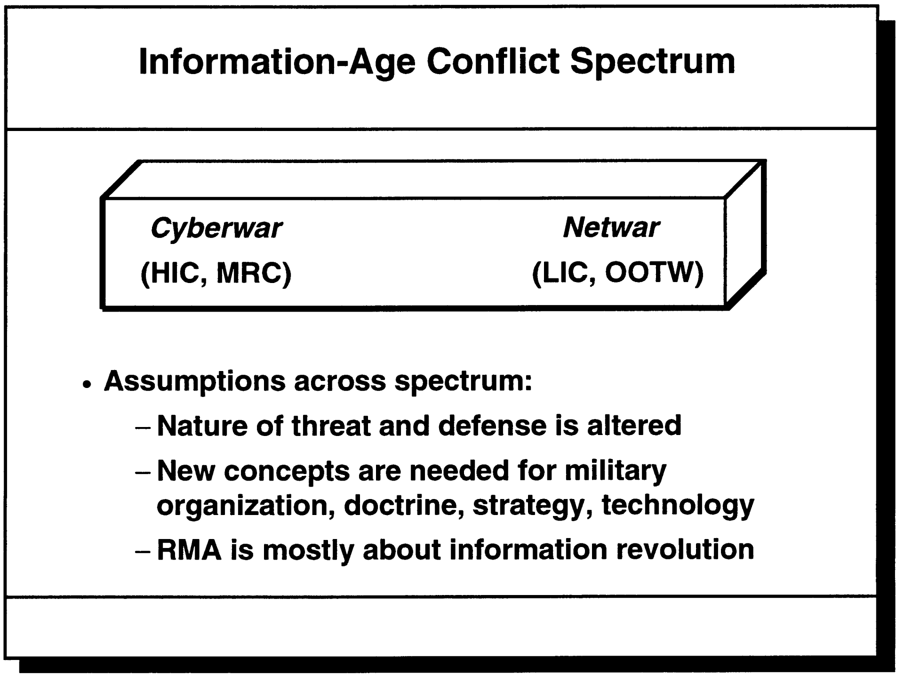
Chapter Two

CONCEPTUAL OUTLINES



Information-Age Conflict Spectrum

Cyberwar
(HIC, MRC)

Netwar
(LIC, OOTW)

- Assumptions across spectrum:
  – Nature of threat and defense is altered
  – New concepts are needed for military organization, doctrine, strategy, technology
  – RMA is mostly about information revolution

In our view, the information-age conflict spectrum looks like this: What we term "cyberwar" will be an ever-more-important entry at the military end, where the language is normally about high-intensity conflict (HIC) and middle-range conflict (MRC). "Netwar" will figure increasingly at the societal end, where the language is normally about low-intensity conflict (LIC) and operations other than war (OOTW—a broader concept than LIC that includes peacekeeping and humanitarian relief operations). Whereas cyberwar will usually see formal military forces pitted against each other, netwar is more likely to involve nonstate, paramilitary, and other irregular forces. Both concepts are consistent with the views of analysts like Van Creveld (1991) who believe that a transformation of war is under way, leading to increased "irregularization."

The terms above reflect two assumptions (or propositions) about the information revolution. One is that conflicts will increasingly depend on, and revolve around, information and communications—"cyber"—matters, broadly defined. Indeed, both cyberwar and netwar are modes of conflict that are largely about "knowledge"—about who knows what, when, where, and why, and about how secure a society, military, or other actor is regarding its knowledge of itself and its adversaries.

The other assumption is that the information revolution favors and strengthens network forms of organization, while making life difficult for hierarchical forms. This implies that conflicts will increasingly be fought by "networks" more than by "hierarchies." Thus, whoever masters the network form should gain major advantages in the new era.

Both assumptions permeate this analysis and are discussed further as it proceeds. A point to emphasize here is that these assumptions affect the entire conflict spectrum. They mean that major alterations are looming in the nature of our adversaries, in the threats they pose, and for the defense measures the United States should consider. Information-age threats are likely to be more diffuse, nonlinear, and multidimensional than industrial-age threats. Cyberwars and netwars may even be mounted at the same time, in mixes that pose uncomfortable societal dilemmas. All this will place the U.S. military and society under increasing pressure to develop new concepts for organization, doctrine, strategy, tactics, and technology.

