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The Pentagon's March 1999 brochure on information operations begins with a few words from the Chairman of the Joint Chiefs of Staff, General Henry H. Shelton. He notes that "information operations and information superiority are at the core of military innovation and our vision for the future of joint warfare. . . . The capability to penetrate, manipulate, and deny an adversary's battlespace awareness is of utmost importance."[1] The Pentagon's brochure adds that "the chief concern of information superiority is the human user of information. Without knowing when, where, why, with what, and how to act, warfighters cannot perform mission-essential tasks efficiently and effectively."[2]

Kosovo, unfortunately, exposed problems with this concept. First, in spite of NATO's near total information superiority, its battlespace awareness was manipulated by the Serbian armed forces more often than expected. When human and software interpreters of intelligence information were fooled, it resulted in munitions wasted on fake or incorrect targets and in bad assessments of the actual situation on the ground. It also affected both mission-essential tasks and battle damage assessments. In the latter case, it meant different estimates by NATO and Pentagon officials of the number of armored vehicles destroyed.

Second, testimony indicates that both NATO planners and the human users of information were not adequately prepared to conduct information operations. For example, in their lessons-learned testimony before the Senate Armed Services Committee on 14 October 1999, Secretary of Defense William Cohen and General Shelton noted that "the pool of personnel available to perform certain key functions, such as language translation, targeting, and intelligence analysis, was limited" and that "the conduct of an integrated information operations campaign was delayed by the lack of both advance planning and strategic guidance defining key objectives."[3] But planning had started in earnest in the summer of 1998, Cohen and Shelton testified, some nine months before the start of the conflict on 24 March 1999. Did initial planning not include information operations?

Finally, General Wesley K. Clark, Supreme Allied Commander Europe, reportedly stunned a recent session of the Senate Armed Services Committee when he called for a complete rethink of Western strategy and questioned the need for the aerial assault on Serbia. General Clark noted that NATO could have used legal means to block the Danube and the Adriatic ports, and could have used "methods to isolate Milosevic and his political parties electronically."[4] If implemented and augmented with other measures, Clark added, *the military instrument might have never been used*.[5] These and other issues demonstrate that, for the present anyway, information superiority is a goal to be achieved and not a given that US forces can assume as their birth right.

This article will look at the conflict between NATO and Yugoslavia not from the standpoint of the intent or success of the air campaign (although these issues will be touched upon) but rather through the prism of information superiority. Information superiority allowed NATO to know almost everything about the battlefield, but NATO analysts didn't always understand everything they thought they knew.

What Is Information Superiority?

Information superiority, the cornerstone of Force XXI, is a capability (not a proven condition) that the US armed forces are trying to develop. Once the concept becomes robust it will help to reduce uncertainty, provide a more complete intelligence picture of the battlefield, and assist precision-guided missiles in obtaining and destroying targets. Much of this capability was on display in the recent conflict in Kosovo.

Information superiority is defined by US Joint Publication 3-13 as "the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same."[6] According

to this definition, NATO's forces entered the Kosovo conflict with near total information superiority. It appeared that NATO was able to collect, process, and disseminate military information at will while denying the Serbs the same capability. However, NATO forces did encounter intelligence and information problems, including instances of the Serbs using nontechnical methods to manipulate NATO analysts' perceptions, resulting in misinterpreted information. Joint Publication 2-01 warns about this phenomenon in a discussion of the "intelligence cycle." The publication notes, "Time constraints and the demands of modern battle tend to make the processing and production phases indistinguishable."[7] This in turn limits "evaluating, analyzing, and interpreting information from single or multiple sources into a finished intelligence product."[8]

In addition, Serbian civilian and military personnel were able to use civilian telephone and radio links to pass military information. Such nontechnical offsets either thwarted information collection or corrupted NATO information superiority. That is, the human link in the NATO analytic process was less successful in interpreting information, reducing uncertainty, and providing a clear intelligence picture of the battlefield than expected. For example:

. Some six months after the conflict, NATO and the Pentagon still did not know how many tanks and armored personnel carriers they destroyed, in spite of supposed total information superiority during the conflict, the ability to monitor Serb forces leaving the area after the conflict, and the presence of their own people on the ground to inspect targets that were hit.

. NATO pilots were forced to drop millions of dollars of ordnance in the Adriatic and on open countryside because they could not find their targets or engage them properly due to bad weather and the aerial rules of engagement (ROE) imposed by politicians. (The planes could not land with the unexpended ordnance on board.) Since the ROE were imposed by politicians, this means that politicians affected information superiority, too.

. NATO after-action reports stress that Milosevic may have intercepted NATO communications and warned targets that they were about to be hit. The testimony of Secretary Cohen and General Shelton supports this thesis. They indicated that NATO lacked interoperable secure communications, forcing reliance on nonsecure methods that compromised operational security.[9] This speaks poorly about the progress of communications technology, compatibility, and information superiority in NATO after 50 years of practice (and in this case with no enemy radio-electronic opposition of any consequence).

