Incidental Paper

Seminar on Intelligence, Command, and Control

Guest Presentations, Spring 1999
Charles J. Cunningham, Jr., Kawika Daguiio,
Patrick M. Hughes, Peter H. Daly, Walter Jajko,
David J. Kelly, Gregory J. Rattray,
Michelle K. Van Cleave, Robert T. Marsh,
Randall M. Fort

Program on Information Resources Policy

Harvard University
Center for Information Policy Research
Cambridge, Massachusetts
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Seminar on Intelligence, Command, and Control

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Cleave, Robert T. Marsh, Randall M. Fort

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Project Director:
Anthony G. Oettinger

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I also wish to thank: George W. Hays, for his intellectual and his logistical efforts on behalf of the seminar; Margaret MacDonald, for whipping raw transcripts into readable form and for supervising production; and Fran Jonuskis, for transcribing and setting up the text.

The responsibility for any sins of omission or commission nonetheless remains entirely mine.

Anthony G. Oettinger
Introduction

The papers in this volume are lightly edited transcripts of presentations and discussions ordered in the sequence in which they took place. The informality of oral exposition interrupted by questions or comments has been preserved. Only pauses and repetitions have been eliminated and halting sentences smoothed. Substance has, as far as possible, been left unaltered. All guests made their presentations in an open forum, forewarned that neither classified nor proprietary matters are appropriate in a university classroom.

In the spring of 1999 the seminar examined the evolution since World War II of the concepts, technologies, and institutions of the U.S. intelligence and military communities and, in particular, the linkages of that evolution with international security and domestic policies. Speakers representing both the military and civilian communities offered a variety of presentations—for example, on organizational agility, protection of systems, global information services, information warfare—in which developed similarities were developed and evaluated between the functions and support systems of the intelligence staff and the command-and-control line on the one hand and the business management information and decisionmaking functions and support systems on the other.
Anthony G. Oetinger, Professor of Information Resources Policy, has had a continuing interest in the ways in which institutions draw on systems of people, policies, and technologies to gather and use information for survival and growth. Since 1980 his graduate seminar on intelligence, command, and control has explored this topic with a series of guest speakers from military organizations, civil government, and businesses. While the guest speakers tend to be practitioners of the decision-making process, some are theoreticians who attempt to see patterns in the chaos of day-to-day crises. Taken as a whole, the series chronicles the recent history of this field. The following descriptions of previous volumes identify the speakers' roles at the time of their presentations.

In the fall of 1997, rather than focus on a particular theme, speakers addressed a variety of topics centered on evolving information needs in the 21st century. Underlying these presentations was a recognition that information, with the capabilities it creates, has become not only the driver of effective military strategy and politics but also a "center of gravity" developed nations must protect. The speakers, representing both military and civilian communities, illustrated this recognition by examples that ranged from satellite-based intelligence collection to a smartcard system, which would reduce the dependence on cash for commercial transactions.

Robert R. Rankine, Jr., Vice President for Government Business at Hughes Space and Communications Company, and Director of the Washington Space Office for parent company Hughes Electronics Corporation: "Military Applications of Commercial SATCOM Systems."

Victor A. DeMarines, President and Chief Executive Officer of the MITRE Corporation: "FFRDC Business at MITRE."

Keith R. Hall, Assistant Secretary of the Air Force (Space) and Director of the National Reconnaissance Office (NRO): "Space Systems as Contributors to Information Superiority."

William R. Cloutz, Director for international support at MPRI, Inc.: "C3I Issues from a United Nations Perspective-Revisited."

Kenneth A. Minihan, Director of the National Security Agency (NSA)/Central Security Service: "Shaping the Intelligence Environment in the Information Age."

Henry A. Lichstein, Vice President of Citibank, N.A.: "The Smartcard as the Ultimate Thin Client: Looking Beyond the New York Smartcard Pilot."


In the spring of 1997, speakers elaborated on aspects of "information warfare" — the primary theme of the two previous years. Certain aspects of this issue recurred in several presentations: distinguishing between "strategic" information warfare and criminal activity; assessing the developed nations' vulnerability to attack on the information infrastructure; and achieving information superiority in battlefield situations. Several speakers provided historical perspectives...
on the interactions among technical advances, intelligence, and defense policy. All presentations emphasized the growing importance of reliable and responsible intelligence collection and of interoperable military systems at a time of decreasing defense budgets.