At present, the U.S. military is the world's leader with regard to thinking, planning, and preparing for cyberwar. The United States is the only country with an array of advanced technologies (e.g., for command, control, communications, and intelligence (C3I), surveillance, stealth, etc.) to make cyberwar an attractive and feasible option. But potential U.S. adversaries have the lead with regard to netwar. Here, the U.S. emphasis must be on defensive measures. This continues a long trend in which the United States has been prepared for waging major wars, while our adversaries may instead wage guerrilla warfare, terrorism, and other irregular modes of conflict. This may be partly the result of displacement—some adversaries, seeing that they should avoid or could not win at regular warfare, have opted for irregular modes, which the U.S. military may then try to treat as "lesser-included cases." Such displacement may occur again with netwar. But, hopefully, netwar will not be perceived as a "lesser-included case" of information-age conflict, for it is not.

Instead of using terms like cyberwar or netwar, many analysts have been treating such points under the rubric of the "revolution in military affairs" (RMA). Yet, this very general concept is still mainly about the information revolution and its effects and implications. It led early exponents to view technology innovation as the most important dimension of the RMA. But other, recent exponents have come to accept that the RMA is equally if not mainly about organizational and doctrinal innovation—a view we have emphasized since beginning our efforts to conceptualize cyberwar and netwar. Even so, discussions about the RMA tend to focus on HICs and MRCs that revolve around regular, albeit much-modified military forces. Exponents of the RMA have had less to say about the netwar end of the spectrum (see Arquilla and Ronfeldt, 1995).

What Is "Netwar"?

- **Conflict and crime at societal levels that involve**
  - **measures short of war**
  - **protagonists who rely on network forms of organization, doctrine, strategy, communication**
- **New and old (but modified) protagonists**
  - **terrorists, proliferators, criminals, fundamentalists, ethnonationalists**
  - **next generation of radicals, and revolutionaries**
  - **also, new nonviolent activist "netwarriors"**

The term "netwar" denotes an emerging mode of conflict (and crime) at societal levels, involving measures short of war, in which the protagonists use—indeed, depend on using—network forms of organization, doctrine, strategy, and communication. These protagonists generally consist of dispersed, often small groups who agree to communicate, coordinate, and act in an internetted manner, often without a precise central leadership or headquarters. Decisionmaking may be deliberately decentralized and dispersed.

Thus netwar differs from traditional modes of conflict and crime in which the protagonists prefer to use hierarchical organizations, doctrines, and strategies, as in past efforts to foster large, centralized mass movements along Leninist lines. In short, netwar is about Hamas more than the PLO, Mexico's Zapatistas more than Cuba's Fidelistas, the Christian Identity Movement more than the Ku Klux Klan, the Asian Triads more than the Sicilian Mafia, and Chicago's Gangsta Disciples more than the Al Capone Gang.

Actors across the spectrum of social conflict and crime are evolving in the direction of netwar. This includes familiar adversaries who are modifying their structures and strategies to gain advantage from the rise of network designs: e.g., transnational terrorist groups, black-market proliferators of weapons of mass destruction (WMD), drug and other criminal syndicates, fundamentalist and ethnonationalist movements, intellectual-property pirates, and immigration and refugee smugglers. Some urban gangs, rural militia organizations, and militant single-issue groups in the United States are also developing netwar-like attributes.