. NATO had almost perfect intelligence about the intentions, goals, and attitudes of President Milosevic through a multitude of personal discussions with him over the previous four years by representatives from scores of nations (and possibly from communications intercepts), yet could not get him to the negotiating table, foresee his ruthless ethnic cleansing campaign in time to stop him, or predict his asymmetric responses to NATO technological and bombing prowess.

Further, NATO did not process information quickly enough to enable aircraft to strike mobile targets. This was because of the reaction time required to pass data from EC-130 (airborne command, control, and communications) aircraft to NATO's Combined Air Operations Center at Vicenze, Italy, and then on to strike assets. Total information superiority did not prevent the most technologically advanced air armada in the world from mistakenly striking trains and convoys, schools and hospitals, and Bulgaria with missiles. Yes Bulgaria, the wrong country, although that incident was the result of a weapon system malfunction, not an error in the application of information.

Two important qualifiers are missing, but implied, in the Joint Publication 3-13 definition of information superiority: "accurate" and "timely." Information superiority requires the "accurate and timely" collection, processing, and dissemination of information. Battle damage assessments on armored vehicles indicate that the accuracy of hits on mobile targets, for example, was much lower than originally stated. Such inaccurate information can lead to wrong conclusions and assumptions. For example, NATO claims that 99.6 percent of the bombs dropped hit the intended target are difficult to fathom.[10] Undoubtedly the percentage differed for stationary and for mobile targets. And does this figure reflect that some bombs hit fake targets, and that many bombs had to be jettisoned into the Adriatic due to bad weather or because a target had moved? Only after illuminating the data with such criteria can a real assessment

of accuracy be made. A lower figure--perhaps 80 percent--might be a more realistic assessment but still a perfectly acceptable measure of success.

Strikes on fake targets indicate that the Serbs let NATO daytime reconnaissance flights see real targets and then replaced them at night, or that US target analysts misinterpreted the information furnished them. Processing information is one thing, interpreting it is an art. Serbian civil and military officials improvised and developed low-tech offsets that limited the effectiveness of NATO's information superiority and misled NATO collection assets. Put another way, they fooled our information interpreters. Their offsets included deception, disinformation, camouflage, the clever use of radar, spies within NATO, helicopter movements NATO couldn't detect, and the exploitation of NATO's operational templating of information-dominance activities (e.g., satellites, reconnaissance flights). As Lieutenant General Michael C. Short, NATO's air operations chief, noted, "NATO placed its own air crews at increased risk by taking certain steps to reduce civilian casualties, such as bombing bridges only on week nights between 10 p.m. and 4 a.m.--a regular schedule that made NATO planes more vulnerable to antiaircraft fire."[11]

Additionally, Serbia exploited the strict rules of engagement to protect or move certain target sets. This further limited the effectiveness of NATO's information technology. For example, NATO aerial ROE stated that pilots could fire only on visual recognition, diminishing the value of targets obtained by other methods. Finally, political statements that no ground campaign was planned allowed the Serbs to hang on longer against an opponent with total information superiority and attempt to exploit any cracks in NATO's solidarity. One can conclude there are ways to manipulate total information superiority.

Digital interpreters of data differ from the old intelligence analysts who worked with photos and captured documents to interpret data. The former must be aware of and study nontechnical offsets in addition to technologically produced intelligence, and constantly review the methods they use to interpret data. There is much to learn from Kosovo about the current myth of information superiority, particularly that simple human innovations can severely degrade digital dominance, and that human interpretation of data is a science worth reinvigorating.

NATO's Information Superiority

The conditions were right for NATO to achieve total information superiority. There was virtually no air force flying against NATO's 37,000 sorties (Serbs flew only some 10 air intercept or fast-mover missions). NATO faced antiquated, minimal enemy air defense artillery assets developed in the 1950s through the 1980s that couldn't reach above 15,000 feet. No real counter-radar challenge was offered since the air defense assets that could reach higher levels were not turned on. NATO possessed the ability to pinpoint targets using Predator and Hunter unmanned drone aircraft as well as satellite and JSTARS intelligence links, yet made mistakes. There was a huge assortment of intelligence products on hand concerning Belgrade and Serbia based on several recent field exercises. There were elements on the ground to assist in the effort, including personnel from the Kosovo Liberation Army. There was no Serb jamming of communication or radar assets. Total NATO information superiority was at hand. Yet errors were made in the selection of buildings to be hit, most notably the Chinese embassy.

