about fixing the operational decisionmaking process that was talked about yesterday by several flag officers. We’re about taking it down to the level of the individual who has to go into harm’s way, because we know we’re putting him there. So what I want to talk about today are some of the technologies that we have been looking into.
Here’s a quote from one of our squad leaders. During our Urban Warrior experiment in Oakland, we found out that the casualty rate, just as is in Chechnya, was still high. We have not solved this problem. But the actual experiment covered the whole spectrum of the three-block war. To address this problem, the Warfighting Lab is continuing to do urban experimentation with small-unit combined arms tactics in Project Metropolis.
Overview

- Phase I: Monterey (13 March)
  - Naval Postgraduate School (NPGS)
  - Defense Language Institute (DLI)
- Phase II: Transition to Bay Area (14 March)
  - Moffett Federal Air Station
  - Concord Naval Weapons Station
- Phase III: SF Bay Area (15-18 March)
  - Embarcadero and Pier 35 in San Francisco
  - Oak Knoll Hospital in Oakland

This is just a quick breakdown on the dates. We found that hiring professional actors helped us quite a bit during Urban Warrior. They were more believable than Marines trying to play civilians. They did a superb job, even to the degree that a few of our coalition force members got hand-to-hand with a couple of them because they were playing their roles so well.
Urban Warrior Future
MOUT Concepts

Urban Warrior experiments based on advanced concepts in seven areas:

- Command and Control
- Mobility/Countermobility
- Measured Firepower
- Survivability
- Adaptability
- Sustainability
- Awareness

Concept-based experimentation: if the concept’s right, then let’s go forward. Back in the 1920s and 1930s, as the Corps was experimenting with the amphibious assault concept, we were told it was folly. We said, “No, it can work.” It just wasn’t being done right. We took the concept and went forward. The Higgins Boat hadn’t been made yet, but we knew the concept was right when we experimented with it. Yeah, sure, Marines fell out of wooden boats and these boats turned over. There were a lot of problems. But eventually we got the right technology because the concept was right. Well, that’s what we’re trying to do here.

Just a reminder: we’re concept-based and we look at future MOUT concepts. These are the seven areas we’ll talk about. I’ll show you the technologies that go into them.
This is the Dragon Fire. It is one technology that has a lot of promise right now. Our NATO allies like it. It’s something you can set up in an urban environment. You don’t have to have men to actually man it. And you can also put it into your system so that C4I can do a fire mission very rapidly, very quickly. The problem with it is that there is no auto loader. So after you fire a round, somebody’s got to go back there and put a round in it. We don’t want it to be that way, so we want to develop the system further.
Something that we recently did during our AWE is link our end user terminal for automatic call for fire to a precision intelligent targeting system. We took it down into the urban canyon to see how well it would work. It had the same problem that any laser does: around all that steel, glass, and other things like smoke it was reflected or its range was reduced.
Tactical ATA (Airborne Target Acquisition)

- Airborne sensor
- Quickly and accurately locates and identifies ground targets
- Rapidly transmits targeting data to direct support units
- Rapid call for fire/adjustment
- Automatic target handoff to weapons platforms
- Targeting accuracy: 20m Circular Error Probable @ 5 km

- Experiments limited to surrogate form (equipment mounted on a helicopter)
- Results very promising both in direct support of small units ashore and commands operating from a sea base
- Requires additional experiments with actual UAV

Airborne target acquisition system: this worked well. We had to use helicopter surrogates quite a bit because we couldn’t fly actual UAVs over the civilian environment due to FAA and civilian safety concerns. It worked well and we think it has a lot of promise.
The cutlass: this is a killer UAV. It can go in and find the target. Aviators like it because it has the potential to actually locate items like anti-aircraft and take them out. You can also use it for reconnaissance missions. We still want to do more experimentation to determine the tradeoff. What’s the cost? Can we afford to have a system of this nature?
Boom Gun

- Crane that has remote control .50 caliber machine gun (with camera) at end of boom
- Uses same weapon mount as Mobile Counter Fire System
- Used for situation awareness and force protection

Boom gun: this idea came from some Marines who suggested we look at mounting a sniper system remotely. We like to take ideas from the bottom up. Remember my example—the 9,000 casualties? The people on the receiving end might have some real good ideas. We like to listen to them. This is one and it does show promise in an urban environment. How do you see up and over things? Well, we mounted a camera and a gun on an elevated platform. Maybe it’s not the right piece of kit yet, but the concept seems right.
Nothing real sexy about this. It works, maybe we need to do better, make them smaller, have more of them. You can reduce the number of people that you need in certain soft-target areas which typically are where you have your combat support elements. You can monitor these systems and reduce the number of people who have to be assigned to security missions. In Mogadishu, a whole lot of Marines and soldiers were always pulling security. We had this big logistics dump down there at the airfield; in fact, there was a period when every coalition force was securing itself around the airfield. It was unbelievable. It got to a point where it was hard to put a plane in there because of everyone pulling security on the airfield. Maybe we can reduce the numbers we need for actions of this nature and then tie into another system that provides rapid reaction. Perhaps we can take the boom gun and use it for reconnaissance. We might well put a night-vision capability on it and so forth.
I said we do things that span the high end to the low end. Here you see a Marine with knee pads and elbow pads. We’ve already found out Marines don’t like the elbow pads. They’re too restrictive. They also think the knee pads need to be designed so as to be more like football pads, where you put the pads inside the uniform so that they’re a little less restrictive. Those are the kinds of things we find out that then help these Marines as they’re hitting concrete, steel, ladders, or whatever as they move through the urban environment. We found out that the uniform does have an IR capability that reduces the signature in an urban environment. That is another benefit that we’re looking at with this type of stuff. One suggestion we got was to make the uniform reversible, maybe gray for urban environments and brown or green depending on where you’re going.
Something that has really been good is this combat decision range. We’ve run a combat squad leaders course that we’ve turned over to our Training and Education division. They are formalizing the course for use in the operating forces. We run squad leaders through a variety of scenarios, and we require them to use new technologies like squad radios and hand-held GPS. It’s good stuff. We are looking at sending it over to Kosovo for our Marines on the ships there.
The Auragen Generator is vehicle mounted. We are using it to potentially solve the battery problem that you have when Marines are using their end-user terminals.

