

# Technology and the Future of Warfare

Author and Pentagon advisor John Arquilla believes that today's big weapons systems are wrong for modern battle.

By Mark Williams Pontin

March 23, 2006

In 2007, the Pentagon's budget will exceed the *combined* military spending of every other country in the world. In round numbers, according to the U.S. Department of Defense's own [Quadrennial Defense Review](#) (QDR), published this past February, the American military will spend more than \$440 billion next year, supplemented with another \$120 billion for operations in Iraq and Afghanistan.

It would be more reassuring, then, if the Pentagon's four-year plan for how its strategic priorities and force structure align with its budget made for less schizophrenic reading.

On the one hand, as the QDR lucidly explains, the threats confronting U.S. forces today are asymmetric: catastrophic attacks by small groups, insurgencies by enemies of U.S. allies, and so on. This argues for the "transformation" of America's military, away from industrial-era U.S. forces that depend on "big platform" weapons systems such as aircraft carriers and tank regiments, which took half a year to mass in the field for operations like the Gulf War [in 1991]. Instead, the QDR counsels that the new military should be networked, lean, and nimble, using special operations and robotics for rapid global response.

On the other hand, the 92-page document calls for \$84 billion of weapons spending – mostly for items like the F-22 and F-35 fighters, DD(X) and LCS warships, and the CVN-21, the Navy's next-generation supercarrier, which will start construction in 2007 and be bigger than today's Nimitz-class carriers. Thus, despite a 15 percent increase in Special Forces and investments in new systems such as drone aircraft, overall, the Pentagon continues to embrace military gigantism.

Yet what if the Pentagon's big platforms weren't merely the wrong weapon systems to fight present and future wars, but actually likely to bring defeat? John Arquilla, one of the military intellectuals who created and promoted the concept of "transformation" for the U.S. military, believes that may be the case. Arquilla teaches at the Naval Postgraduate School in Monterey, CA, and is a RAND consultant and a Pentagon advisor. His publications include *Networks and Netwars: The Future of Terror, Crime, and Militancy*, *In Athena's Camp: Preparing for Conflict in the Information Age* and the forthcoming *The Reagan Imprint: Ideas in American Foreign Policy from the Collapse of Communism to the War on Terror*.

**Technology Review:** During 1976-1990 – when Reagan pushed the U.S.S.R. into an arms spending race that helped to trigger its downfall – budget authorization for U.S. defense averaged \$337 billion annually and outlays averaged \$316 billion. Today’s military spending is outpacing that. Besides being economically unsustainable, why do you think it’s wrong to let the Pentagon maintain the industrial-era “big platform” policy alongside the new tech?

**John Arquilla:** It’s an interesting question as to whether we spent the Soviets into oblivion or ourselves into senselessness. What Reagan was really trying to do with all the military spending was to create a fence between conventional and nuclear war. Every year NATO exercises ended with the American commander calling for the use of tactical nuclear weapons, which appalled Reagan. So he said, “What do you need in order not to do that?” The military said, “Tens of billions more dollars every year.” Reagan said, “Fine, whatever it takes.” Consequently, the military got used to an enormous baseline for spending, enabling it to forego hard choices about what our technology strategy should be.

More broadly, our military today oversees spending of about a billion and a quarter dollars every day. Most of that is misspent. Over this past quarter-century, we’ve reinforced an old industrial-policy military with hardware that makes increasingly less sense, spending most on things that provide the least return. The principal argument for that is: “We have to keep the big, old-style military because we might fight a big, old-style war one day.” But in the future the bigger you are, the harder you’re going to fall to ever-more accurate weapons. Creating a mass army to deal with an old-style mass army is simply to put hundreds of thousands of our troops in harm’s way needlessly.

**TR:** In short, smart, precision-targeted weapons like cruise missiles are going to become increasingly cheap and available to any government or group that can afford them. The Falklands War between Britain and Argentina gave early indications of the vulnerability of big platforms, didn’t it?

**JA:** I think so. The lessons there include: how many British submarines did it take to pen up the entire Argentine navy? Two. Simultaneously, the Exocet missile proved the slow-moving capital ship’s vulnerability. Today, the Chinese aren’t developing aircraft carrier battle groups, but brilliant sea-going mines that know how to maneuver, supersonic anti-ship missiles – which means the Falklands War on steroids – and super-cavitation torpedoes, which create a bubble of air in front of the torpedo, letting them move at hundreds of knots per hour. The Chinese have an explicit “swarming” doctrine that can best be characterized as sea power without a navy. In this new naval antagonism that’s emerging, our potential enemies are not trying to emulate what we’re doing. Instead, they’re innovating in very thoughtful, effective ways.

**TR:** What could twenty-first-century naval conflicts look like? You’ve said that the submarine realm awaits its Battle of Jutland [the major sea battle in World War I, fought between the British and German fleets in 1916].

**JA:** The biggest problem with having a submarine Jutland is the command and control of undersea fleets. But even that’s beginning to be solved – and is a sensitive area I can’t go into. What I would say is, in terms of twenty-first-century naval warfare, expect the rise of sea power without a navy. The point that was emerging in sea warfare even 24 years ago in the Falklands War was that these smart new weapons with great range and high accuracy would allow one to fight at greater distances, not closer distances. Given that, it beggars the imagination that the U.S. Navy has a fleet of ships that will burn to the waterline when hit, and yet their doctrine today calls

for them to go in and fight at eyeball range. The whole thing is driven by the idea that the U.S. Navy has no big, “blue-water” opponent out there, so we have to learn to fight in close.