C. Kenneth Allard, Chief Executive Officer of Cyber Strategies, Inc.: “Information Warfare: Hierarchies or Networks?”

Charles A. Briggs, former Executive Director of the Central Intelligence Agency (1981-84): “CIA Paths Toward the Information Highway.”


A. Denis Clift, President of the Joint Military Intelligence College: “Intelligence: The Left Hand of Curiosity.”

Arnold E. Donahue, President of Pactrade, Inc.: “Perspectives on U.S. Intelligence.”

Philip B. Heymann, James Barr Ames Professor at Harvard Law School; Director of the Center for Criminal Justice at Harvard University: “Relationships Between Law Enforcement and Intelligence in the Post-Cold War Era.”


Gregory J. Rattray, Ph.D candidate at the Fletcher School of Law and Diplomacy, Tufts University: “Strategic Information Warfare.”


Since 1980, the seminar has addressed generic questions concerning the evolution of the conception, technologies, and institutional framework of the U.S. intelligence and military communities by examining specifics of that evolution since World War II, drawing analogies wherever possible between the functions and the support systems of the intelligence staff and the command-and-control line in the military world and management information and decision-making functions and support systems in the civilian world of business and government. In 1995–96, the debates over the reorganization of U.S. intelligence functions and over “information warfare” provided vehicles for an unusual amount of institutionalized trend-surfing as well as spotlights that illuminated perennial fundamentals. A subtheme was U.S. operations in Bosnia.

Arthur K. Cebrowski, Director for Command, Control, Communications, and Computer Systems (J-6), the Joint Staff: “Command and Information Systems.”

James R. Clapper, Jr., Vice President of Vredenbergs: “A Proposed Restructuring of the Intelligence Community.”

Albert J. Edmonds, Director of the Defense Information Systems Agency and Manager of the National Communications System: “Information Systems Support to DOD and Beyond.”

Mark M. Lowenthal, Staff Director of the House Permanent Select Committee on Intelligence: “Congress and the Intelligence Community: Oversight and Reorganization Plans.”

John M. McConnell, Partner at Booz-Allen & Hamilton, Inc.: “The Evolution of Intelligence and the Public Policy Debate on Encryption.”


As in previous years, issues of command and control, from crisis management, as in the Gulf War or the Six Day War, to long-term planning for information warfare or coalition warfare, were joined to changes in the world (from “bipolar” to “multipolar”), in the defense budget, and in technology. The capabilities and vulnerabilities of the U.S. defense information infrastructure were examined in terms of new technologies (as well as the ancient problem of human error) and the “fit” between intelligence and democracy.


Michael L. Brown, Analyst and military assistant for the Director of Net Assessment in the Office of the Secretary of Defense: “Information Warfare and the Revolution in Military Affairs.”

A. Jay Cristol, Chief Judge of the United States Bankruptcy Court of the Southern District of Florida: “The Liberty Incident.”


Arthur V. Grant, Jr., Member of the professional staff of the U.S. Senate Select Committee on Intelligence: “Effective Intelligence and Free Democracy—Is That an Oxymoron?”

Robert Lawrence, Chief, Planning and Scheduling Division, Office of the Inspector General, Headquarters Air Mobility Command, Scott Air Force Base: “Global Reach Laydown.”

John A. Leide, Director, National Military Intelligence Collection Center, Defense Intelligence Agency: “Coalition Warfare and Predictive Analysis.”

William A. Owens, Vice Chairman of the Joint Chiefs of Staffs: “The Three Revolutions in Military Affairs.”
This year's seminar series continued to focus on new demands being placed on the United States and the new world order resulting from dramatic changes in the international geopolitical picture in recent years. The promise of emerging technologies in responding to the issues served as a central, underlying theme, while each speaker highlighted concerns forcing not only widespread organizational changes in the U.S. defense establishment but also a significant shift in the conceptual framework of DOD doctrine and the strategy of the National Command Authorities, which drives U.S. national security policy.