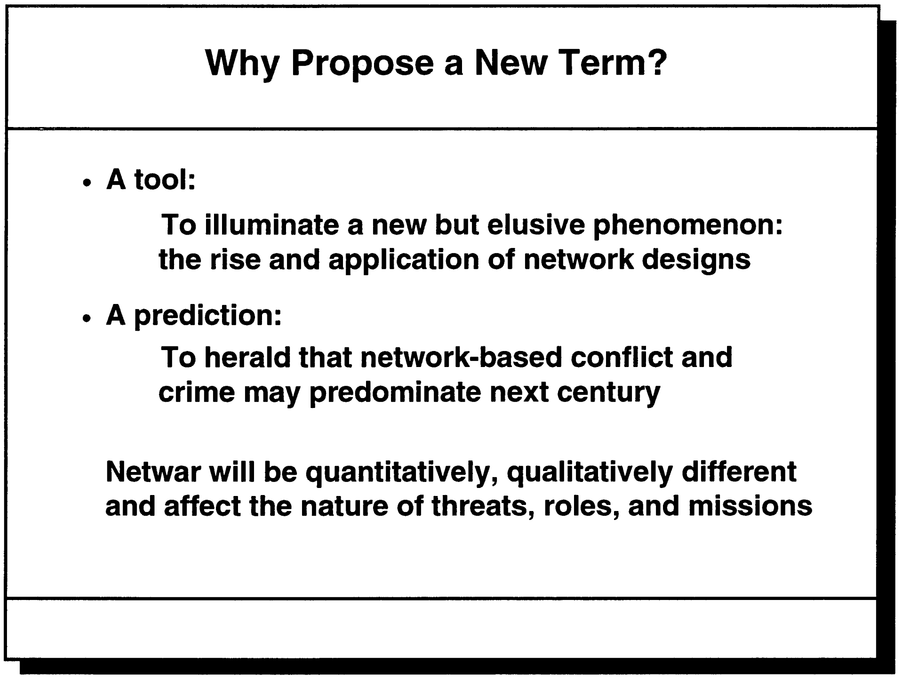
But that is not all: The netwar spectrum may increasingly include a new generation of revolutionaries and activists who espouse postindustrial, information-age ideologies that are just now taking shape. In some cases, identities and loyalties may shift from the nation-state to the transnational level of "global civil society." New kinds of actors—e.g., anarchistic and nihilistic leagues of computer-oriented "cyboteurs"—are also beginning to arise who may partake of netwar.

Many if not most netwar actors will be nonstate and even stateless. Some may be agents of a state, but others may turn states into their agents. Odd hybrids and symbioses are likely. Moreover, a netwar actor may be both subnational and transnational in scope.

Many netwar actors may be antagonistic to U.S. interests, such as WMD proliferators. But others, like some transnational social activists, may not. In some cases, a netwar actor may benefit U.S. interests. Many variations are possible. Thus the advent of netwar may prove mainly a bane but at times a boon for U.S. policy.

The full spectrum of netwar proponents may seem broad and odd at first glance. Some actors could be fit into standard notions of LIC, OOTW, and crime. But not all fit easily into prevailing categories. And trying to make them fit risks overlooking the underlying pattern that cuts across all these variations: the use of network forms of organization, doctrine, strategy, and communication attuned to the information age.

Despite the modernity of the concept, historical instances of netwar-like actors abound. Examples mentioned in this study include: irregular warfare in North America during the French and Indian Wars, and the American Revolution in the eighteenth century; the warfare waged by indigenous Spanish guerrillas against the Napoleonic occupation in the early nineteenth century; as well as pirates and other criminals and terrorists that have long operated on the fringes of empires and nation-states. Yet, in contrast to the currently emerging examples of netwar, these early cases were forced, largely by circumstance, into netwar-like designs; these were not designs that were determined by explicit doctrine, or that could be sustained for long, or over great distances.



Why Propose a New Term?

- **A tool:**

  To illuminate a new but elusive phenomenon: the rise and application of network designs

- **A prediction:**

  To herald that network-based conflict and crime may predominate next century

Netwar will be quantitatively, qualitatively different and affect the nature of threats, roles, and missions

We think a new term is needed to focus attention on the fact that network-based conflict and crime are increasing. No current terms about LIC and OOTW fit this purpose. Moreover, the term "information warfare" (IW) and its derivatives (e.g., "infowar," "information warriors") are both too broad and too narrow to be appropriate. On the one hand, IW is used sometimes to refer to the entire spectrum of information-age conflict; on the other hand, it is increasingly associated with narrow technical issues of cyberspace vulnerability, security, and safety.