In spite of this superiority, a ground operation was almost launched. *The Washington Post* described top-secret talks among NATO countries' defense ministers at the end of May to plan a ground invasion. That is, flying with impunity, grounded only by bad weather, NATO mounted a 78-day air campaign (Desert Storm's lasted 43 days) and this still wasn't enough. NATO was forced to stand down a last-minute scramble to mount a ground campaign. (Planning for such an operation had taken place much earlier. The reference here is to moving forces into position to cross the Kosovo border in an underdeveloped theater, where the force in place was attending to the needs of thousands of refugees, and to conduct operations before winter.) It took a combination of an underrated assist from President Martti Ahtisaari of Finland and former Prime Minister Victor Chernomyrdin of Russia, the threat of a ground operation, and the air campaign to actually achieve a negotiated settlement and later a capitulation to stop the air war. General Wesley Clark, Supreme Allied Commander Europe, noted that Milosevic probably caved in simply because he ran out of options.[12]

The air campaign, however, was the signal event of NATO's strategy. The pilots and support personnel should rightly receive nearly all the credit for making Milosevic blink. On the other hand, what did the air campaign eventually

achieve? Achievements should be viewed in accordance with both political and military measures. A logical political expectation would be that the Milosevic government would sign Rambouillet Two or some other agreement less acceptable to Yugoslavia, since Serbian reluctance to sign this document was the motivation for going to war. But Rambouillet Two was not signed and the Belgrade Agreement that was signed delivered something far less. That is, the prosecution of the air campaign did not lead to NATO getting what it originally wanted. The question must be asked, was the air campaign unsuccessful in the political respect because NATO's initial demands were too high?

On the other hand, military planners state that the intent of the air campaign was to negate the effective use of Yugoslav forces in Kosovo and ultimately eject those forces from Kosovo. This was accomplished by the use of air power, and no one can dispute this. Simultaneously, however, Yugoslav paramilitaries and police began their ethnic cleansing operation which the air campaign could not target. The air campaign was unable to target individual policemen or other ethnic cleansers unleashed by Milosevic. Was a ground operation needed to prevent the ethnic cleansing? Did the successes of the international negotiators and the threatened ground force intervention at the time that Milosevic threw in the towel mean that the air campaign "was successful because it failed"?[13] That is, the air campaign was not able to deliver an end game by itself without the combined threats of a ground attack and the negotiating prowess of the Russian and Finnish participants.

There is much to ponder and learn from the conflict in Yugoslavia. However, Kosovo should not be considered a typical future conflict on which to base subsequent contingencies. NATO and US leaders cannot plan on always flying without opposition (or having unimpeded communications). Kosovo and, to a certain extent, Desert Storm were aberrations in that regard. Another danger is the tendency of some officials to spout euphoria about the "matchless" NATO force and its unrivaled capabilities. "Matchless" when pitted against what--the air defense forces of Iraq and Yugoslavia? Neither NATO nor the United States has fought a modern, up-to-date power. Finally, another lesson to be learned is that even without information superiority, a thinking opponent can take actions that must be countered. Clausewitz noted this lesson in his own century.

Battle Damage Assessment: What Do We Believe?

One of the major indicators of the myth of information superiority is the ongoing examination of battle damage assessment. This is particularly the case with official figures offered by the NATO Supreme Allied Commander and the Department of Defense versus those of foreign defense departments and independent reporters.

The Views of General Wesley Clark, Supreme Allied Commander, NATO

It is important to note that this analysis is simply an attempt to express the concern generated by sets of figures that do not correspond to one another. It is not an attempt to cast doubt on General Wesley Clark, who has received far less credit than he deserves for keeping the alliance together during the conflict. General Clark does not count tanks; he relies on figures provided by others. It is fair to examine the figures he is being provided, however, and to consider how he chose to use them.

On 12 July, one month after the end of the bombing, the *Navy Times* discussed General Clark's testimony before the Senate Armed Services Committee. Relying on information provided by his staff, Clark stated that reports about NATO warplanes striking decoys and failing to destroy tanks and personnel carriers was a concerted disinformation campaign. Rather, he chose to underscore the virtual invulnerability of NATO aircraft and the fact that Kosovo set a new standard for warfare. He did not mention that there was no air force flying against NATO, nor that the 15,000-foot limitation was set to ensure there would be no damage to NATO's "virtually invulnerable" fleet. Battle damage assessment, according to Clark, included the destruction of 110 Serb tanks, 210 armored personnel carriers, and 449 guns and mortars. He also noted that NATO was aware the Serbs were using decoys and were able to recognize them. Department of Defense estimates of battle damage were slightly higher than Clark's estimates (120 tanks, 220 armored personnel carriers, and 450 artillery pieces).[14]

Clark later offered a reason why the battle damage may not have been as high as initially expected--there was a spy within NATO giving targets away to Belgrade. The *Pacific Stars and Stripes* quotes Clark on 13 August as saying the leak "was as clear as the nose on your face."[15] That is certainly one form of asymmetric offset to information superiority, and again it involves the human dimension. Even with complete information superiority, one can't destroy

the target if the enemy knows an attack is coming and simply moves it or replaces it with a dummy target. NATO officials were reportedly tipped off that a spy might be among them by the fact that certain targets appeared to be vacated after appearing on target lists but before NATO planes attacked.