- The AuraGen G5000 is a 5Kw mobile generator that is mounted internal to a HMMWV.
- The G5000 operates at any engine RPM and generates 60 Hz AC power that can run the most sensitive electronic equipment.
- Reduces logistical footprint ashore by providing an organic power source and lighting capability.

• Technology appeared to work well
• Ultimate utility of using current TE vehicles as a substitute for dedicated electrical power devices requires more experimentation
Portable Reverse Osmosis Water Purification System (PROWPU)

- Man portable system
- Capable of supporting 42-man infantry platoon (250 gallons)

• Capability judged to be a promising idea for the support of isolated small units
• Portability requires improvement if intended as a man-packed item—too heavy!

This is portable water purification. The need’s there, but it’s a little too heavy right now. We are currently working with the developer to reduce the weight.
Advanced Surgical Suite For Trauma Casualties (ASSTC)

- A rapidly deployable, modular structure that supports trauma management, resuscitative surgery, ancillary services, and temporary patient holding.

- Equipped with an environmental control unit and is capable of sustaining 25 trauma cases prior to resupply.

- Not employed tactically during UW
- Set up and layout appears to meet the requirement
- West coast units believe Mobile Expandable Container Configuration (MECC) may be a more promising technology for this capability due to its larger physical capacity

Advanced surgical suite, trauma casualties; we used this on the east coast. We had a mobile expandable container configuration on the west coast. The difference is (1) the expandable can be mounted into sea containers, moved on a trailer, and (2) it’s self-contained so you can wipe the floor. The medical people like that because then you can sanitize it.
Scissors Truck

- Provides transportable above-ground sustainment or casualty extraction
- Commercially available
- Works up to 40 feet high

- Truck version only employed during east coast experiments with limited success
- Trailer version used during AWE with some utility
- Requires significant development

This is another one of those things that is not real sexy, but seems to have utility, at least in concept. It provides another way to move casualties out of a multiple-story building and things of that nature, including moving supplies.
MV-22 Compatible Tactical Vehicle

- Internal and external MV-22 compatible
- Highly agile, extremely stable on all terrain
- Can carry 3000-pound payload (Four personnel and equipment)
- 2 variants:
  - Light Strike Vehicle
  - Light Tactical Vehicle

- Assault variant provides a promising solution to the helo transportable vehicle requirement
- Met all mission requirements during AWE
- Logistics variant not used due to its size (not internally transportable)
- Requires additional experimentation to provide valid assessment of tactical utility

This type of vehicle provided us with the right technology solution to our mobility and OMFTS challenges.
GATOR

- Provides mobility on surface, subsurface, and structural layer of the urban battlespace
- Provides a resupply capability to the MAGTF
- Commercially available with proven logistic support

• Very successful employment during east coast experiments
• COTS vehicle may require improvements for military employment

Gator: you may have seen this already on one of the previous slides. We use it for moving our supplies, logistics, for medevac, and so on.
This is one we’ve had success with. From 20 nautical miles off the coast we actually took a mannequin and moved it as a mock casualty back to the ship. It shows a lot of promise for a variety of missions and payloads.
Here's our experimental combat operation center. A lot of what we do is C4I; we’re looking now at how we do that from a forward base. We conduct over-the-horizon communications from the ship. Here is a picture of the ECOC in the sixth deck of the USS Coronado. We also put a smaller deployable ECOC forward in the littoral battle-space ashore.
Integrated Marine Multi-Agent Command and Control System (IMMACCS)

The centerpiece of the experimental C2 systems is the Integrated Marine Multi-Agent Command and Control System (IMMACCS). IMMACCS attempts to demonstrate the utility of a comprehensive suite of automated decision support tools designed to interact as a whole. An innovative aspect of IMMACCS is the cutting-edge, multi-agent software which interacts with real-time information to provide the commander and his staff with useful “knowledge” about the battlespace.

- As a proof of concept, worked extremely well
- Requires significant refinement to assess its full operational potential

IMMACCS: we’ve developed this in conjunction with several other agencies. The Joint Propulsion Laboratory with NASA is looking at this as a potential technology to help with the mission to Mars because one of the things that we do is have agents interact with one another in the battlespace. These agents actually can tell you something about the battlespace. Maybe there is a church on the other side of that hill where you thought you were going to fire an artillery mission. The agents can be set for an ROE alert and pick the fire mission up, alerting the commander/watch officer and shooter that this is an ROE problem.
Geospatial Information Database (GIDB)

- Enables the MAGTF to access national geospatial databases and build digital mapping "views" needed in the ECOC and EUTs
- Totally digital architecture for delivering mission-specific geospatial data from the producer (NIMA) to the MAGTF and its subordinate elements

- Promising technology
- Successfully linked SPMAGTF(X) to national data bases and provided products that were translated into the IMMACCS object data base.
- Requires more experimentation to fully explore its potential

IMMACCS uses this. We need a digitized map system so that we can make sense of the symbols and graphics, and then we send it down to the individual squad leader who has an end-user terminal. We want to give him the appropriate information that the commander needs him to have for mission accomplishment.
GOSSIP (Ground Observation Special Support Intelligence Program)

- Provides radio identification of personnel placed on specific lists
- Based on “GangNet” software used by the LAPD and California Highway Patrol to track urban gangs
- Totally compatible with IMMACS and available to any EUT

• Achieved full integration into MAGTF C2 architecture
• Operators proficiency problems demonstrated the need to simplify or to devote more training time to equipped units
• Requires further experimentation in tactical scenarios

This one that could be used now during riots by organizations such as the LAPD and the California Highway Patrol.
Multi-lingual Interview System

• Technical success during AWE both as a means to deal tactically with local populace and for enhancing medical care to foreign language speakers
• User interface aspects like the audio output and controls require refinement

– Hands-free operation using voice-recognition
– Resulting native-language speech can direct action or obtain a “yes or no” response

This was a big success. We want to keep using it, especially for medical cases and as an interview system in instances where you grab somebody who you may not be able to initially identify as friend or foe.
Digital Automated Field Terminal

- Platoon commander’s EUT suite
- Standard load-bearing vest modified to carry the following:
  - EUT Libretto 100 palm top computer
  - Wireless LAN 2 (Antenna on his right shoulder)
  - Differential GPS (Antenna on his left shoulder)
- Total weight is less than 12 lbs
- Provides individual instrumentation package