The term "netwar" connotes that the information revolution is as much about organizational design as about technological prowess, and that this revolution favors whoever masters the network form. The term amounts, then, to both a tool and a prediction:

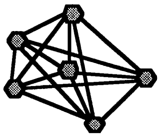
- *Tool,* because it illuminates—and instructs the eye to focus on—a new but elusive phenomenon requiring new concepts and methodologies to understand: the rise of network forms of organization.
- *Prediction,* because it heralds the prospect that networked adversaries will probably predominate the spectrum of conflict and crime early next century.

The term may strike some readers as fanciful, and a better term may yet be found. But meanwhile, in addition to providing a basis for this analysis, it is already being adopted by protagonists of varied political creeds who believe it resonates with their doctrines and objectives. For example, some extreme rightist militia members in the United States have been heard to declare netwar (or *netkrieg*) against the U.S. government, and have organized a virtual *netwaffe.* Also, center-left activists operating in Mexico sometimes refer to themselves now as "netwarriors."

The phenomenon of netwar is not entirely new—there are examples from decades past—but it is growing and spreading to an extent that will make it quantitatively and qualitatively different from what has gone before. It is becoming both more plentiful and more powerful, enough to compel a rethinking of the overall nature of potential threats, and of the roles and missions for responding to them.

Netwar Design Elements

- **Web of dispersed, interconnected "nodes"**
  - **Nodes may be large or small in size,**
  - **tightly or loosely coupled to each other,**
  - **inclusive or exclusive in membership,**
  - **specialized or segmentary**



- **Flat structure: no central command, little hierarchy, much consultation, local initiative—a "panarchy"**
- **Central doctrine and decentralized tactics**
- **Dense communication of functional information**

—> A distinctive design with unique strengths

The phenomenon of netwar is still emerging; its organizational, doctrinal, and other dimensions are yet to be fully defined and developed. But the outlines are detectable.

An archetypal netwar actor consists of a web (or network) of dispersed, interconnected "nodes" (or activity centers)—this is its key defining characteristic. It may resemble the bounded "all-channel" type of network pictured above. These nodes may be individuals, groups, formal or informal organizations, or parts of groups or organizations. The nodes may be large or small in size, tightly or loosely coupled, and inclusive or exclusive in membership. They may be segmentary or specialized; that is, they may look quite alike and engage in similar activities, or they may undertake a division of labor based on specialization. The boundaries of the network may be sharply defined or blurred in relation to the outside environment.

The organizational structure is quite flat. There is no single central leader or commander; the network as a whole (but not necessarily each node) has little to no hierarchy. There may be multiple leaders. Decisionmaking and operations are decentralized and depend on consultative consensus-building that allows for local initiative and autonomy. The design is both acephalous (headless) and polycephalous (Hydra-headed)—it has no precise heart or head, although not all nodes may be "created equal." In other words, the design is a heterarchy, but also what might be termed a "panarchy" (see below).

The structure may be cellular for purposes of secrecy or substitutability (or interoperability). But the presence of "cells" does not necessarily mean a network exists, or that it is of the "all-channel" design. A hierarchy can also be cellular, as has been the case with some subversive organizations. Or the cells may be arranged in a "chain" or "star" rather than an all-channel shape.