In September, a Pentagon review of the war was delayed by one month in order to fill in gaps in the number of armored vehicles and artillery batteries actually destroyed. One report noted that General Clark told a Pentagon officer that analysts verified only some 70 percent of the reported hits. Clark then ordered the US European Command to prepare a new estimate as well.[16] In a later report, Clark lowered his battle damage assessment, noting that in all likelihood only 93 tanks and 153 armored personnel carriers were destroyed.[17] The difference--17 tanks and 57 armored personnel carriers--is close to two reinforced infantry battalions. That obviously would be an extremely significant difference to a ground commander preparing for an attack. Accurate damage assessments are crucial to a ground commander's maneuver requirements.

Even with total information superiority, it was not possible to verify battle damage with any accuracy some two months after the conflict ended, despite having NATO forces on the ground and overhead coverage of departing Serb vehicles. Since DOD and NATO still have not produced a compatible set of figures to this day, there clearly is a faulty methodology or other problem here as well. All of these hits were cockpit recorded and many were shown on TV. There should be near compatibility between NATO and Pentagon findings in the age of information superiority.

The British Press and Other Reporters on Battle Damage Assessment

Independent accounts from reporters covering the battle for Kosovo offered an entirely different set of battle damage statistics from those offered by either General Clark or the Pentagon. Their perspective is interesting for it is offered from firsthand, on-the-ground analysis, just like the latter NATO and Pentagon estimates.

The first newspaper reports on battle damage appeared at the end of June. Indications were that only 13 Serb tanks and fewer than 100 armored personnel carriers had been destroyed. Reporters noted the ruins of many different types of decoys hit by NATO forces (e.g., rusted tanks with broken parts, wood or canvas mock-ups). Carlotta Gall of *The New York Times*, a veteran war correspondent from the first Russian war in Chechnya, saw little damage. *Newsweek* reporter Mark Dennis found only one destroyed tank after driving around Kosovo for ten days. Did the Serbs manage to extricate all of their destroyed vehicles during their publicly filmed withdrawal, did they hide them, or did they really experience much less damage than NATO sources declared?

In late July, *Aviation Week and Space Technology* reported that NATO had dropped 3,000 precision-guided weapons that resulted in 500 hits on decoys, but destroyed only 50 Yugoslav tanks. Deputy Defense Secretary John Hamre also reported that all 30 (other sources use the figure 20) incidents of collateral damage would be studied (the trains, convoys, schools, hospitals, and Bulgarian strikes).[18] What types of bombs actually hit the decoys is known only by Pentagon insiders, so they are the only ones capable of calculating the amount of money wasted on these targets. This is an important issue, however, because early in the war NATO and US stocks of precision weaponry ran very low, a fact that undoubtedly was noted and highlighted by other nations with hostile intent toward the alliance. They received a yardstick measurement of how long an air campaign can proceed using certain types of high-tech armaments against specific targets before stocks run low.

U.S. News and World Report, in its 20 September 1999 edition, stated that a NATO team visited 900 "aim points" targeted by NATO in Kosovo and found only 26 tank and similar-looking self-propelled-artillery carcasses. This would again throw NATO's revised number of 93 tanks out the window. However, how many tank carcasses were in Serbia, where the NATO team did not visit, is not known, making this figure less provocative and contradictory than it originally appears. The article also reported increased friction between General Clark and his NATO air operations chief, Lieutenant General Michael Short, over target selection and strategy (mobile targets such as tanks versus infrastructure, respectively). The article concluded that it was not air power but Russia's withdrawal of support for Serbia that probably brought an end to the air war in Kosovo. The article noted that in future conflicts, the most merciful way to end them may be to conduct them swiftly and violently instead of by the trial-and-error, phased approach used in Kosovo.[19]

Finally, several British officers, both retired and serving, also noted that damage was much less than originally stated. One newspaper report, citing British Ministry of Defense sources, stated that the damage done to tanks was perhaps even less than the lowest quoted figure of 13 tank kills.[20] But the most damning comment could prove to be from an *International Herald Tribune* article on 1 October. Written by Frederick Bonnart, the editorial director of the independent but highly authoritative *NATO's Nations*, the article discusses how NATO "propaganda" was used against the West. He notes:

> In democracies, it is the duty of the public services to present the truth even in wartime, and particularly when they are in sole control of the information. If it is deliberately designed to engender fear and hate, then the correct term is propaganda.[21]

In particular, Bonnart believes the armored vehicle totals did not properly represent the vehicles actually destroyed, and that NATO deliberately used the West's reputation for truth and fairness to carry out a highly charged information policy against the Serbs. This made NATO's information policy rife with propaganda, Bonnart contends, and he points out that recommendations are being prepared to create a future NATO crisis information organization to keep this from happening again.[22] When did we ever think that a NATO-oriented publication's editor would be publicly accusing SACEUR's organization of propaganda and disinformation?