- Limited use of this and the individual EUT during East Coast experiments
- Limited technical success achieved during AWE—full digital connectivity with IMMACS
- Systems improvements and additional experimentation are needed to fully develop this capability and assess its impact

This isn’t what we want our Marine of the future to look like, but that’s the individual GPS radio system. He’s also got another radio system, his end-user terminal. Of course, if he fell forward to dodge a bullet, he’d crack that thing. This isn’t what we want. Again, it is the concept that is key; we’re going to move forward with this. We’re getting great ideas on how to change what this looks like.
### Tactical Instrumentation

- EUT and IGRS provided combined instrumentation
- Technology proved promising: worked better during later stages of the AWE once user procedures were refined
- Additional functionality, e.g., life status, would greatly enhance tactical utility
- Significant enhancement to training/analysis efforts

- Real-time continual tracking of all personnel
- Integrated into existing C4I systems
- Indoor/outdoor
- Potential operational application

Tactical instrumentation: we were able to instrument the buildings and Oakland Hospital during Urban Warrior so that we could see where everyone was. Individual GPS radio systems showed where the friendly, enemy, and role players were. We had boxes inside the buildings. These boxes sent signals to show people moving because GPS doesn’t work inside buildings. We think there is a possible tactical use for these boxes. As you go in and clear a building, you could leave the boxes behind and monitor them; if someone went in and broke its wire, you know that you have an intruder.
Joint Conflict and Combat Simulation

- Newest USMC high-resolution model
- Provides details of urban terrain
- Level of resolution well suited to supporting MCWL experiments
- Planned technical integration with instrumentation system

- Integration of JCATS and C4I system during AWE permitted expanded CTP
- Interior building instrumentation used to track combatants inside buildings
- JCATS generated enhanced operational level play by introducing additional constructive forces into the scenario
- JCATS provided computer-based resolution of indirect fires to live forces

Here’s a picture of what we saw in JCATS: the red, the blue, and the neutrals. It gets updated about every 2 minutes. You could actually see individuals moving across the screen.
We talked to the aviation somewhat already. We could not do a lot of fixed-wing aviation in Oakland, so what we did is put it all into our Yuma exercise for June 1999.
Summary

- MCWL analysts will reconstruct the experiment data to glean information and develop knowledge
  - analysts accompanied troops in battlespace
  - subject matter experts were in every part of the battlespace
  - debriefing of participants was done on-site immediately following each evolution of the Experiment Plan
- Report due in June 1999

This gives you an idea of what we're going to be doing and what we have already begun. The final report will be due in June 1999.
Urban combat problem is not solved

- Physical and psychological challenges of modern, steel and glass highrise buildings require special—and repeated—training
  - not easy to apply existing and emerging TTPs without focused training
- Use X-Files to get word to operating forces
  - as information is inserted into the Combat Development System

I'll be honest with you. We haven’t solved the problems associated with urban combat. That’s a bloody one; it’s hard to solve. If it were easy we’d probably already have done it. We’re going to keep working it.
This is what it’s all about. We want to prepare Marines, soldiers, airmen, or sailors to do the mission that their country’s going to give them.
My name is Sean Edwards and I am a doctoral fellow at the RAND Graduate School of Policy Studies. My brief presentation this afternoon is on tactical communications in MOUT. I want to do this from a policy perspective. Although I touch upon technical terms and concepts, I leave most of the technical subject matter for the communication engineers among you.

By the way, my own experience with communications is limited to my fond memories of humping a AN/PRC-77 around for my company commander when I was a light infantryman in the Army. I think I speak for all infantrymen when I say size does matter.
In the next ten minutes I have two objectives: to outline the basic challenge inherent in wireless communications for urban areas and to note ways to alleviate the problem.

First, let’s look at the demand side of the communications challenge.
As you know, the Army and the Marine Corps are seeking to provide situational awareness for their combat formations. The problem is, this may not be possible in difficult environments such as sewers or deep inside multi-story structures. Because of this, we need to approach the problem from the demand perspective as well as the supply perspective. Think of it this way: communications resources must supply the information and data that warfighters demand, while that demand for information may sometimes need to be adjusted to the technological limitations of supply. Demand can be adjusted in several ways:

- **Information quantity**: How much is enough? Do you need location and status? A balance should be found between providing the soldier too much information—information overload—and too little information, which would fail to exploit the ongoing information revolution.

- **Information type**: Does the soldier need text? Voice? Still imagery? Video?
• **Information destination:** Who needs it? Not every command echelon has the same information demands. Whereas a battalion commander may find a real-time video teleconference with his company commanders a useful capability, a fire team leader in charge of clearing the floor of a building probably only needs voice and positional information.

• **Information timeliness:** Does the information really need to be real time?
Challenges on the Supply Side

- Propagation
  - Radio propagation problematic because of path loss and fading
- Hardware limitations for man-portable radios (size, weight, power)
- Communications security
  - Detection
  - Exploitation
  - Interception
  - Resistance to Jamming

We talked about demand; now let’s talk about major challenges on the supply side.

First, in an urban environment, wireless communication suffers from path loss and fading. Transmitted signals are blocked, reflected, refracted, and defracted as they travel through and around buildings, walls, and floors. Received signal strength drops, which also lowers throughput.

Second, MOUT is largely an infantry fight, so most radios must be man-portable. Hardware size, weight, and power (read batteries) are a challenge.

Third, communications security and resistance to jamming continue to be major concerns, especially when one discusses the possibilities of commercial-off-the-shelf (COTS) systems. Warfighters are concerned with:

- Low probability of detection (LPD), which is keeping the enemy from knowing that friendly units are transmitting.
• Low probability of *exploitation* (LPE), which is keeping the enemy from fixing friendly unit positions.

• Low probability of *interception* (LPI), which is keeping the enemy from knowing what friendly units are sending.

• Resistance to jamming.
I already mentioned that fading and path loss are the most difficult propagation problems.

Fading, which is variation in received signal strength, occurs for several reasons. Fading (multipath) occurs when direct waves and reflected waves from the same signal arrive at the receiver from different paths and at different times (out of phase) and are subjected to destructive interference. Basically, fading occurs when radio waves from the same signal reflect off of obstructions and interfere with each other.

Path loss occurs when radio signals are attenuated as they pass through or around walls, buildings, and objects in the channel. Energy is absorbed or reflected as it passes through objects. Path loss is a term used to quantify the difference (in dB) between transmitted power and received power.