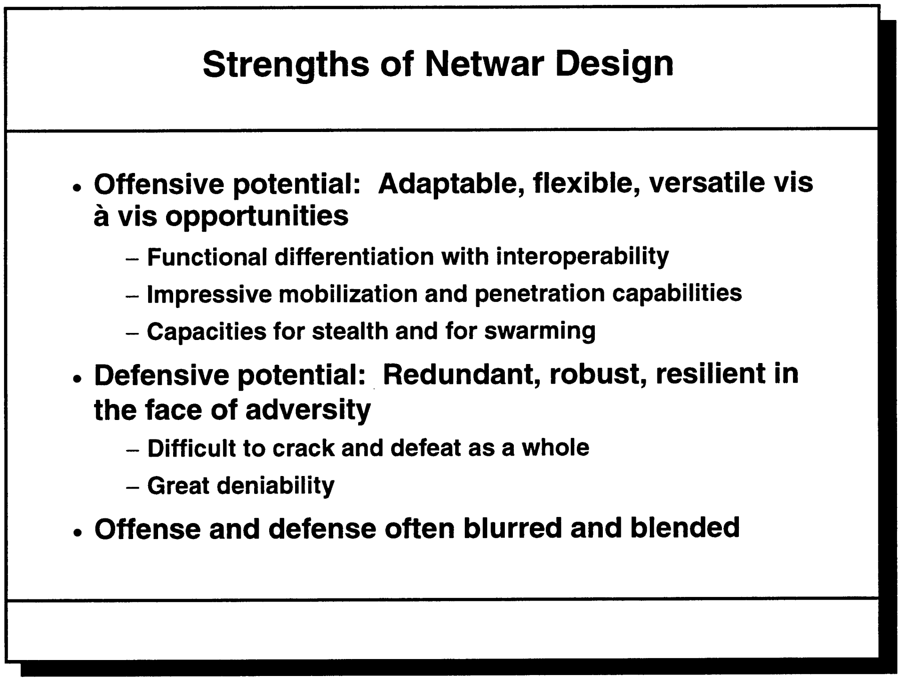
The capacity of this nonhierarchical design for effective performance over time may depend on a powerful doctrine or ideology, or at least a strong set of common interests and objectives, that spans all nodes, and to which the members subscribe in a deep way. Such a doctrine can enable them to be "all of one mind" even if they are dispersed and devoted to different tasks. It can provide an ideational, strategic, and operational centrality that allows for tactical decentralization. It can set boundaries and provide guidelines for decisions and actions so that they do not have to resort to a hierarchy—"they know what they have to do." That is why a nouveau term like panarchy may be more accurate than heterarchy.

The design depends on having a capacity—better yet, a well-developed infrastructure—for the dense communication of functional information. This does not mean that all nodes have to be in constant communication; that may not make sense for a secretive actor. But when communication is needed, information can be disseminated promptly and thoroughly, both within the network and to outside audiences.

In many respects, this archetypal netwar design resembles a "segmented, polycentric, ideologically integrated network" (SPIN). The SPIN concept, identified by anthropologist Luther Gerlach and sociologist Virginia Hine, stems from an analysis of U.S. social movements in the 1960s and 1970s:

> By segmentary I mean that it is cellular, composed of many different groups. . . . By polycentric I mean that it has many different leaders or centers of direction. . . . By networked I mean that the segments and the leaders are integrated into reticulated systems or networks through various structural, personal, and ideological ties. Networks are usually unbounded and expanding. . . . This acronym [SPIN] helps us picture this organization as a fluid, dynamic, expanding one, spinning out into mainstream society (Gerlach, 1987, p. 115, based on Gerlach and Hine, 1970).

The SPIN concept is a precursor of the netwar concept. Indeed, Gerlach and Hine anticipated two decades ago many points about network forms of organization that are just now coming into vogue.



Strengths of Netwar Design

- **Offensive potential: Adaptable, flexible, versatile vis à vis opportunities**
  - **Functional differentiation with interoperability**
  - **Impressive mobilization and penetration capabilities**
  - **Capacities for stealth and for swarming**
- **Defensive potential: Redundant, robust, resilient in the face of adversity**
  - **Difficult to crack and defeat as a whole**
  - **Great deniability**
- **Offense and defense often blurred and blended**

This distinctive design has unique strengths for both offense and defense. On the offense, netwar is adaptable, flexible, and versatile vis-à-vis opportunities and challenges that arise. This may be particularly the case where there is functional differentiation and specialization among the network's nodes. These node-level characteristics, rather than implying a need for rigid command and control of group actions, combine with interoperability to allow for unusual operational flexibility, as well as for a rapidity of maneuver and an economy of force.

When all, or almost all, network elements can perform either specialized or general missions, the mobilization process can unfold rapidly. This capability alone should improve offensive penetration since the defense's potential warning time may be truncated. The capacity for a "stealthy approach" of the attacking force suggests the possibility that, in netwar, attacks will come in "swarms" rather than in more traditional "waves."[1]

Further, during the course of a netwar offensive, networked forces will, more than likely, be able to maneuver well within the decisionmaking cycle of more hierarchical opponents. This suggests that other networked formations can reinforce the original assault, swelling it; or they can launch swarm attacks upon other targets, presenting the defense with dilemmas about how best to deploy their own available forces.