**TR:** It’s the Navy justifying its big platforms and new toys?

**JA:** Without question. It’s a terribly wrong-headed doctrine.

**TR:** How do you see the possibilities for the Air Force?

**JA:** The Air Force is the most forward-thinking service, in many respects. They’re interested in all the possibilities of networking, moving information laterally as quickly as possible. They understand that some legacy technologies, like the B-52 bomber, can continue indefinitely because the information-processing capacity and range of today’s weapons allow one to get by with much older platforms. So the Air Force has all that correct.

But there’s one huge error in their mindset. The Air Force seeks to use technology to validate a questionable concept: strategic bombardment. Now, we’re almost a hundred years into the era of strategic bombing. In that time, you can count on the fingers of one hand how many such campaigns ever succeeded. Yet the Air Force continues to try to make this work. Shock and Awe – which did nothing besides spurring some Iraqis to join the insurgency – is the linear descendant of strategic, round-the-clock carpet bombing in World War II, of Curtis LeMay’s ideas, and of Operation Rolling Thunder in Vietnam. Strategically, it’s a trail of tears. Yet the Air Force is still on it.

In technological terms, in fact, they’re taking a fatal upward turn. Every Air Force general I talk to says, “We’re going into space.” For them, that’s the ultimate high ground. They want to make strategic bombing work from space with bombers that climb into orbit, then drop directly on a country somewhere. They’re even talking about moving small numbers of troops very quickly – a “starship troopers” approach. The Air Force is bedazzled by the technology of going into space and hopes this will somehow validate strategic bombardment. In fact, they’ll create a catastrophe if they start an arms race in space.

**TR:** You don’t think that the militarization of space is inevitable?

**JA:** I’m very much against violating the 1967 Outer Space Treaty. But, like lemmings, the U.S. military are heading for it – and the cosmonauts and taikonauts [Chinese astronauts] will be not far behind.

**TR:** If you want to protect your information systems and satellites, won’t you inevitably militarize space?

**JA:** No. You can create defenses that don’t require offensive capabilities. We have something under development called ANGELS – Autonomous Nanosatellite Guardian for Evaluating Local Space. They’re autonomous nano-satellites. We’re in a sensitive area now, but ANGELS will allow us to move our satellites to safer locations. We’re also experimenting with the rapid ability to reconstitute space assets.

**TR:** Let’s now consider the Army. How do you rate the Future Warrior concept now under development at the Soldier Systems Center at Fort Natick in Massachusetts and at MIT’s Institute for Soldier Nanotechnologies?

**JA:** It bothers the hell out of me that Future Warrior is focused simply on throwing enough technology at the individual soldier to make him invincible, like the armored knight of the middle

ages. I think it's like the related Future Combat Systems for Army vehicles – largely a wrong-headed approach. The Future Combat System has so far not been thought of as a real system of interconnecting parts. With these programs, we're really de-emphasizing the connectivity part of military effectiveness. That's unfortunate. The more your people are interconnected and work skillfully with each other, the more effective they are.

**TR:** What should we be doing against both the insurgency in Iraq and al-Qaeda?

**JA:** The terrorists have a technology strategy designed to get the most effective, most usable tools out there for their use. They've learned to ride the rails of our technology to strike at us. One area of short-term research that the U.S. is emphasizing is the effort to deal in a technological way with the problem of the improvised explosive device. Of course, our opponents have figured out a variety of systems allowing them to detonate these weapons in a way that cannot be jammed. I can't talk in more detail, but these leaderless networks we're fighting in Iraq are giving as good as they get in technological terms.

The real answer is about understanding the enemy as a system and trying to pull that system apart. But we're not doing that. We're going simply for the technological fix and that's one reason we've had so much trouble with these IEDs. Since we're spending so much on military affairs, maybe some of that should be directed towards technologies that will break our opponents' communications. In World War II, there was an investment in creating the first high-performance computers, for that very purpose. Today, it may be an investment in creating the most effective quantum computing or figuring out how to structure the vast ocean of data that masks the movements of al-Qaeda on the Net and the Web. We need a new Bletchley Park [the country house where the German WWII codes were broken], if we're going to win this war.

**TR:** Aren't our enemies in Iraq an entirely human network? It's not clear that breaking into their Internet communications...

**JA:** Oh, but they don't exist without the Web and the Net. You don't move around that country easily and even the old-school Baathist insurgent elements rely on the Web. A networked insurgency doesn't have anything like a traditional leadership. Most of the leadership they get is by going on websites, where they share information very quickly.

**TR:** Could we take down the Net in Iraq and would it have the effect of downing the insurgency to a significant degree?

**JA:** You could end all Internet access in Iraq and it would in many ways cripple the insurgents, in terms of slowing them down tremendously. But you'd also cripple reconstruction.

**TR:** So, in other words, we should data-mine Net exchanges within Iraq?

**JA:** There you go. The great figure in all this is Admiral John Poindexter. He suffered from his vaguely Orwellian-seeming tendencies and his connections with the Iran-Contra scandal. But the truth is he's had the most important ideas in decades about how to revolutionize intelligence-gathering. He understands the Web and the Net. He's one of the original, great military computer scientists and it's a tragedy that his ideas were discredited for very poor reasons.

**TR:** Why were those reasons poor?

**JA:** We live in an era when the power of small groups and individuals has expanded beyond our imaginations. We live in a virtually transparent world. The truth is that to have more security we have to give up some privacy.

by [Mark Williams Pontin](#)