Summer 1998
No. 75

Commentary

a CANADIAN SECURITY INTELLIGENCE SERVICE publication

EXPLOITING THE NEW HIGH RESOLUTION SATELLITE IMAGERY: DARWINIAN IMPERATIVES?

Mark Stout and Thomas Quiggin

The high resolution commercial satellite imagery that will soon be available to everyone with a credit card and a computer will provide unheard of opportunities for warfighters and peacekeepers. However, we fear that a Darwinian imperative will lead to more effective use of this new tool by relatively agile terrorist organizations, guerrilla groups, and other such combatants seeking to engage in asymmetrical warfare against larger, better equipped opponents. Conversely, effective use of this new capability by would-be benefactors such as the United Nations would require them to change standard operating procedures and rethink the problematic role of intelligence in their operations.

I am the eye in the sky
Looking at you
I can read your mind.
– The Alan Parsons Project

Introduction

"The CORONA reconnaissance satellites revolutionized the collection of intelligence in the 1960's. This was a time when it was still extraordinarily difficult to gather information by any other means from 'denied areas,' including the Soviet Union, Communist China, and their allies." So writes the CIA in the introduction to its book, CORONA: America's First Satellite Program. The first successful CORONA satellites, known in the classified world as KH-1s were launched in 1960 and had a ground resolution of forty feet (12.6 meters). By 1967, their descendants, the KH-4Bs, were operational with a best resolution of 5 feet, (or 1.57 meters). KH-4Bs were still being launched in 1972. The exposed film was deorbited and snatched out of the air over the ocean by specially equipped aircraft. The film was then

Mark Stout is an analyst with the US Department of State, previously on the staff of the Director of Central Intelligence and with the Headquarters, Department of the US Army. Thomas Quiggin is a former Canadian Forces Intelligence Officer, with Service in Yugoslavia. He has served on the staff of the PCO, and is currently a PhD student at King's College, London.

rushed to imagery analysts in the United States. This system meant that days or weeks would pass between the time a photograph was taken and when it began to yield its secrets.

Despite the low resolution of this system and the great time delays involved, the crude CORONA system did indeed "revolutionize" the intelligence business in America. However, within months of this writing satellite imagery with a resolution of one meter or better – far sharper than the most advanced CORONA – will be commercially available in near real-time to any person in the world with a credit card and a computer. These high-resolution commercial imagery satellites will have daily access to virtually any spot on the surface of the earth and the images they return, electronically, not by dropping payloads over the ocean, in many cases will be militarily actionable.

High-resolution imagery will not be a silver bullet, but it will have profound implications for security issues and for warfighting, particularly as consumers become more savvy about how to fully exploit it. The belligerent who buys only one image of the opposition will probably have wasted his money. However, the belligerent who buys many images, particularly of a limited target set with which he can become intimately familiar, is likely to gain substantial advantage, militarily or otherwise. Similarly, smart users of this technology will focus satellite collection on targets which for whatever reason, can not be easily surveilled by friendly humans. Users who learn these lessons will find their eyes opened about targets in restricted areas to the same extent that the United States did when it started analyzing CORONA's pictures of the Soviet Union, previously locked up tight as a drum.

Nearly every government and armed group that does not currently have a robust imagery capability will stand to benefit from these new commercial satellites. However, belligerents whose forces and operations are not readily detectable on imagery will stand to gain more than others. Thus, relatively non-mechanized guerrilla or even terrorist groups such as Chechen or PKK separatists will potentially receive greater aid in their fight against opponents whose national infrastructures, mechanized military forces, garrisons, and other targets are readily detectable on imagery. This capability could be a great boon to those endeavoring to engage in asymmetrical warfare against a larger, better equipped enemy.

Commercial imagery may also be used in the world of psychological operations and perception management, where it will give an advantage to the side with the greater imagination and savvy, rather than the side with the more mechanized or technologically advanced armed forces.