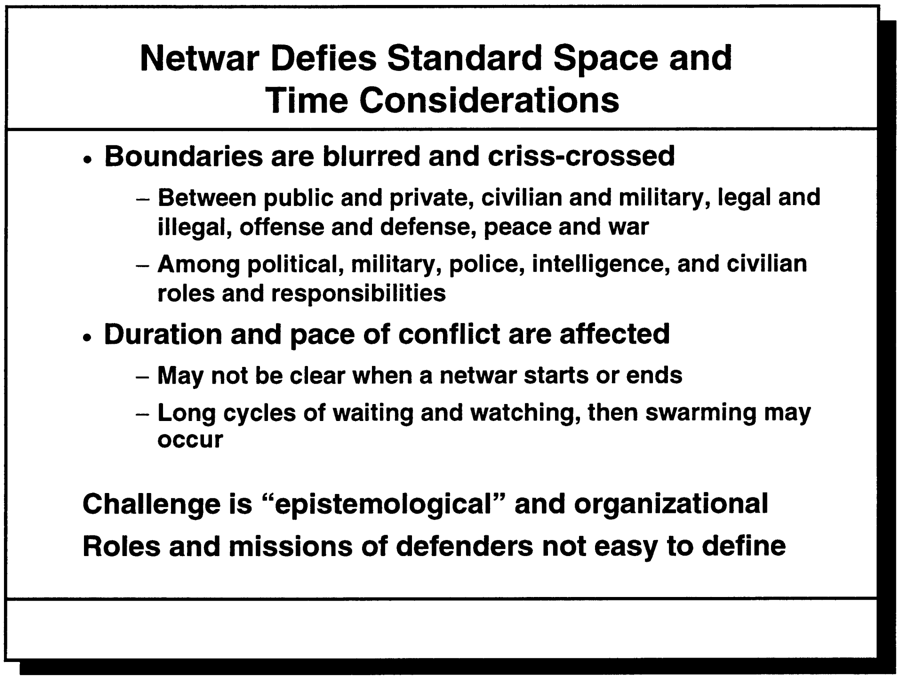
In terms of their defensive potential, networks tend to be redundant and diverse, making them robust and quite resilient in the face of adversity. Because of their capacity for interoperability, and their absence of central command and control structures, such network designs can be difficult to crack and defeat as a whole. In par-

[1] Swarm networks and the capacity of networks for swarming are raised by Kelly (1994).

ticular, they defy counterleadership targeting (i.e., "decapitation"). This severely limits those attacking the network—generally, they can find and confront only portions of it. The rest of the network can continue offensive operations, or swarm to the aid of the threatened nodes, rather like antibodies. Finally, the deniability built into a network affords the possibility that it may simply absorb a number of attacks on distributed nodes, leading the attacker to believe the network has been harmed when, in fact, it remains operationally viable and may actually find new opportunities for tactical surprise.

The difficulty of dealing with netwar actors is deepened when the line between offense and defense is "blurred"—or "blended." When blurring is the case, it may be difficult to distinguish between attacking and defending actions; they may be observationally equivalent. Swarming, for example, may be employed to attack some adversary, or to form an antibody-like defense against incursions into an area that formed part of the network's defensive zone against a hierarchical actor. A historical example is the swarming Indian attack on General George Braddock's forces during the French and Indian Wars—an instance of a network of interconnected American Indian tribes (Gipson, 1946) triumphing over an army designed around a rigid, traditional command hierarchy. While the British saw the Indian attack as presaging a major offensive against the seaboard colonies, it was but an effort to deter incursions into the French-held Ohio River Valley. The French and their Indian allies, outnumbered by the colonists and British imperial forces, took advantage of the disarray caused by their attack to engage in other pinprick raids. This reinforced the British view of an offensive in the making, compelling them to attend primarily to defensive preparations. This lengthened the time it took for the British to muster forces sufficient for the defense of the colonies and the taking of Canada (Parkman, 1884). Today, as discussed later, the Zapatista struggle in Mexico demonstrates anew the blurring of offense and defense.