For cellular frequencies, private firms have conducted field experiments to measure path loss. This kind of information is usually proprietary, but some studies have demonstrated the relative path losses
for various environments. For example, building construction materials, building age, wall locations, ceiling heights, and the like all affect path loss. Major obstacles include steel slabs, metallic pipes, and ventilation ducts. Concrete is worse than brick, and brick is worse than limestone. Floor level also matters. For example, middle floors are the best when building penetration loss is the concern and other tall buildings are adjacent. More windows help radio propagation.
Given these challenges, what are the wireless options available?

SINCGARS is the current tactical line-of-sight (LOS) radio. It is already a part of the Tactical Internet, has good security, and has a range of 5–10 kilometers for man-portable sets.

LOS microwave radios have a higher data rate, but the antennas are too bulky for dismounted deployment.

Cellular phones and satellite-based PCS phones are usually seen as an attractive option. The Chechens used them in Grozny and the Somalis used them in Mogadishu. Satellite phones offer a mobile user the option to uplink to a satellite whenever a ground base station is unavailable. There are several problems, however:

- Cellular telephone systems require a fixed infrastructure of base stations and land lines which could be vulnerable in a firefight;
- Neither cellular nor satellite-based PCS phones have high data rates;
• They are to some degree incompatible with existing military systems; and
• Most important, both types of phones have poor security and are easily jammed.

Since commercial firms try to maximize profit, they use the most economically efficient waveforms available and do not worry about jamming. Waveforms with high anti-jam and LPD characteristics are to some degree incompatible with high spectral efficiency. They end up sacrificing security for greater spectral efficiency (bits per second per hertz).

The packet radio is a promising alternative. A network of packet-switching radios can exchange information in a store-and-forward fashion, so that the source and destination radios do not need to have unbroken LOS (unlike the systems described above). There is currently no packet radio available, but one may be available in the near future.
Objectives

- Outline the communications challenge in MOUT
- Note possible workarounds and solutions

Now that I have outlined the basic challenge, I want to suggest some doctrinal and technological options that might help alleviate the communications problem.
The first four options are technologies that will help supply more information to the warfighter. These include the software radio, retransmitters, ultra-wideband signaling, and array antennas. The fifth suggestion is doctrinal: adjust tactics to lower the demand for information.
The software radio (also called wideband or transforming radios), is a packet switching, non-LOS radio that uses software applications to perform some of the major communications functions that analog components do in current radios.

Software radios can be thought of as having “multiple personalities” because they will be capable of jumping between frequency bands as necessary to maximize performance in restrictive environments. A smart version of the radio will optimize modulation, frequency, and power level to best suit the environment and desired security. The same radio might have three primary bands of operation: VHF band (30–87 Mhz) and two UHF bands (for example, 225–450 Mhz and 450 Mhz–2 GHz).

For example, if a soldier finds himself in a room, surrounded by wooden walls containing chicken wire, the soldier can switch from VHF to a higher-frequency UHF signal with shorter wavelengths capable of squeezing through the gaps in the wire. If he wants to go
outside, he can switch back to a VHF signal that will propagate more effectively around buildings in the urban canyon.

The new software radio will be compatible with new waveforms (modulation and error-control coding) that haven't been invented yet.
Retransmitters, or relays, can add communication nodes to a radio net. Relays can be mounted on buildings, aircraft, UAVs, vehicles, or dismounted soldiers to establish communication between units that are not necessarily in LOS. It may even be feasible to air deploy relays to building tops.

DARPA is investigating a drop off attritable relay compatible with SINCGARS and the future software radio.
Ultra-wideband signaling is a promising new technique that is more covert, hard to jam, and fades less.

Ultra-wideband (UWB) signals are more covert than narrowband signals because UWB signals are spread across a larger band of frequencies than is required for normal transmission. As a result, the average power or amplitude in at any given frequency is indistinguishable from background noise.

Ultra-wideband signals also do not fade as much because they are time-modulated rather than amplitude or frequency modulated. UWB radio pulses are so short—about 40 million pulses a second—that the reflected versions of the signal do not cause destructive interference (fading).

The wide operating bands of UWB systems make it difficult for jammers to distribute enough energy across all the used frequencies (up to several Ghz in some cases).
Array antennas use multiple antenna elements at the receiver end (with a separation greater than or equal to half the signal wavelength), so that several separate, independently fading signal paths are established between the transmitter and receiver. The received signals can be combined for a stronger signal that reduces fading.
My last suggestion is to lower the demand for information by adjusting tactics, especially in very difficult electromagnetic environments with high path loss and fading characteristics, such as sewers or large multi-story buildings built of steel and reinforced concrete. In areas where wireless radio cannot operate, what you might call “communication dead zones,” tactics may need to be based on zero situational awareness.

Perhaps a more realistic goal in the immediate future is to achieve between-building rather than in-building situational awareness. By between-building situational awareness I mean letting the warfighter know what is going on building-to-building, street-to-street, and block-to-block, not necessarily what is going on deep inside structures. I have displayed the Mogadishu example to make the point that between-building situational awareness can still save many lives. The Rangers and Delta Force commandos who fought in Mogadishu in October 1993 could have used between-building more than in-building situational awareness. Most U.S. casualties occurred during movement down streets and between buildings. They
actually did little room-to-room clearing or fighting inside very restrictive environments like the target building indicated above.

Now, we should keep in mind that there will be communication dead zones in the future—individual infantrymen, fire teams, and squads will continue to be cut off from their radio nets for one reason or another. General Scales mentioned that our enemies will adapt. One thing they might try is to use radio frequency (RF) bombs. RF bombs are grenades small enough to be hand tossed that set off a mini-electromagnetic pulse that can fry communications gear, at least temporarily. “Traditional” signaling techniques and tactics based on limited or zero situational awareness, essentially the tactics we use today, will continue to be relevant for MOUT.