Assessing the Results of Information Superiority

One danger of the air campaign over Yugoslavia is overestimating NATO and US capabilities. All of the systems did not function all of the time with perfection. For example, some of the high-tech systems were unable to operate under poor weather conditions, as underscored in the daily Pentagon briefings during the campaign. Certainly it was an exaggeration to say:

> A vast number of intelligence, surveillance, and reconnaissance systems allowed for the rapid collection and collating into a single system the vital battlefield intelligence that we sent to our shooters. Taken together, all these innovations allowed our pilots to hit any target, any time, day or night, in any weather, accurate to within a few feet.[23]

Secretary of Defense William Cohen, in a November speech in California, listed several extremely important qualifiers regarding capabilities. He noted that even the most advanced technologies have limits and that a precision-guided weapon can only hit the coordinates it is given. Moreover, "our vast intelligence system can create such a haystack of data that finding the one needle that will pinpoint a target in the right time frame is difficult, indeed."[24]

Hitting the right target on time requires sorting out the right coordinates from a pile of information (interpreted correctly) at the right time, a degree of data management that is difficult to achieve. Yet that, most believe, is just what information superiority was designed to do. It is clear from the Secretary's comments that much work remains. His "technologies have limits" qualifier requires our attention. This is perhaps a recognition that our systems still cannot, as evidenced by Kosovo, determine if a target is a fake, and this in an environment where we were not confronted by opposing information technology systems to disrupt friendly systems. As a result, NATO and the United States lost untold resources each time we expended ordinance on impostor targets.

Does a count of destroyed tanks matter? When counts are off by such a margin, they do. A comparison of these figures causes the average American to shake his head in confusion and frustration. Worse yet, these figures affect American lives. The interpretation of data by analysts at the lowest level also directly affects the credibility of our leaders and commanders who must stand before service members and the American public to relate the data. The problem is analogous to that encountered with counting SCUD missiles during Desert Storm. Coalition assets often hit gas or trailer trucks instead of missile launch vehicles for the same reasons. We haven't corrected this problem, and maybe it is simply beyond our ability to do so with current technologies. But we must face up to our shortcomings if we want to do better. Concern over battle damage assessment is not analogous to the Vietnam era's "body count" fixation, as some try to imply. Rather, the battle damage assessment debate is over just how much of our battlespace awareness was manipulated, and that does matter.

Another problem with disputes over battle damage assessment in Kosovo is that focusing on that aspect loses sight of

the actual war that Milosevic fought (and not the template war that NATO assumed he would fight). Milosevic's real war was the ethnic cleansing offensive against the Albanian civilian population of Kosovo. Milosevic had two objectives. The first one was immediate, to rob the Kosovo Liberation Army (KLA) of its medium of support. The second objective was the campaign against NATO's center of gravity, its political stability. Milosevic confronted the United States and its allies with the grave risk of expanding instability throughout the "target" countries of Albania and Macedonia, and extending into the entire Balkan region. His instrument in this campaign was primarily paramilitary and police formations which left little information signature. This made targeting armored vehicles and artillery systems largely irrelevant to countering Milosevic's offensive. Additionally, targeting the Yugoslav infrastructure offered only protracted operations with significant economic damage to all of southern Europe, whereas the refugee problem was immediate and catastrophic. Milosevic proved he was a master at playing chess while his NATO counterparts played poker.[25] This made General Clark and General Short's arguments over targeting at best tangential to the war Milosevic was imposing on his opponent.

Asymmetric Offsets to Information Superiority

Admiral James Ellis, Commander-in-Chief of NATO's Allied Forces Southern Europe, noted in an interview on Kosovo in early September 1999 that too much information has the potential to reduce a military leader's awareness of an unfolding situation. Too much data leads to sensory overload: "Information saturation is additive to the `fog of war' . . . uncontrolled, it will control you and your staffs and lengthen your decision-cycle times."[26] Admiral Ellis extended this problem to video teleconferencing as well, since it can become "a voracious consumer of leadership and key staff working hours."[27] This is probably the most interesting and underrated lesson learned of the entire war, that information superiority overload can actually hurt mission performance. Whether this fact influenced the tank count is unknown. Secretary Cohen also mentioned this problem in his speech in California. The point to make is that perhaps this flood of information in its own way manipulated the human interpreter's evaluation of the situation on the ground. Technical systems provided "proof" that a tank had been destroyed, when in fact the target hit wasn't a tank.

Admiral Ellis also recounted some of the asymmetric Serbian responses during the conflict, sighting the following: sporadic use of air defense assets; deceptive media campaigns; deliberately increasing the risk to NATO pilots of collateral damage; and developing political cleavages between NATO allies. To prevent its air defense assets from being neutralized, the Serbian armed forces turned their assets on only as needed. They therefore presented a "constant but dormant" threat. This resulted in NATO using its most strained assets (e.g., JSTARS, AWACS) to conduct additional searches for air defense assets and forced NATO aircraft to fly above 15,000 feet, making it difficult for them to hit their targets. Ellis noted that NATO achieved little damage to the Serbian integrated air defense system.[28]

Admiral Ellis also spoke about not being able to counter Milosevic's state-controlled media and his attempts to gain international sympathy. As Milosevic's forces killed hundreds of people, NATO was always responding to its collateral damage problem. This is another lesson that must be addressed, how to prevent the press from becoming an asymmetric asset for the enemy.