The blending of offense and defense will often mix the strategic and tactical levels of operations. An example is the netwar-like guerrilla campaign in Spain during the Napoleonic Wars. Much of the time, the guerrillas, and the small British expeditionary force, pursued a strategic offensive aimed at throwing the French out of Iberia. However, more often than not, pitched battles were fought on the defensive, tactically. Similarly, where the guerrillas were on the defensive strategically, they generally took the tactical offensive. The war of the mujahideen in Afghanistan provides an excellent modern example.



Netwar Defies Standard Space and Time Considerations

- **Boundaries are blurred and criss-crossed**
  - **Between public and private, civilian and military, legal and illegal, offense and defense, peace and war**
  - **Among political, military, police, intelligence, and civilian roles and responsibilities**
- **Duration and pace of conflict are affected**
  - **May not be clear when a netwar starts or ends**
  - **Long cycles of waiting and watching, then swarming may occur**

Challenge is "epistemological" and organizational

Roles and missions of defenders not easy to define

This blurring of offense and defense reflects a broader feature of netwar: It tends to defy and cut across standard spatial boundaries, jurisdictions, and distinctions between state and society, public and private, war and crime, civilian and military, police and military, and legal and illegal. A netwar actor is likely to operate in the cracks and gray areas of a society.

A netwar actor may also confound temporal expectations by opting for an unusual duration and pace of conflict. Thus, it may not be clear when a netwar has started, or how and when it ends. A netwar actor may engage in long cycles of quietly watching and waiting, and then swell and swarm rapidly into action.

Moreover, sometimes it may not be clear who the protagonists are. Their identities may be so blurred, and so tangled with other actors' identities, that it is difficult to ascertain who, if anyone in particular, lies behind a netwar. This may be particularly the case where a network configured for netwar is transnational and able to maneuver adroitly and quietly across increasingly permeable nation-state borders.

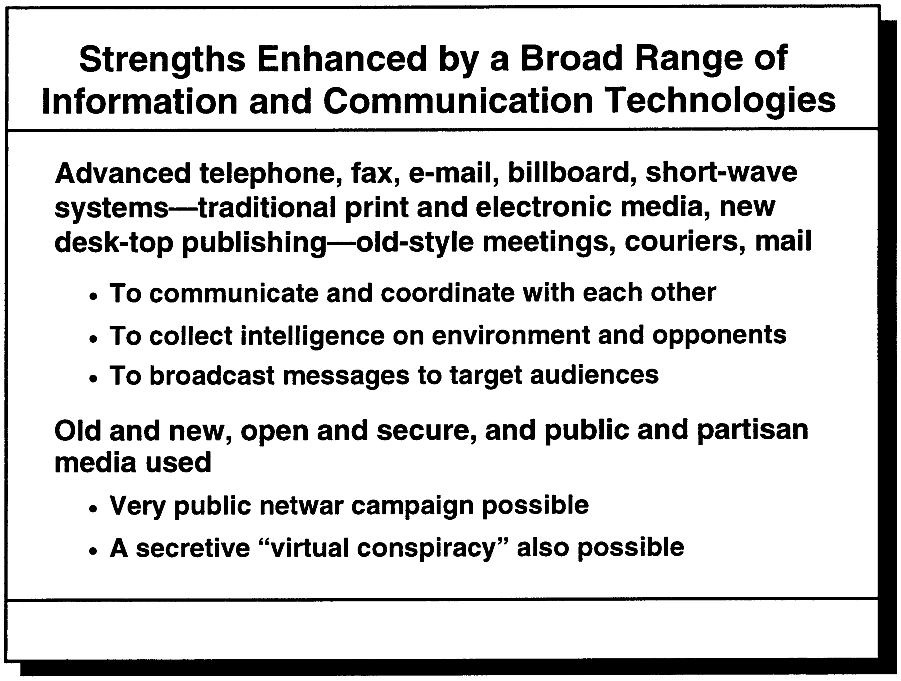
This means, as Szafranski (1994, 1995) illuminates in discussing "neo-cortical warfare," that the challenge can be "epistemological": a netwar actor may aim to confound people's most fundamental beliefs about the nature of their society, culture, and government, partly to strike fear but perhaps mainly to disorient people so that they no longer presume to think or act in "normal" terms.