We also believe, however, that commercial imagery holds great promise for the peacekeeper and the military observer. UN peacekeeping, intervention and humanitarian missions will be able to enjoy near real-time imagery in a way that was impossible in the past. Whether it is trying to locate long columns of refugees, artillery positions or arms control storage sites, the imaginative peacekeeper will have a new tool to use.

Like every other new technological innovation, high resolution imagery will have its advantages and disadvantages. Its use in conflict may set off yet another round of defense versus offense maneuvering. Just as the introduction of mechanized armor changed the battlefield and forced new doctrine and defenses to be created, open source imagery will create another round of "offense versus defense" changes to be made. Modern security and warfare issues are much more information-based now than even ten years ago. In this case, the advantage will go to those organizations which are difficult to detect on imagery and who have the agility to react rapidly to change. Terrorist and guerrilla groups are usually more noted for these characteristics than are governments or multinational organizations.

The Systems

In the past, high resolution satellite imagery has been a closely guarded secret and its existence has surfaced only

rarely in the public domain. As the quality of military satellite imagery improved, and the number of satellites increased, the concept of open source imagery gradually became a reality. Open source imagery first became publicly available when NASA launched the first of its LANDSAT series in 1972 with 80 meters (approximately 262 feet) of resolution. While these satellites provided valuable service in a variety of applications, the quality of the product was virtually never equal to the demands of military or intelligence consumers.

Resolution was typically the limiting factor. As with a TV screen or computer terminal, a digital satellite image is really a series of pixels (or tiny dots) of varying shades arranged to form an image. Each pixel represents a tiny part of the whole image. The resolution of the image is a measure of the area on the ground that each pixel represents. For instance, if a satellite image has a resolution of one meter, then each pixel represents a distance of one meter on the ground. Thus, such a satellite could find or "discriminate" objects that were one meter in length or longer. The smaller the resolution, the greater the ability of the imagery analysts to see and identify small objects in pictures taken by that satellite.

What will the new commercial companies be able to offer their customers in terms of resolution? There are at least four countries involved in offering optical satellite imaging services (USA, Russia, France and Israel). From these four countries will come about 10 different satellites offering imagery at four meters of resolution or less, with four of these satellites working at one meter of resolution. What will the clients get to see for their money? The following table shows the approximate resolutions required for useful analysis of ground targets. Figures are for detection, basic identification, and precise identification.

Table One: Resolution and Identification (all figures in meters)

	Detection	General Identification	Precise Identification
Tactical Aircraft	4 to 5	1.5	1
Vehicles	1.5	.6	.3
Radar and Radio Sites	3	1 to 1.5	.3
Bridges and Roads	5	4	2
Powerlines	3	1	1
Industrial Plants	60-70	10-30	2 to 3
Terrain	90+	30-90	4.5

The above figures do not take into account the ability of software programs to enhance imagery. For instance, an image delivered to a customer by digital means could be improved by the customer. While circumstances vary considerably, it is reasonable to think that images taken at one meter of resolution could be enhanced to equal images of .75 meters or less.

The Suppliers

Within the next few years, three US companies and one US-Israeli partnership will enter the one meter-range imagery market, outflanking the Russians who are already providing archival or otherwise delayed images of similar resolution from their KVR -1000 satellite.

For example, Space Imaging described in one trade publication as "virtually an NRO [National Reconnaissance Office] outlet store – was scheduled to launch in December, 1997 a satellite, developed by Lockheed-Martin, which will give one meter panchromatic (i.e. black and white) resolution and four meter multi-spectral resolution. Another satellite is to follow in 1998 and Space Imaging reportedly expects each to last approximately seven years. These satellites will orbit at 680 km above the earth and will be able to take one meter resolution images up to 350 km to either side of their ground track. The software and hardware of the system will allow an 11 km x 11 km high-resolution image to be available for analysis in as little as 18 minutes. Reportedly, as many as "nine Space Imaging operations centers will run as individual enterprises," supporting local customer bases around the world. "They will not only receive data down-linked from the satellites, but will actually control the satellites over their territory."