Regarding the media, the US military's airborne psychological warfare machine, "Commando Solo," was unable to affect the Serb state media. Its use was hampered by the unknown air defense threat in the area. NATO officials were unwilling to risk flying the plane over Belgrade in fear that Milosevic would trade an air defense site in exchange for shooting down the slow-moving platform. As a result, Commando Solo flew far away from the Serb capital and was unable to affect TV coverage. One report during the bombing campaign asserted that NATO had proposed a moratorium on the bombing if Milosevic would just give NATO three hours of air time on TV and radio each evening. This indicates how unsuccessful the psychological warfare plan had become. All the while Milosevic maintained information superiority over his own people.

The expectation that the air campaign would last only a short time also was a detriment to the NATO psychological operations effort, since those assets were not included in the initial plans. It took two weeks to start delivering products and some 30 days to develop a campaign plan. Serbia started its psychological operations campaign days earlier and won the early initiative. The Serbs were initially successful on two fronts. First, they instituted the "target" campaign among their own people, in which citizens adorned themselves with bulls-eye targets, as if daring NATO to strike them personally. This idea greatly enhanced Serb morale and resistance at the start of the conflict. Second, they used

the Internet to spread various campaign themes and claims, an effort the former US Information Agency (USIA) worked hard to control. One USIA analyst believes the conflict was the first Internet war, with both sides using the electronic medium to fight one another in a war of words and logic. But the point to again be made is that at the start of the conflict Serbia maintained information superiority over the minds of its citizens.

Another asymmetric offset, one not noted by Admiral Ellis, was the ability of Milosevic's air defense personnel to template US and NATO air operations based on their performance during the Gulf War and in Bosnia. Knowing when reconnaissance flights would be conducted, or when satellites would fly overhead, the Serb military would preposition armored vehicles to be picked up as targets. Then the Serbs would move the actual targets; in some instances they put in the target's place an old tractor with a telephone pole attached to make it look like a tank from 15,000 feet. At night it was difficult to tell the difference. And, it must be remembered, NATO pilots still had to contend with the possibility that air defense assets could be turned on and fired at a moment's notice, reducing their target focus.

In hindsight, NATO did not handle the political side of information superiority well either. The alliance had the combined assets and knowledge of its 19 nations to draw on in composing a psychological and negotiating profile of President Milosevic. From this background, political analysts around the world should have been able to draw a reliable profile of Milosevic's intentions, goals, and desires. In addition, NATO had the negotiating edge at Rambouillet. Some believe, however, that a mistake was made in the form of an ultimatum to Milosevic that ended the talks. Many diplomats apparently expected the ultimatum to result in a quick capitulation or a Milosevic retreat.[29] That did not happen. Instead, look at the results: at Rambouillet One, Albanian moderates signed the agreement; at Rambouillet Two, the KLA signed in the expectation that elections for Kosovo would be held in three years, and that NATO transit in Serbia would be allowed; and at the final moment when the Belgrade Agreement was signed, neither of those two conditions survived.

One hopes that State Department analysts are studying in depth these negotiating shortcomings and the inability to persuade Milosevic, just as the military should be studying the shortcomings in its information superiority approach. For example, did diplomats and military representatives alike make the wrong assessment of the projected length of this conflict based on Milosevic's behavior following NATO's air campaign in August 1995? The 1995 concessions were likely the result of the combination of the air campaign *and* the simultaneous ground force offensive that was under way in Croatia, not just the bombing campaign alone. Did planners overlook this? Undoubtedly, Milosevic was to some extent irrational, but we also knew him well and should have been able to foresee his responses with some degree of certainty based on previous conversations and actions.

Technological and Political Fixes

Of course attempts are being made to correct some of the technological problems encountered during the conflict in Kosovo. NATO technical weaknesses included an inability to identify moving targets and to find armored or other equipment that was well camouflaged. The director of the Defense Advanced Research Projects Agency (DARPA), Frank Fernandez, is trying to solve both of these problems. He noted, "You had to put a human eyeball on [a] target before you could give the command to shoot because we don't trust our identification systems."[30] Again, the human dimension is stressed. Initial areas of intensified DARPA research include:

- Improving a sensor's ability to identify targets and see through camouflage. Reducing the size of space radars and their antennas to more accurately sense moving targets.
- Finding better methods to combine and pass target data through networks to aircraft or weapons.
- Developing techniques to find underground facilities and see what is happening inside.
- Establishing tactics for accurately striking moving targets in bad weather.[31]

The efforts to identify moving targets are focused on multi-, hyper-, and ultra-spectral (optical) sensors that take electromagnetic spectrum slices to identify targets. Technologies to uncover camouflaged equipment will take advantage of operational sequencing of various types of targets to uncover them, as well as low-frequency radars and computer programs designed to see through foliage. Finally, Fernandez noted that future attacks will be based on a piloted vehicle operating in tandem with two or three pilotless vehicles: "That's what we learned in Kosovo--to strike these targets that are hidden took two people, one to fly and release the weapon and another to look for and designate

the targets."[32] Fernandez's desire to have a human assist pilotless vehicles is important because it indicates that DARPA may not fall prey to an American tradition--trying to just find technological answers to problems.