Communication limitations have changed tactics before. Along the western front in World War I, commanders lost contact with their assault troops when they crossed into “no man’s land” because the field telephone system of the day was vulnerable to artillery fire. As a result, when subordinate units went “over the top” they entered a black hole from which no further communication with higher levels of command was possible (except by runner). No communication meant that all coordination between the rolling artillery barrages and the advancing infantry had to be preplanned. All too often the infantry got bogged down for some reason during their advance and ended up watching with helpless horror as their protective artillery barrage “walked off.” Tactics were adjusted to use Very pistols as a signal for artillery support after telephone communication was lost. The history of command in war (and the search for situational awareness) essentially consists of an endless quest for certainty—certainty about the disposition and the intentions of the enemy and your own forces. But as Clausewitz himself explained, uncertainty and “friction” define the very nature of war.
In conclusion, there is hope in some of the near-term technology initiatives, but our soldiers should continue to train for MOUT with tactics based on limited situational awareness.

My contact information is listed here; I look forward to your suggestions or questions if you want to contact me in the future.
Backup Slides
Findings from the Marine Corps Warfighting Lab

• **Data is most useful:**
  – For predefined information (e.g., position reports)
  – For routine information (e.g., status reports)
  – For numerical data (e.g., target coordinates)
  – For rapid (“burst”) transmission of high-volume information

• **Voice is most useful:**
  – When on the move
  – In high-tempo operations
  – For personal communications (e.g., hearing the stress in a subordinate’s voice)

Field tests are beginning to answer these types of questions. Exercises by the Army and Marine Corps provide a starting point for determining warfighter needs. The chart at right is an example of how data requirements differ between unit types. Combat service support units, for example, require more data communication than voice communication.
My name is Lieutenant Colonel Bob Hahn. I am a member of the Army After Next Project at the U.S. Army Training and Doctrine Command (TRADOC). My primary areas of responsibility within AAN are geopolitics, economics, and coalition operations. For the past two years, I’ve also had the opportunity to serve as the Director of the Army After Next (AAN) Urban Warfare Project. Over the next few minutes, I will provide you with a brief overview of some of the work we have been doing in the area of future urban operations. I intend to address the purpose and organization of the Urban Warfare Project, the operational concepts we have developed for use in the AAN series of war games, and a brief description of some of the weapon systems we have been looking at for use in the urban fight in the 2020 time frame.
Initiatives/Technology Panel Presentations 543

I realize some of you are not very familiar with the Army After Next project. We were created by General Dennis Reimer, the Chief of Staff of the Army (CSA), in early 1996. The purpose of the organization is to provide an institutional process through which the Army can examine warfare in the mid- and far-term future, which for us represents the timeframe from about 2010 to 2025. We are organized to conduct our examination of the future along four major axes: geopolitics, military art, technology, and human/organizational behavior. Each year, with the help of a large number of franchise organizations, we conduct a series of studies, war games, and seminars which we then use to produce an annual final report for the CSA. The 1998 Annual Report was released in December and is entitled “Knowledge and Speed: Battle Force and the U.S. Army of 2025.” It is available in both printed form and from the AAN homepage. We also provide input directly into the R&D and combat development community through the Office of the Deputy Chief of Staff for Combat Developments at TRADOC Headquarters.
The early AAN tactical war games we conducted suggested that many of the concepts, organizations, and weapon systems we were examining did not work as well in highly urbanized areas as they did in more open terrain. In November 1997, we created the AAN Urban Warfare Project to study urban operations more closely. At that time we chose to focus primarily on the operational level of war. We have since expanded the purpose of the Urban Warfare Project to include an in-depth look at operations at the tactical level of war, down to and including squad and individual soldier activities. Most of our study of the tactical level takes place within the context of the Urban Integrated Idea Team (Urban IIT). I will speak more about the Urban IIT in a few minutes.
• **Military Operations on Urbanized Terrain (MOUT):** All military actions planned and conducted on a topographical complex and its adjacent natural terrain where man-made construction is the dominant feature. (FM 101-5-1, 30 Sep 1997)

• **Complex Terrain:** Any combination of natural or man-made terrain, urban infrastructure, and civilian population that negates or restricts the application of advanced technology systems and severely complicates maneuver, interdiction, and battlespace awareness during military operations. (nondoctrinal term)

As you have probably noticed, I used the term “complex terrain” on the previous slide rather than the more traditional term “MOUT.” Complex terrain is a nondoctrinal term we created at the TRADOC Analysis Center (TRAC) at Fort Leavenworth to better capture the entirety of the challenge presented by the large urban expanses we expect to encounter during warfare in the 2020 time frame. While primarily referring to the urban environment, complex terrain can also include other forms of restrictive terrain such as extensive, steep mountain ranges. One of the critical components of complex terrain tends to be the presence of a substantial civilian population. The large noncombatant populations and urban infrastructure that we expect to encounter during operations in complex terrain greatly complicate the operational, logistical, and technical challenges being faced by the Joint Force Commander. In many ways, urban operations will be fundamentally different from military operations on open terrain.
The AAN Urban Warfare Project actually consists of three mutually supporting organizations. The core of the effort is located within DCSDOC, TRADOC at Fort Monroe and includes the primary AAN staff in the Futures Directorate as well as the near- and mid-term urban operations experts in the Joint and Army Doctrine Directorate (JADD). JADD serves as our link to the J-8 Urban Working Group and to the doctrine writers at Fort Leavenworth.

In general terms, AAN franchises provide an in-depth look at specific areas in support of the larger AAN effort. We currently have franchises that examine space and missile defense, special operations forces, information operations, force projection, sustainment, homeland defense, medical support, and urban operations.

The Future Urban and Complex Terrain Operations Franchise is located at Fort Benning, Georgia. The Urban Franchise is an extension of the recently created Combined Arms MOUT Task Force and is focused on developing concepts and organizations for brigade-level and below for future urban operations.
The final component of the Urban Warfare Project is the Urban IIT. Co-sponsored by AAN and the Army Research Lab, the Urban IIT brings together operators and technologists to conduct an integrated examination of AAN equipment, organizational structures, and operational concepts. This year, the Urban IIT spent a great deal of time developing the Future Soldier System with an eye on how that system could be used during urban operations.
This slide lists the major activities and events associated with the AAN Urban Warfare Project during fiscal year 1999. As you can see, the AAN Urban Warfare Project has sought to participate in most of the major activities mentioned by other participants in this conference. The remaining projects we still have ongoing for this year are the AAN Spring War Game and tactical excursions, the writing of the Urban IIT final report, and possibly a test of the Joint Conflict and Tactical Simulation (JCATS). We have been working closely with the program manager for JCATS on developing ways to integrate the capability JCATS provides into our existing suite of AAN war game models and simulations.
This slide should help you better understand how we approached the challenge of AAN-era urban operations this year. First, we produced a “Future Joint Concept for Urban Operations” that we have used as the organizing framework for the rest of our study effort. It is based on an overarching AAN concept that we call “Advanced Full Dimensional Operations (AFDO).” We then built a specific organizational structure, the “Light Motorized Battle Force (LMBF),” that we attempted to optimize for urban operations. As do most of the other AAN battle forces, the LMBF includes a combination of aviation, motorized infantry, and fire support assets. The difference is that we sought to combine them in a ratio that we felt was most applicable for urban operations of the kind our operational concept requires. During the upcoming AAN Spring War Game, we will examine the applicability and effectiveness of some of the specific weapons and equipment developed by the Urban IIT. Finally, based on what we learn during the war game and some tactical excursions we are going to conduct later this summer, we hope to be able to identify some
key enabling technologies that we will include in the Urban IIT final report this fall.
I am going to speak very briefly now about the four areas I have just addressed: operational concepts, organizational structures, weapons and equipment, and enabling technologies.