Another consortium in the business is Earthwatch. This group plans a four satellite constellation, though not all will be capable of providing one meter images. On the other hand, they claim that they will be able to provide a more rapid "revisit rate" than Space Imaging. Their first satellite, capable of three meter resolution was to be launched in early 1997, but the program has suffered from a serious delay. Their first one meter satellite, Quickbird, is scheduled to go up in 1999. Orbimage, a subsidiary of Orbital Sciences Corporation also plans to enter this market, with a satellite, called Orbview, expected to go up in approximately 1999.

A final entry in this competition will be a joint US-Israeli project, involving the American firm Core Software Technology of Pasadena, California, and Israel Aircraft Industries (IAI). Their first effort, dubbed EROS A uses a Russian rocket. Unlike the other systems mentioned thus far, the technology will not be purely American, as EROS A will, in fact, be an evolutionary descendant of the IAI's Offeq-3 satellite, already in orbit and used for intelligence purposes by the Israeli government. EROS A will offer 1.5 meter resolution imagery.

In the next few years, it is reasonable to assume that other countries will want to involve themselves in this potentially lucrative market. Russia is already releasing two meter resolution images that it has archived over the years and its prodigious need for revenue will almost certainly pull them into the market if the first American and Israeli efforts are commercially successful. Other likely contenders if these initial efforts are commercially successful include France, Japan. Germany, and possibly China.

The various companies now entering the market are advertising a wide range of applications for their high-resolution imagery. Of course, these include the standard environmental, arms control, media, and NGO applications. However, they are simultaneously playing up military and security applications. The Orbimage company, for example, under the rubric of "National Security" advertises the following applications for its one meter imagery: "resource deployment, mission planning, targeting, battle damage assessment, intelligence gathering, and trend analysis."

Earthwatch describes the military and intelligence advantages of their coming product rather differently: "Earthwatch's low capitalization costs and the frequent revisit times permitted by the simultaneous operation of multiple satellites offer significant competitive advantages in this market, as in the commercial market. Continuous monitoring of any area will be possible for less than the operating costs of a single reconnaissance aircraft or the price of a single fighter

aircraft. Moreover, the digital format in which the images will be distributed readily facilitates analysis with commercially available GIS [geographic information systems] hardware and software."

In short, these companies are offering to enhance, or even create, the imagery intelligence capabilities of prospective clients.

American Law

This market, however, is not entirely without regulation. Under "Presidential Decision Directive 23" or PDD-23, signed in March 1994, US companies are allowed to obtain licenses to develop commercial satellites with characteristics similar to those which are now or soon will be available from foreign competition. Thus far, this has led to the licensing of systems able to provide resolution as good as approximately .8 meters. However, there is a catch; the US Government retains so-called "shutter control" of these satellites. In other words, the government can stop the dissemination of imagery whenever it determines such action would be required in order to safeguard US national security.

This restriction, however, may have little practical importance for most potential clients. PDD-23 has been interpreted as follows in the licensing agreements: "The Secretary of Commerce may, after consulting with the Secretary of Defense or State, as appropriate, require the licensee to stop imaging an area and/or stop distributing data from an area during any period when national security or foreign policy interests may be compromised. To ensure that restrictions will be invoked only where appropriate, this consultation and any decision to implement this condition will be controlled at the Secretarial level and any Secretarial disagreement will be elevated to the Presidential level."

In short, though some interests, notably the news media, have expressed concern that the government could drive a truck through the "shutter control" loophole, it appears that the Federal Government will exercise this right very rarely. The only thing likely to stand between a separatist organization or a terrorist group and intelligence-quality imagery of its enemy will be the policies of the company controlling the satellite.