Examples can be found in the behavior of some terrorists and criminals. Terrorists, notably those using internetted, less hierarchical structures (like the "leaderless" Hamas), have been moving away from the use of violence for specific, often state-related purposes, to its use for more generalized purposes. There has been less hostage-taking accompanied by explicit demands, and more terrorist activity that begins with a destructive act aimed at having broad but vague effects. Thus, for example, Islamic fundamentalist Sheik Rahman sought to blow up the World Trade Center with the intent of changing "American foreign policy" toward the Middle East. The current rash of domestic terrorism in the United States—e.g., the bombing in Oklahoma, and the derailment in Arizona—involves violent actions and vague or no demands. This reflects a rationality that disdains pursuing a "proportionate" relationship between ends and means, seeking instead to unhinge a society's perceptions.

Criminals also use methods tantamount to epistemological warfare when they insert themselves deeply into the fabric of their societies, e.g., by wrapping themselves in nationalism, acting like local "Robin Hoods," and/or seeking to influence, if not control, their governments and their foreign and domestic policies. Examples abound, in Colombia, Italy, Mexico, and Russia, where symbiotic ties exist between criminal and governmental organizations.

The more epistemological the challenge, the more it may be confounding from an organizational standpoint. Whose responsibility is it to respond? Whose roles and missions are at stake? Is it a military, police, intelligence, or political matter? The roles and missions of defenders are not easy to define, and this may make both deterrence and defense quite problematic.

Netwar adds to the challenges facing the "nation-state." Its traditional presumptions of sovereignty and authority are linked to a bureaucratic rationality in which issues and problems are categorized so that specific offices can be charged with taking care of specific problems. In netwar, things are rarely so clear.



Strengths Enhanced by a Broad Range of Information and Communication Technologies

Advanced telephone, fax, e-mail, billboard, short-wave systems—traditional print and electronic media, new desk-top publishing—old-style meetings, couriers, mail

- **To communicate and coordinate with each other**
- **To collect intelligence on environment and opponents**
- **To broadcast messages to target audiences**

Old and new, open and secure, and public and partisan media used

- **Very public netwar campaign possible**
- **A secretive "virtual conspiracy" also possible**

It is not easy to make a multiorganizational network function well—a hierarchy is easier to run. A key reason for this is that network forms of organization generally require constant dense communications. The information revolution dramatically enhances the viability of the network form (as discussed below). Thus, the new technologies strengthen the prospects and capabilities for actors to take a netwar approach to conflict and crime.

Indeed, new technologies make possible a rather "pure" variety of netwar in which all strategy and tactics—for example, disinformation campaigns and disruptive computer hacking—occur on "the Net" and in the media. But—and this should always be kept in mind—netwar is not just about the new technologies.

The latest telecommunications systems—including advanced telephone, fax, electronic mail (e-mail), and computerized billboard and conferencing systems—all contribute to netwar, and their roles in recent conflicts are often remarked about. But older technologies, like short-wave radio and cassette tape, are also important for some actors. Computerized desktop publishing, a fairly recent development, enhances the outreach of some actors, but access to traditional print and electronic media remains crucial too, depending on the actor and the audience. Meanwhile, old-style face-to-face meetings, human couriers, and regular mail have not ceased to play roles. If a terrorist or criminal sent a coded fax, this would likely be an example of netwar-related behavior, but if the same actor paid off a journalist for an article critical of some U.S. policy, this may also be an example.

Such technologies enhance the capabilities of a network's members not only to coordinate with each other, but also to collect intelligence on the external environment and on their opponents, and to broadcast or otherwise transmit messages to target audiences. The varieties of netwar actors that we discuss later have used all kinds of old and new, high-tech and low-tech, open and secure, and public and partisan media; indeed, many netwar actors are likely to use a layered mix. The technologies can be used to wage a very public netwar campaign (as in Mexico) or to foster a secretive "virtual conspiracy" (as may be an aim of some extreme rightists in the United States).[2]

[2] Credit for the term "virtual conspiracy" is owed to journalist Lou Dolinar of *Newsday*.