As I mentioned, the concept for urban operations that we developed is based on the AAN concept called Advanced Full Dimensional Operations (AFDO). This slide outlines the four major interrelated functions within AFDO: sensing operations, shaping operations, decisive operations, and sustaining operations. AFDO is our attempt to describe the rapid, simultaneous, continuous, and dynamic application of our integrated joint military capability in such a way as to cause the enemy to concede, disintegrate, or face certain failure. AFDO are made possible through a combination of knowledge, speed, and power. Knowledge is based on a combination of understanding of the environment and opponent before the conflict and the clear, integrated picture of the situation during conflict. Speed is achieved through a combination of knowledge and the physical agility AAN forces will possess. Power is the synergistic momentum
produced by knowledge and speed coupled with the ability to generate sustained lethality.
In addition to AFDO, we also based much of our Concept for Future Joint Urban Operations on the Operational Concept for Joint Urban Operations being developed within the J-8 Urban Working group. Our concept includes six interrelated activities that will likely be conducted simultaneously by the Joint Force Commander. These actions are shape, isolate, penetrate, exploit, consolidate, and transition.

Shaping actions are best described as employing key joint force capabilities to limit the ability of the enemy to use complex terrain to lessen or neutralize our operational advantage in speed, battlespace situational awareness, and precision munitions.

Isolation requires the identification and control of the movement of personnel, equipment, and information into, out of, and within the urban area.

Penetration includes all efforts to gain initial access to the urban area and to establish a force presence within the urban battlespace.
Exploitation is the application of maneuver and interdiction to destroy the ability of the enemy to conduct coordinated military operations within the urban area.

Consolidation actions are those taken to strengthen existing control over the urban area and to prepare for future operations.

Finally, transition is the transfer of routine control over the urban area to local security forces and civilian authorities.
This slide is designed to depict what it looks like when we put all of the various pieces together using a combination of aerospace, naval, and land forces. The joint force is conducting what we refer to as three-dimensional urban nodal operations. Rather than trying to seize a limited foothold in the city and then expand control building by building, block by block, the force is simultaneously attacking critical infrastructure nodes and enemy positions throughout the urban battlespace using multiple forms of interdiction and maneuver. Many of these nodes would be the responsibility of relatively small units that will have extensive robotic and “reachback” precision fires capabilities. The shock produced by this operation would likely cause the enemy forces within the city to disintegrate, thus creating a situation where additional U.S. or coalition forces could be safely brought in, if necessary, to facilitate continued control over the city and establish the conditions required for consolidation and transition.
The Light Motorized Battle Force depicted in the previous slide is just one of five types of battle forces that we have developed for use in AAN war games. As you can see in this slide, we have battle forces built primarily around two different types of vehicle: a 26-ton Future Combat Vehicle (FCV) and an 8-ton Advanced Combat Vehicle. We also use various mission-tailored strike forces and other types of Army XXI forces during our war games. We have a complete description of our battle force designs, organizational structures, and operational concepts available on our Web site.
The primary focus of the Urban IIT this year has been to develop the various components of the Future Soldier System. We have also looked at the challenges of using the aviation and ground systems resident in AAN battle forces within the context of urban operations. These investigations have led us to conclude that much of our ability to successfully conduct small-unit urban operations in the future will require an extensive suite of unmanned systems and small, brilliant precision munitions. We believe that a small unit (company or platoon) equipped with the right combination of robotic systems and reachback fires will be able to control areas of a city that now require a very substantial commitment of traditional forces.

The Urban IIT plans to continue its examination of small-unit operations throughout fiscal year 2000 with an emphasis on the synthesis of manned and unmanned systems at the company, platoon, squad, and individual level. We will also be seeking to identify the specific unmanned systems and munitions technologies that need additional research and development funding in order to produce
the capabilities we believe must be resident in the force for future urban operations.
This has been just a very brief overview of the Army After Next Urban Warfare Project. If you are interested in looking at Army After Next in more depth, please feel free to visit our Web site at the address listed on this slide. The site contains the CSA annual report, all of our current briefings, and specific information about the efforts of the franchises and the integrated idea teams we sponsor. Thank you for your attention. I’ll be glad to answer any questions you may have.
We’ve been discussing various important components of the urban operations challenge (communications, medical issues, etc.). An area that is perhaps underinvestigated—but has potentially high payoff on both offense and defense across the spectrum of intensities—is deception. The RAND Arroyo Center MOUT project has been studying the topic, and we present here a glimpse at our ongoing work.
What is deception?

The box depicts a doctrinal definition of deception taken from the appropriate literature on the subject: Joint Pub 3-58, Army FM 90-2, and Army FM 101-5-1. We’ve altered the definition slightly for breadth, replacing “enemy” with “relevant,” in order to point out the potential utility of targeting noncombatants in addition to principals in the enemy command structure.

Notice what isn’t present in the definition:

1. Offense or defense: Deception may be employed for both.
2. Friendly versus hostile: We should be prepared to counter an opponent’s deceptions, and we may effectively employ deception ourselves.
3. Technology: Deception efforts may exploit technology, but they are not dependent upon it.
While deception operations and deceptive activities are actions in their own right, they are almost always conducted concomitantly with another activity. If history is any guide, deception can prove invaluable.
How does deception work?