James Davis, Assistant Deputy Chief of Staff for Intelligence, U.S. Army: “The Role of Army Intelligence in the National Foreign Intelligence Program.”


Keith R. Hall, Deputy Assistant Secretary of Defense for Intelligence Collection Center, DIA: “Intelligence Needs in the Post Cold War Environment.”

Col. Richard L. Layman, USAF, Commander, Second Space Warning Squadron: “Survivability and Space-Based Missile Warning Capabilities.”

Major General John A. Leide, USA, Director, National Military Intelligence: “Intelligence Analysis in Coalition Warfare.”


Col. Lewis Wallace, Jr., USAF Fellow, Institute for the Study of Conflict, Boston University: “From the Soviet Union to Russia: Contradictions and Implications.”

This year's seminar series focused on new demands being placed on the United States and the new world order resulting from dramatic changes in the international geopolitical picture in recent years. Many speakers emphasized new threats to U.S. national security caused by the changing global geopolitical landscape and each emphasized the ever-increasing importance of effective command and control and interoperability of forces in the success or failure of future armed conflict.

Randall M. Fort, Deputy Assistant Secretary for Functional Analysis and Research, Bureau of Intelligence and Research, Department of State: “The Role of Intelligence in Economic and Other Crises.”

Barry M. Horowitz, President and CEO, MITRE Corporation: “The Emergence of Data Systems: Cost and Technical Change in Military Systems.”

Walter Jajko, Director, Special Advisory Staff, Office of the Under Secretary for Policy, Department of Defense: “Defense Intelligence: Adaptability, Character, and Capability.”
Major General Gary W. O'Shaughnessy, Commander, Air Force Intelligence Command and Director, Joint Electronic Warfare Center: “The Structure and Missions of the Air Force Intelligence Command.”

Read Admiral Edward D. Sheafer, Director of Naval Intelligence: “Naval Intelligence in the Post-Cold War Era.”

Nina J. Stewart, Executive Assistant to the Director of Central Intelligence: “Infrastructure for Security.”

Vice Admiral Jerry O. Tuttle, Director of Space and Electronic Warfare: “The Copernican Pull.”

Michelle K. Van Cleave, Esq., Assistant Director for National Security Affairs and General Counsel, White House Office of Science and Technology Policy: “Intelligence: The Science and Technology Connection.”

This year’s seminar series focused on evolving threats to U.S. national security as Congress and National Command Authorities struggled to redefine America’s global geopolitical interests and the organizational changes needed to meet them. Several speakers emphasized the stakes for new and advanced technologies in this national debate.

Roscoe M. Cougill, Director, Command, Control, Communications and Computer Systems Directorate: “C3 During Desert Shield and Desert Storm.”

Richard L. Haver, Assistant to the Secretary of Defense for Intelligence Policy: “The Process of Reorganization within the U.S. Intelligence Community.”


Frank B. Horton, Deputy Chief of Staff/Intelligence, HQ Strategic Air Command: “Command Plan and C3I.”


Albert R. Lubarsky, Director, C3I for Counternarcotics, Department of Defense: “C3I in Transition.”


John M. McConnell, Director for Joint Staff Intelligence, J2: “The Role of the Current Intelligence Officer for the Chairman of the Joint Chiefs of Staff.”

This year’s seminar series stressed the role of intelligence in organizations. A number of speakers addressed the challenges confronting the U.S. intelligence apparatus in the Post-Cold War political environment.


Duane P. Andrews, Assistant Secretary of Defense (C3I): “Restructuring the World of C3I.”

Carnes Lord, Assistant to the Vice President for National Security Affairs: “Bureaucratic Problems in Formulating National Strategy.”

Eugene B. Lotochinski, Vice President, Marketing, Northern Telecom World Trade: “Global Communications Capabilities for the Banking Industry.”

David Y. McManis, National Security Agency/CSS representative to DOD: “Technology, Intelligence and Command.”

John M. Ruddy, Vice President, The MITRE Corporation: “Military Use of Satellite Communications.”