The State of Israel, however, will be an exception to that rule. Concerned that high-resolution imagery can be used by military forces and terrorist groups, Congress added one restriction beyond simple "shutter control:" no imagery of Israel may be sold that is of a resolution higher than is otherwise commercially available from alternative sources. Interestingly, when considering both resolution and timeliness of delivery, the nearest competition to the US satellites will probably be EROS A, the Israeli-American joint venture. It is safe to assume that this consortium will also not be selling high-quality imagery of Israel.

In the future, this American shutter control may be of limited value. Non-American imagery companies certainly can not be counted on to give the US Secretaries of Commerce, State, and Defense control over their satellite operations. They may operate under analogous restrictions, giving the licensing government for example shutter control, but with US, Israeli, Russian, French and perhaps other concerns potentially in the business the day will come when consumers unable to buy the image they need from one company will be able to turn to one of several companies of a different nationality more than happy to take their money.

Effects on "Small Wars"

Commercial imagery will be able to support operations across much of the spectrum of conflict, including psychological operations and perceptions management. It will have widespread applications both for combatants and for peacekeepers and observer missions. However, we fear that insurgents and terrorists are more likely to take early and effective advantage of it than will the United Nations and other international organizations involved in peacekeeping.

There are several reasons for this. First, intelligently-used satellite imagery can be a very

cost-effective "force multiplier" and thus combatants will to some degree be forced to use it. No combatant has the leisure of forgoing the use of a legally permissible means of advancing their cause. In the zero-sum or near-zero-sum game that is warfare, those who do not take every advantage end up at least defeated and frequently dead. International organizations face no such Darwinian pressures. Effective or not, the United Nations will continue to exist.

Second, the command structures of most terrorist and insurgent groups are relatively small and thus more capable than large bureaucracies of quickly adopting new procedures or tools. Indeed, in many groups, a single leader will have the authority to make binding decisions on his own initiative for the entire body. Examples might include the founder of a very small terrorist cell; the charismatic leader of a movement defined by its support for him (for example, Laurent Kabila, who recently took control of Zaire); or the leader of an organization which is strictly hierarchical by ideology (for example, some communist and religiously-motivated organizations).

It is perhaps instructive to note that many insurgent and terrorist groups have enthusiastically embraced the Internet – another cutting-edge information technology that now reaches vast parts of the globe – as a way of advancing their cause. Some organizations use it to get their message out both through sites on the World Wide Web and through Usenet news groups. The classic example was the Zapatista rebels in Mexico in 1994. However, numerous other groups do the same today, with varying degrees of success, including the Taliban, the Chechens, the Tupac Amaru Revolutionary Movement. Other groups reportedly are using e-mail and probably encryption software to pass operational messages.

Finally, of course, the United Nations has a "phobia of spying on member nations" as one former commander of a UN peacekeeping force puts it. Traditionally, the UN has even preferred the term "information" over "intelligence" to avoid what it believes to be the aroma of skullduggery exuded by the latter. Certainly the United Nations' approach to intelligence has relaxed somewhat in recent times with the establishment of a "Situation Center" in New York and the reported acceptance of some intelligence information from the United States to support recent peacekeeping operations. Nonetheless, the day when the United Nations will contract with a commercial company to provide high-quality near real-time imagery of denied areas of a member state's territory against that state's will is probably far off.

Despite its promise, the proposed use of imagery by such an organization as the UN raises numerous questions that would not be as problematic for national or sub-national users. Within the UN, who would control tasking? The operational commander? The Headquarters in New York? If so, which component of the Headquarters? And to whom would the imagery be delivered and the analysis be done? What systems could be used to disseminate the information derived from imagery analysis in a timely fashion to the necessary consumers? Analogous questions would apply to OSCE peacekeeping or monitoring missions. On the other hand, ad hoc peacekeeping coalitions might not face such issues.

Combat Applications

While high-resolution commercial imagery may not revolutionize warfare, it has the potential to serve as a significant "force multiplier" for some consumers. Virtually any country or warring faction mounting operations against mechanized forces or infrastructure will find use for open source imagery.