It also will be interesting to watch the explanation of political lessons learned over the next few months. For example, there should be a serious effort at the State Department and in the National Security Council to right some apparent wrongs in our decisionmaking process. Wouldn't it be wise to study why we failed to develop a campaign plan beyond the first five days? And shouldn't we study why we put our operational art in the hands of politicians who tried to dictate the pace, scope, and rules of engagement, and perhaps even the target selection process? Wouldn't it be advantageous to find new ways to persuade the Milosevics of the world to negotiate, allowing NATO and the United States to withhold the use of their war machine in the first place and thus not having to deal with the technological problem sets of such a conflict? Wouldn't this be better than simply developing new technological solutions?

Conclusion

Why is information superiority a dangerous myth? Primarily because we don't interpret what we collect as well as we might. It is not that we are doing poorly, just that we aren't doing as well as we think we are. Consider, for example, the shortcomings sighted above of NATO's use of total information superiority:

. Total information superiority did not allow us to achieve a political or diplomatic victory. Like Saddam Hussein, Milosevic is still in power, and the Belgrade Agreement was a far cry from what was sought at Rambouillet.

. Total information superiority did not enable NATO to locate the Serbian armed forces' center of gravity, the police and paramilitaries doing the killing.

. Total information superiority did not counter rumor nor prejudiced reporting. For example, to cite an instance not covered in this analysis, information superiority did not allow NATO to know, even approximately, how many Kosovo civilians were killed before the bombing started. Instead of 100,000 Kosovo victims, as rumors suggested, 10,000 now appears to be closer to the truth. Would NATO have gone to war over 10,000 people? To date, only some 2,500 bodies have been discovered.

. Total information superiority was affected by politicians, who demanded that pilots fly above a certain height to minimize casualties, thereby degrading the effectiveness of information systems.

. Total information superiority was manipulated, if the debate over the total number of tanks destroyed is any indicator, by asymmetric offsets (e.g., fake tanks, other decoys) and by a study of NATO air operation templates.

. Total information superiority did not result in NATO communications working without serious problems, even after years of practice and in the face of no radio-electronic counterattacks.

During the air campaign over Yugoslavia and Kosovo, NATO had information superiority. But as the discussion above demonstrates, if analysis is inadequate, then information superiority is not enough. One danger in information superiority, then, is in assuming knowledge. Another danger, as the 99.6 percent figure demonstrates, is in overestimating our abilities.

If applied against the major criteria of reducing uncertainty, providing a more complete intelligence picture of the battlefield, and assisting precision-guided missiles in acquiring and destroying targets, information superiority passed many but failed some critical tests in Kosovo (as battle damage assessment showed). We may possess information superiority, but we often fail to exploit it because we can't always correctly interpret what we gather. As a result we are unable to lower uncertainty.

Three problems deserve to be highlighted. First, the methodologies we are using to evaluate data appear to have minor

shortcomings which sometimes result in horrific mistakes that directly affect our credibility at higher levels. That is, incorrect assessments by low-level data interpreters eventually diminish the credibility of those officials who have to stand before the public and explain the facts and figures. Sometimes this is a result of consumers who press too hard for answers. But had NATO ground troops been inserted into Kosovo before the Finnish-Russian negotiations ended the conflict, two more reinforced mechanized infantry battalions were awaiting them than expected. This miscalculation was due to the inability of information technology systems and analysts to properly assess and interpret what their "total information superiority picture" of the battlefield really showed (and there were cockpit recordings to study). If open-source reports are correct, we destroyed mockups and decoys in many cases, not working armored vehicles. The cost-effectiveness of air power was greatly diminished as a result. Clearly, more emphasis needs to be placed on the art of battlefield visualization.[33]

Second, we are not realistically assessing the conditions under which our military capabilities are being employed. What was "combat" directed against in Kosovo? Stationary objects, such as buildings, civilian infrastructure, press and police headquarters, and military garrisons; and mobile targets that moved mainly at night if at all, such as tanks, armored personnel carriers, and artillery units. It was not face-to-face combat, but combat conducted from afar. Perhaps "engagement" would have been a better choice of words than combat, although no pilot would agree! We can do better in realistically assessing and describing the conditions under which our forces are engaged.

Third, the US military must rid itself of a degree of self-deception that occasionally appears. The US and NATO forces are good and they know it. But they must do better in their estimates of success, for manipulated figures could lead to unrealizable goals or expectations. This attitude can lead military planners to draw false conclusions about Kosovo, previous conflicts, and consequently future operations. A sober assessment of what went wrong is just as important as seeing what went right. No better example could be offered than the expectation of a repeat of the August 1995 "quick concession" from Milosevic, which left planners unprepared beyond the first few days of the conflict in 1999. Our air power is magnificent, but we are becoming its captive because of exaggerations such as those enumerated in this article. Let air power's success speak for itself; even without exaggeration it is without peer.