The planning process begins with the desired end and maps backward. We begin by asking, “What do we want to accomplish?” and then, “What do we need the target to do to gain that objective?”

Knowing what we want the enemy to do, we then ask, “Who can make that happen?” This is the target of the deception, and we subsequently ask, “What does the target need to believe in order to galvanize the desired actions?”

Once we know what the target needs to believe, we then ask, “What does the target need to see in order to engender those beliefs?” The answer is the story that must be told to the target, and it is told through the means of deception: the classic instruments such as camouflage or disinformation that comprise the deceiver’s arsenal.
This may be glib, but it is a compelling point nonetheless: deception is different in different environments. It takes different forms, requires different efforts, and has different results. The RAND Arroyo Center Urban Operations Team has been considering the relationship between urban terrain and deception, and we have generated six hypotheses as part of our ongoing work on the subject.
How the City *Aids* and *Alters* Deception Efforts

- **Density**: Scope of Deception Is Increased
- **Activity**: ‘Background Noise’ Is Significant
- **Resources**: The Variety and Detail of Deceptions Are Increased
- **Op Tempo**: Decision-Making Is Hastier, Less-informed
- **Population**: Great Difficulty in IFF, Combatant Vs Noncombatant
- **Clutter**: The Edge of Intelligence-Gathering Is Blunted

Essentially, it is our contention that urban terrain both *abets* and *alters* deception in these six fundamental ways.
RAND Hypotheses Concerning Deception & Urban Operations

How the City *Aids* and *Alters* Deception Efforts

- **Density**: Scope of Deception Is Increased
- **Activity**: ‘Background Noise’ Is Significant
- **Resources**: The Variety and Detail of Deceptions Are Increased
- **Op Tempo**: Decision-Making Is Hastier, Less-informed

Given our time constraints, we present a brief discussion on four of them here.
This is the canonical example of high-intensity urban operations, and it serves as an excellent example of how vast deception operations can get. Consider just how enormous the Soviet deception plan was to cover the attack against the German 6th Army. It was successful, as evidenced by OKH records, and gained surprise at all operational levels for the Soviet forces.

We believe that the geography—the urban terrain—was essential in allowing such a massive deception plan to succeed.
At the other end of the urban operations spectrum, we see an interesting lesson in the urban campaign of the Peruvian “Shining Path” insurgency. Shining Path documents indicate that they deliberately sought to cloak their activities in the noisy environment of the city (e.g., was that a bank robbery or what the insurgents would call an “expropriation”?)

The effects of this strategy were that Peruvian intelligence was again and again forced to expand its assets in the city to try and isolate the “signal” from the “noise”.

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**Activity: ‘Background Noise’ Is Significant**

**Lima, 1980–1989**

- Shining Path *deliberately* operating at “sub-threshold” level
- Peruvian intelligence bogged down preparing urban battlefield—doubling and redoubling assets
Consider an urban insurgency campaign as not a loosely linked series of terrorist acts but rather a form of military campaign evolving over time. One such source of material, which we can only scratch the surface of here, is the longstanding conflict in Northern Ireland.

During the urban phase of the IRA struggle against British forces in Northern Ireland, nearly every manner of deception imaginable was used at one point or another, tapping the wealth of resources available in the city. These resources include areas with a friendly non-combatant population!

It is also worth pointing out that deception in a terrorist campaign generally falls into operational levels like a military campaign. At the tactical level, deception aids the execution of terrorist acts (using disguises, diversionary explosions, etc.). At the strategic level, deception embraces those acts within a social/political/legal context (using hoaxes, false-flagging, disinformation, etc.).
Note that the use of deception by British (or Ulster Loyalist) forces is another important and fascinating topic, but due to time constraints is not treated here.
Another illustrative example of deception employed in an urban insurgency campaign is the anticolonial struggle for Algerian independence.

The insurgent FLN force explicitly sought to isolate small French units, reasoning that those units would have less access to intelligence and thus be more gullible. They also sought to operate as rapidly as possible to encourage poor French decisionmaking by unit commanders, also increasing their gullibility.

It is important to point out that (reminiscent of the PIRA) FLN operational plans deliberately sought to operate on friendly ground whenever possible, knowing that the flow of HUMINT would be unidirectional.
One preliminary conclusion reached by the RAND Arroyo Center MOUT project is that these factors affecting and abetting the use of deception in urban operations can apply to all contenders. The classic model would have deception used by the force that knows and/or holds the city, but we believe otherwise.
Preliminary Conclusion

Deception Can Play a Significant Role in Force-Projection

<table>
<thead>
<tr>
<th>US &amp; Allies, 1999</th>
<th>Soviets in Berlin, 1945</th>
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<tbody>
<tr>
<td>• Operating almost exclusively abroad</td>
<td>• Soviets successfully use deception in Germans’ own backyard</td>
</tr>
<tr>
<td>• Very much concerned with reducing casualties</td>
<td>• Soviets expressly use deception to reduce casualties</td>
</tr>
<tr>
<td>• Desiring tactical and operational surprise</td>
<td>• Soviets use deception to gain surprise at the operational and tactical levels</td>
</tr>
</tbody>
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It is our contention that deception can be a very valuable commodity to a force-projection power that desires to keep casualties low in urban operations at a variety of intensities, and whose doctrine calls for tactical and operational surprise even when strategic surprise is forfeit.

We think that the example of the Soviet assault on Berlin in the closing days of World War II is an excellent example of leveraging deception to great effect for exactly those ends.
ANNEX 6: Q & A FROM INITIATIVES/TECHNOLOGY PANEL

Question: I have a question on C4I. Once a close battle in a MOUT environment has been joined, how will command and control at the brigade or the task force level provide a common operational picture? Are you doing anything in that arena?

Major Offen: What we have here is essentially a difference in echelon. The largest force we will look at is a battalion. That will occur both during the second joint experiment in September 1999 and the culminating demonstration in September 2000. We’re not looking at digital systems and how they contribute to situational awareness. It’s just outside the scope of what we’re doing.

LtCol Schattle: We are. The command and control study includes scenarios with a brigade-sized task force, and we’re looking at all of that.

Major Offen: A fair amount of that should come out of the JCFAWE, which is a joint AWE. It will include Marine and Air Force play as well.