Paul R. Schwartz, Major General, USA: “Coalition Command and Control in Desert Shield/Desert Storm.”


Joseph S. Toma, Chief, Special Action Division, Joint Staff J6-A: “C3: A View from Inside the Joint Staff.”

Guest Presentations, Spring 1990. [146 pages; December 1991/Incidental Paper: I-91-3]
This year’s seminar series stressed the role of intelligence in organizations. A number of speakers addressed the challenges confronting the U.S. intelligence apparatus in the Post-Cold War political environment.

Lt. Gen. James Cassity, Jr., USAF, Director, Command, Control & Communications (J-6), Joint Chiefs of Staff: “Restructuring Military Policy to Reflect Worldwide Political Changes.”

Kenneth M. Duberstein, President and CEO of The Duberstein Group, formerly Chief of Staff to President Reagan: “The White House Information Process.”

Thomas K. Latimer, Staff Director, House Permanent Committee on Intelligence, U.S. House of Representatives: “The Congressional Intelligence Committees.”

James W. Lucas, Dean, School of Professional Studies, Defense Intelligence College: “The Information Needs of Presidents.”

Gordon Negus, Executive Director, Defense Intelligence Agency: “Intelligence in Support of U.S. Foreign Policy.”

Vice Admiral W.O. Studeman, Director, National Security Agency: “The Philosophy of Intelligence.”


This year’s presentations included continuing assessments of the Defense Reorganization Act of 1986, a look at the impact of new technologies on C3I planning and perspectives on intelligence, command and control activities in some civilian domains.

**James M. Fox**, Assistant Director in Charge, New York City, Federal Bureau of Investigation: “Crisis Management at the FBI.”


**Stuart E. Johnson**, Director, Strategic Concepts Development Center, INSS, National Defense University: “Command and Control Education and Research.”

**John F. Magee**, Chairman of the Board, Arthur D. Little, Incorporated: “Some Business Analogies to C3I.”


**John T. Myers**, Lieutenant General, USA, and Director, Defense Communications Agency: “Future Directions for Defense Communications.”

**Charles A. Zraket**, President and CEO, The MITRE Corporation: “Four Vital Issues in C3I.”


Speakers in this series addressed a variety of topics, but two themes predominated. The first of these was the reorganization of the U.S. Department of Defense in accordance with the Goldwater-Nichols Reorganization Act of 1986. The second major theme was the role of Special Operations Forces and Low Intensity Conflict (SOF/LIC) in defense planning and organization.

**Frank J. Breth**, Brigadier General, USMC, Director of C4I2 Department/Director of Intelligence: “Getting in Front of C4I2 Problems.”

**Ruth M. Davis**, President, Pymatuning Group, formerly an Assistant Secretary of Energy and Deputy Under Secretary of Defense: “Putting C3I Development in a Strategic and Operational Context.”

**Robert T. Herres**, General, USAF, and Vice Chairman, Joint Chiefs of Staff: “Strengthening the Chairman of the Joint Chiefs of Staff.”

**Rae M. Huffstutler**, Deputy Director for Administration, formerly Director, National Photographic Interpretation Center, Central Intelligence Agency: “Intelligence Sources and Their Applications.”


**James R. Locher, III**, Professional Staff Member, Senate Committee on Armed Forces: “Special Operations and Low Intensity Conflict: A Congressional Perspective.”

**Earl F. Lockwood**, President and Chief Executive Officer, Betac Corporation: “The Evolution of Special Operations Forces.”


Jerry O. Tuttle, Vice Admiral, USN, and Director, Command, control and Communications Organization of the Joint Chiefs of Staff (J-6): “Tailoring C3I Systems to Military Users.”

Speakers explored the information requirements of national, military, and business organizations at a time of technological and organizational change in the military and civilian worlds. The reorganization of the U.S. Department of Defense in accordance with the Goldwater-Nichols Defense Reorganization Act of 1986 was the occasion for analysis and re-evaluation.

**Archie D. Barrett,** professional staff, House Armed Services Committee, formerly military staff assistant to the Executive Secretary of the Defense Organization Study: “Defense Reorganization: A View from the House.”