Drawing the wrong conclusions, as was pointed out with battle damage assessments, can have dramatic and lethal effects on any intervening force. There is a lesson in this, namely that the human in the link still plays a very important role even in the age of information operations, perhaps a more important one than we recognize. Automated warfare is still a long way off if the problems that developed in the nearly opponentless skies over Kosovo are any indicator. US analysts must hone their methodologies to quickly and correctly interpret the cascading amounts of information that confront them in a conflict situation. They must consider asymmetries in information-age conflict. Improvements in the art of battlefield visualization or conceptualization, including the vital element of interpretation, must be made. The human interpreter of information is every bit as important as the human user of information.

Future conflicts may be very different from NATO's experience in Kosovo. Future enemies could possess some or all of the following: an adept air force; up-to-date air defense sites; precision-guided cruise missiles that can do to our air bases and planes from standoff positions what we can do to theirs (to include destroying AWACS); and the ability to reach the United States with weapons of mass destruction, precision missiles, or terrorist acts. When these threats confront US and NATO systems, what will information superiority do for us? Will it be even more unreliable when stressed by both nontechnical offsets and technological counters? How reliable will those new estimates be? What will happen when a real information warfare system confronts ours? Will our capabilities be degraded by a quarter, a third, or more?

The Pentagon's top civilian leaders evidently plan to produce an official report on Kosovo, breaking their study into three parts: a deployment-employment group, an intelligence support for operations group, and an alliance and coalition warfare group. It is important that the intelligence support group study the current information superiority dogma to correct some of the faulty data and impressions being generated by both analysts and leaders from the Kosovo conflict. We have to stop ourselves before heading down the wrong "yellow brick road," and instead inculcate the wisdom that people like Admiral Ellis are revealing. NATO and the United States did almost everything right in Kosovo. Now it is time to assess the little that was done wrong. As the Chinese might say, you can lose in contemporary war in two ways: if you fail to defend your information superiority, or if you become trapped by false information. It is the latter to which we should now pay attention.

NOTES

1. US Joint Chiefs of Staff, "Information Operations," March 1999, p. 1. Information superiority is based on dominance in three areas: intelligence (with surveillance and reconnaissance support), C4 (command, control, communications, and computers), and information operations.

2. Ibid., p. 6.

3. "Joint Statement on the Kosovo After Action Review," presented by Secretary of Defense William S. Cohen and General Henry H. Shelton, Chairman of the Joint Chiefs of Staff, before the Senate Armed Services Committee, 14 October 1999. Downloaded from the Internet, DefenseLINK news, http://www.defenselink.mil:80/news/Oct1999/b10141999_bt478-99.html.

4. Julian Borger, "Cyberwar Could Spare Bombs," *The Guardian*, 5 November 1999, p. 17.

5. Ibid.

6. US Joint Chiefs of Staff, Joint Publication 3-13, *Joint Doctrine for Information Operations* (Washington: GPO, 9 October 1998), p. GL-7.

7. US Joint Chiefs of Staff, Joint Publication 2-01, *Joint Intelligence Support to Military Operations* (Washington: GPO, 20 November 1996), p. III-2.

8. Ibid.

9. "Joint Statement on the Kosovo After Action Review."

10. Phillip S. Meilinger, "Gradual Escalation," *Armed Forces Journal*, October 1999, p. 18.

11. Dana Priest, "Air Chief Faults Kosovo Strategy," *The Washington Post*, 22 October 1999, p. 14.

12. Wesley K. Clark, "The United States and NATO: The Way Ahead," *Parameters*, 29 (Winter 1999-2000), 11.

13. Discussion with a British defense analyst. The comment is his, not the author's.

14. William Matthews, "Clark: Kosovo Attack Set Standard for Waging War," *Navy Times*, 12 July 1999, p. 13.

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21. Frederick Bonnart, "NATO Has a Duty To Be Truthful," *International Herald Tribune*, 1 October 1999.

22. Ibid.

23. William S. Cohen, International Institute for Strategic Studies, Hotel del Coronado, Coronado, California, 9 September 1999, downloaded from the Internet (OSD/PA news release), http://www.defenselink.mil:80/news/Sep1999/b09101999_bt409-99.html.

24. Ibid.

25. Paragraph is based on a discussion with Dr. Jacob Kipp, Foreign Military Studies Office, 30 September 1999.

26. Elaine Grossman, "U.S. Commander in Kosovo Sees Low-Tech Threats to High-Tech Warfare," *Inside the Pentagon*, 9 September 1999, p.1.

27. Ibid.

28. Ibid.

29. Mark Danner, "Kosovo: The Meaning of Victory," *New York Review of Books*, 15 July 1999.

30. "DARPA Tackles Kosovo Problems," *Aviation Week and Space Technology*, 2 August 1999, p. 55.

31. Ibid.

32. Ibid.

33. The subject of battlefield visualization is addressed in the pamphlet "Information Operations" produced by the US Army Information Operations Division, 1999, p. 11.

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