Consider, for example, Croatia in 1990 and 1991. The Serbs enjoyed an advantage in mechanized forces, while their opponents were poorly armed and frequently badly organized. By the summer of 1990, the Croatian Serbs in Knin had blockaded the town and prevented Croatian Ministry of the Interior forces from operating in the area. In Knin, and many other Serb majority areas, the Croatian government in Zagreb had little real idea of the state of affairs in Serb areas, the equipment they had, or their degree of readiness. Knowing

the equipment levels in garrisons or towns in advance could have provided them useful information at both the tactical and strategic levels. If high resolution open source satellite imagery had been available, it is probable that both the political and military leaders of Croatia would have procured imagery of problem areas, enabling them to better employ their limited resources.

Properly combined with other information sources, open source imagery holds the potential to substantially affect the decision making cycles of both political and military leaders. The most obvious applications will be in selecting targets for attack and planning operations. The ability to see an installation such as a nuclear reactor, hydroelectric dam, or military garrison from above is a great advantage to those planning offensive operations against it. Infiltration and exfiltration routes for guerrilla-style raiders can be better planned and an intensive imagery operation could identify normal activity and equipment levels and possibly even guard patterns and patrol routes.

While the offensive applications of imagery may be more "sexy," the defensive applications, such as "indications and warning" (I&W) will probably be at least as valuable. I&W is a difficult business and depends to a great degree on knowing where to look and looking frequently enough over a long enough period of time to understand what is normal and thus to draw the correct conclusions. It also requires a dedicated staff of trained imagery analysts and a good understanding of the enemy's force structure, garrisons and training areas. In addition, the cost of the numerous images necessary to establish the understanding of normalcy may be prohibitive for many insurgent groups. All this suggests that while groups may attempt to use imagery for I&W, they may use it only for a very limited target set. Alternately, they may use it badly and draw many incorrect conclusions.

A further defensive application of imagery would be improving operational security and denial and deception efforts. Even a force which has surrendered complete air supremacy to the other side, as the Chechens did to the overwhelming Russian Air Force, for example, can use satellite imagery of its own positions and forces to see what the enemy sees from above. This information can be used to improve camouflaging, operational security and the quality of deception efforts.

High-quality imagery seems to hold out particular promise for facilitating the job of terrorists and special operations forces. Thus, for example, imagery can tell a potential terrorist what is on the other side of the wall that surrounds a target. In cases where the proposed target (or, at any rate, its perimeter) is accessible on a daily basis, such as an embassy, satellite imagery could be a valuable supplement to ground-level surveillance. In other cases, it might be the only look that terrorists or special forces might have of a distant target before dispatching a team to penetrate deep into enemy territory to attack it. Thus, in effect, satellite imagery might allow terrorists to target facilities previously beyond their effective reach due to lack of information.

Imagery can allow a comprehensive look at large security perimeters and allow terrorists to make educated guesses about the extent of security forces inside a site. As with guerrilla forces, imagery can be used to locate and assess security forces near the target area which may respond to an attack. This intelligence can be used to strategize about how to neutralize or avoid that response force.

Propaganda and Psychological Operations

It is a truism that "a picture is worth a thousand words." A picture, also, can have intense emotional impact. Thus, it is virtually certain that beyond the combat-oriented applications discussed above, high-resolution imagery will be used for propaganda and in psychological operations (PSYOPS).

The technology has a great deal of potential for showing atrocities or collateral damage. Imagine, for example, emotional issues such as mass graves, internment camps, refugees columns or even clear cutting in forests. Even images

of combat operations in progress can have propaganda or PSYOPS value. The news media, which always has its eyes open for "happy snaps" will be convenient allies for would-be propagandists. In some cases, the media may buy and publicize emotionally powerful – and thus politically powerful – satellite images before they are even known to the belligerents themselves.