LtCol Allison: During our AWE, we had the experimental combat operations center for our command element aboard USS Coronado. During an actual operation we might not put it on that platform, but it would be at sea. We had success passing operational status information from the Coronado to squad leaders through their user terminals. The information is shared but not necessarily common. At the highest level the battlespace is huge. The overall force commander was looking at ongoing actions from Concord Naval Weapon Station to Moffet Airfield. Then we broadened his battlespace using the joint conflict tactical simulations (JCATS) to give him more at the tactical level. Was it all relevant to him? Yes, it was. He responded with faster fires and better support. Do we need to establish more protocol with it? Absolutely. We’re only skimming the surface in the experimentation process. The battalion commander in that battlespace also had his own combat operations center. We have tied those pieces together with the portion of the picture relevant to squad leaders’ needs.
Question: Regarding deception, I was interested and surprised by your conclusions that seemed to indicate that deception could best be used by an expeditionary force. It seemed to me during the presentation that the urban environment is really set up for deception use by the defending adversary. Do you agree or disagree?

Mr. Gerwehr: I would actually say it could be used effectively in support of offensive and defensive operations. However, if you own a city, have knowledge of its terrain, and control its noncombatant population, you have significant advantages if you wish to employ deception. I strongly believe that there is room for the employment of deception during force projection. I tried to sample history in a way that covered the spectrum of intensities, the different kinds of missions, and also to demonstrate both friendly and adversary uses of it.

Question: I have a question on the MOUT ACTD process. It seems to me that you took a look at emerging technology in 1998, 1999, and a little bit in 2000. You had a frozen snapshot in time, and then you moved forward with selected items that you felt might be useful. Technology is evolving very quickly today. How do we avoid taking a snapshot of technology and saying “Well, that’s it folks; we’re going to go with it” when in fact it’s evolving very quickly and we should be continuing to seize those golden nuggets on the path toward 2025?

Major Offen: I would say that the entire ACTD process is an effort to do that, to make an effort to shorten the acquisition timeline. Granted, we are sort of taking a snapshot. LtCol Allison, my Marine counterpart, described this as the noncommissioned officer’s ACTD. We have a fair number of very low-tech items that won’t age as rapidly as some of the more high-tech systems. I think that regardless of the rate at which they age, there will be insights gained.

Question: I guess that was what I was trying to get at. It’s not so much what might be available right now, but to avoid exactly that, to avoid having a guy run around in 2015 with what was great technology in 2000. We need to develop a process that keeps bringing this stuff to the surface to look at, not necessarily to buy.

Major Offen: I understand. I think the ACTD process does that quite well.
**Question:** Are you, in fact, open to introducing new technologies?

**Major Offen:** Absolutely. There are ACTD nominations every single year. This is an ongoing DoD process.

**Question:** Maybe just to rephrase the question for either of the first two briefers [Major Offen and LtCol Allison]: First, how do you see the relationship between the MOUT ACTD and the Urban Warrior AWE? Second, when you run across a technology that isn’t quite ready for prime time, doesn’t make the 70 percent cut, or whatever, what happens to it? Who else hears about it? Does someone else get a chance to look at it for later consideration?

**Major Offen:** Our Marine brethren have quite generously invited us to come and observe their Urban Warrior AWE and we’ve done that. Understand that Urban Warrior is a Marine effort, a Marine advance technology and digitization effort. The Army sort of has its own. However, I feel fairly certain that there’s a lot of information sharing going on. I know that between the Dismounted Battlespace Battle Lab and the Marine Corps Warfighting Lab there’s a fair amount of it. With respect to your follow-on question, the information and data that we collect, and the systems we look at, are readily available for review by a wide community. I think that community is fully aware of what we’re doing. And as a matter of fact we have an upcoming event that’s focused on looking at some things that are in the brass board stage. It is our advanced concepts excursion. We’re inviting users from the Marine Corps, the United States Army, and the special operations community to come look at these systems. We are going to tell them not to consider only what they are seeing, but rather to use their imaginations and look at the future capabilities of the systems as well.

**LtCol Allison:** Sometimes people do get confused about what the Marine Corps MOUT ACTD program is doing, what we’re doing in Urban Warrior, or what will happen during our next Capable Warrior series at the lab. The ACTD’s purpose is to get things fielded rapidly down to the user level. We in the Marine Corps only have only one battle lab, and that’s us, the Marine Corps Warfighting Lab. We also have a section that’s called the Next Marine Corps that looks way out there, much like your Army After Next. We are always looking at how we tie the two together.
Audience comment: I’m a reserve officer and also a Chicago police-man. I hear a lot of great things going on here. I think we’re missing out on maybe not putting enough emphasis on psychological operations and civil affairs. The Russian officer in my seminar [at the Army War College] said that Grozny was a psychological operations failure.

Audience comment: I really liked the piece on deception. I’m a military police officer so I understand where you’re coming from. I like the part about the high-tech stuff because it helps with population and resource control. I think that if we get into a fight like you all are describing, and I feel certain we will, the enemy is going to hide, reduce our capability to get them, and is going to use civilians to strategic advantage. There’s another thing. I think we have to be careful when we say we don’t want to destroy infrastructure. I think that no matter what we do with respect to MOUT, we need to tell the enemy that we will look for him and we will kill him.

Question: Are you anticipating or encountering any friction in the joint arena as you seek to transition from experimental concepts to actual capabilities?

LtCol Allison: My sense is that if the world is changing and we’re really serious about adapting to the world, we need to have a serious conversation with everybody in the joint community to make sure we know what it is we’re really doing. The Marine Corps can clearly not go forward with a Marine-only system. That word should be passed. I think we need to find out what works and what doesn’t work and then get word to the joint community. This is real easy to do with the MOUT ACTD because it’s by nature a joint effort.

Question: How do you feel about psychological operations during MOUT? Are the Marines looking at developing their own capability to do that? Are you satisfied with the joint capabilities?

LtCol Allison: We’re going to get a little money to fund nontraditional operational studies next year, and we want to concentrate on those skills that haven’t been given a lot of emphasis, like PSYOP, civil affairs, public affairs in the operational sense, and humanitarian affairs. We’re going to bring in individuals who have done this successfully, noted experts in the field. The battalion commander of our experimental force has some thoughts on what he calls vapor tactics. These involve the use of a combination of PSYOP and nonlethals to
psychologically and physiologically turn up the heat on the bad guys so that by the time you try to collapse their defenses they are pretty well discombobulated.