On the other hand, the availability of commercial imagery will make exaggerated claims of at least certain types of massive enemy atrocities, a staple of warfare since time immemorial, easier to disprove. For example, claims that an enemy has completely destroyed a city – an extraordinarily difficult thing to do without employing nuclear weapons – could be easily belied. Thus, for many target audiences, such claims may be harder to make. Among target audiences in the West other than those with a direct interest, such as diaspora communities, such wild claims were probably perceived as exaggerations more often than not anyway, so there will be no loss. However, among diaspora communities and in other parts of the world, such statements are probably often taken as gospel by many people. Therefore, the existence of an independent check on such claims might lessen the effectiveness of exaggerated claims of mass atrocities on those communities and on others otherwise disposed to believe such stories.

The possibility will also exist of falsifying satellite imagery, which will, after all, be delivered digitally to most customers. Even the photo store in the local shopping mall has the ability to digitally add or remove features from photographs. The ability to doctor imagery could be used to make a propaganda point, perhaps showing mass graves where none exist or enhancing pictures of battle damage in civilian areas. If successful such a deception might affect the international community's views on intervention or aid. Depending on the skill with which this was done and the medium in which the doctored image was presented to the target audience, the forgery could be very effective and very hard to detect. It would be difficult to produce a doctored image which could fool an expert who could examine it in detail, but that is probably an artificially high standard. The operative questions might instead be, "is this image plausible enough to get on the evening news?" or "is this image plausible enough to pull fence-sitters to our side?" Even if an expert came forward to question the authenticity of the image, perhaps with another image, he/she could probably do little more than provoke a "Yes, it is," "No, it isn't," debate.

On the other hand, the day may even come in which a combatant is the deceived party. For example, a terrorist group might wish to purchase imagery of a sensitive government facility it was considering attacking. If a government intelligence service could somehow insert itself between the imagery provider and the terrorist consumers, the terrorist group might receive doctored imagery. If the government wanted to deter an attack, it might deliver imagery showing more security at the site than was in fact present. For example, a barracks, a parking area for armored vehicles, and an ammunition bunker might be artificially added in part of the facility not subject to surveillance from outside the perimeter. Alternately, if the government wanted to invite an attack so as to ambush the attackers, security measures and forces might be erased from the delivered image.

The commercial imagery system could also be exploited in a completely different way for PSYOPS advantage. Imagine, for example, that the Chechen war had taken place during the era of commercially available one meter imagery. Imagine further that the Chechens - widely believed by Russians to be innately disposed to terrorism and crime - had been discovered to have bought imagery of a number of nuclear power plants in southern Russia. If this fact came to the attention of the Russian security services, they would be forced to infer that a terrorist attack, with potentially devastating environmental consequences, was in the offing. The impact might be even greater if the story could be planted in a respected Russian newspaper which would put it before a broad and concerned public. Chechen security

services might plant such a story without any intention of attacking a nuclear power plant and then watch the Russians worry themselves and expend resources protecting against a non-existent threat.

Implications for Peacekeeping

Despite the great possibilities inherent in high-resolution imagery for increasing the mayhem in the world's hot-spots, imagery, and the information derived from it, can be a "force multiplier" for the peacekeeper, just as it can for the warfighter. The utility of commercial imagery will vary according to the type of conflict and peace operation in question. In extremis, imagery can even substitute for manpower, allowing undermanned military observer missions to see terrain they are unable to personally visit. Imagery will also have some utility in humanitarian operations which are frequently closely tied to peacekeeping, such as searching for mass graves or refugees.

When it comes to imaging combatant forces, the technology will be more applicable in areas where the terrain and the make up of the forces are more vulnerable to imagery detection. Open desert area or plains where mechanized forces are operating provide excellent opportunities for imagery. The utility of imagery would probably be near zero in areas such as Haiti, and minimal in places like Somalia where "technicals," i.e. militarized civilian trucks, pickups, and cars, operating in urban areas were a problem.

In an era of limited resources, imagery can also provide data about "ground truth" in locations where there are no UN "eyes on target." This will been particularly helpful to smaller or observer missions which are typically have less resources. UN missions operating in areas such as Cyprus or Macedonia would be able to usefully employ imagery as force multiplier. Imagery could also be used as a confidence and security building measure (CSBM) between former warring factions. In effect, using the UN or some other such organization as a facilitator, a type of "Open Skies" regime could be built in an area, building confidence and helping to convince each side that a surprise attack is not in the making.

In a broader sense, open source imagery may play a role in de-stigmatizing the use of intelligence within the United Nations. Intelligence, almost always seen through a shroud of secrecy, will be partially demystified if imagery is used in an open manner for all to see – both with its benefits and costs. The benefits can come quickly. For instance, UN commanders in the former Yugoslavia found themselves consistently facing leaders of the warring factions who denied responsibility for military activities or denied that they had forces in problem areas. Rapidly available unclassified imagery would give the commander in the field an ace up the sleeve during negotiations. This type of information would have been particularly useful when both Croatia and Serbia denied that they had employed their regular army forces in Bosnia. Even knowing that someone was "keeping an eye on them" and that images of their activities would be world news might have discouraged some of the worst excesses of the warring factions. Secret imagery, typically locked in the safe in headquarters or national capitals, does not have this limiting effect.

UN commanders are also facing greater pressure from the governments of troop contributing nations. Many governments today face voters with extremely limited tolerance for casualties in a military operations, including peace operations. Open source imagery will not be a magic solution to this problem, but used constructively with other information sources, it may help. Even if the UN cannot organize or provide imagery to the various contingents at risk, national level authorities responsible for their troops will no doubt use their own national initiative to provide it directly to the field. Satellite phones and portable computers make this possible now. As noted above, however, the opening of a direct intelligence conduit between national capitals and individual contingents within a combined peacekeeping force, might further undermine the unity of command of that force.

There may also be costs involved, however, in the use of open source imagery. Factions or states are willing to cooperate with the UN only when they are confident that the UN presence works to their advantage, or if they believe they can manipulate the UN and world opinion to their advantage. If the political leaders of troubled areas become aware that UN commanders may call their bluffs or expose their excesses, they may be less willing to cooperate with the UN.

We believe that the UN will have problems instituting an effective program of procuring and distributing timely satellite imagery. Member states may have no practical objections to the UN using imagery in, for instance, Bosnia. But they may object in principle, and oppose such operations fearing that what is used in Bosnia today could be used against them tomorrow.

Conclusion

In sum, the widespread availability of high-quality commercial imagery has the potential to substantially influence security operations and warfare across much of the planet. Insurgent forces, terrorists, and military forces with low levels of mechanization and with a willingness and ability to exploit a newly available technology stand to gain the most. At the same time, this imagery revolution does have the potential to make the notoriously difficult role of the peacekeeper easier. Whether, in the end, the cause of peace will turn out to be served by the availability of this new product is unclear. However, our intuition is that individual nations and sub-national forces, facing a Darwinian imperative to exploit every advantage available to them, will make greater effective use of imagery much more promptly than will large international hide-bound bureaucracies such as the United Nations.

Commentary is a regular publication of the Analysis and Production Branch of CSIS. Inquiries regarding submissions may be made to the Chairman of the Editorial Board at the following address: Box 9732, Stn. "T", Ottawa, Ont., K1G 4G4, or by fax at (613) 842-1312. Consult our World Wide Web site on the Internet for back issues of *Commentary*: http://www.csis-scrs.gc.ca

ISSN 1192-277X
Catalogue JS73-1/75

PacIntel '99 PROCEEDINGS Pacific Intelligence Forum Creating a Virtual Intelligence Community in the Pacific Region: Open Sources - Link Page

Previous	Ref: Background Paper on EAGLE VISION (Office of the Vice Chief, USAF)
Next	Ref: Islamic Unrest in the Xinjiang Uighur Autonomous Region (Open Source Information Report from Canadian Security and Intelligence Service)

Return to Electronic Index Page