**Robert L. DeGross,** provost, Defense Intelligence College: Teaching Intelligence.”

**Fred R. Demech, Jr.** captain, U.S. Navy, formerly executive director, the President’s Foreign Intelligence Advisory Board: “Making Intelligence Better.”


**James R. Locher, III,** professional staff, Subcommittee on Projection Forces and Regional Defense, Senate Committee on Armed Services: “Defense Reorganization: A View from the Senate.”

**George C. Lodge,** professor, Harvard Graduate School of Business Administration, formerly director of information, U.S. Department of Labor and Assistant Secretary of Labor for International Affairs: “Ideology and National Competitiveness.”

**Eugene B. Lotochinski,** vice president, market development, Northern Telecom Inc.: “The Information Management Marketplace.”


**Michael J. Zak,** vice president, marketing, Concord Communications, Inc.: “Coming of Age in C3I.”

**Guest Presentations, Spring 1986.** [168 pages; February 1987/Incidental Paper: I-87-1]
The speakers this year addressed a variety of topics, with two predominant themes. The first was the manner in which organizations—military, diplomatic, business—obtain and use intelligence. The second theme was how organizations protect information from the growing threat of electronic interception.

**Robert Conley,** formerly Deputy Assistant Secretary for Advanced Technology and Analysis and Acting Assistant Secretary for Electronic Systems and Information Technology, Department of the Treasury: “Data Security in the Information Age.”

**Harold Daniels,** Deputy Director for Information Security at the National Security Agency, formerly Assistant Deputy Director for Communications Security: “The Role of the National Security Agency in Command, Control and Communications.”
John Grimes, Director of National Security Telecommunications and Director of Defense Programs (C3) of the National Security Council: “Information Technologies and Multinational Corporations.”

Bobby R. Inman, president and chief executive officer, Microelectronics and Computer Technology Corporation, formerly Director of the Office of Naval Intelligence, Director of the National Security Agency, and Deputy Director of Central Intelligence: “Technological Innovation and the Cost of Change.”

Richard J. Levine, editorial director, data base publishing, Dow Jones & Company: “Data Base Publishing for Business Intelligence.”

Mark Lowenthal, acting director, Office of Strategic Forces Analysis, Bureau of Intelligence and Research, Department of State: “The Quest for ‘Good’ Intelligence.”

Clarence E. McKnight, Director for Command, Control, and Communications Systems, Organization of the Joint Chiefs of Staff, formerly Commanding General, U.S. Army Communications Command: “C3I Systems at the Joint Level.”

Lionel Olmer, formerly Under Secretary for International Trade, U.S. Department of Commerce, heading the International Trade Administration; currently member of Paul, Weiss, Rifkind, Wharton & Garrison, an international law firm: “Intelligence Techniques for the American Business Community.”

These presentations examined the link between defense organization and the efficacy of command, control, communications and intelligence, within the context of current debate over reorganization of the Joint Chiefs of Staff.

Archie D. Barrett, professional staff, House Armed Services Committee, formerly military staff assistant to the Executive Secretary of the Defense Organization Study: “Politics and the Military—The Climate for Reform.”


Lincoln Faurer, formerly Director of the National Security Agency and Chief, Central Security Service, Fort Meade, Maryland: “The Role of Intelligence Within C3I.”


Robert Hilton, consultant specializing in national and international security affairs and political risk analysis; formerly Vice Director for Operations, Joint Chiefs of Staff: “Roles of the Joint Chiefs of Staff in Crisis Management.”

Samuel P. Huntington, director, Center for International Affairs, Harvard University, formerly Coordinator of Security Planning for the National Security Council: “Centralization of Authority in Defense Organizations.”

Donald Latham, Assistant Secretary of Defense, C3I: “A View from Inside OSD.”

**Guest Presentations, Spring 1984.** [125 pages; February 1985/Incidental Paper: I-85-2]
These presentations explored the roles of communication, information, and warning systems in peacekeeping, crisis management, and economic security.


Stuart E. Brauch, Deputy Assistant Secretary for Communications in the Department of State and member, National Communications System and U.S. Communications Security Board of the National Security Council: “C3I and Crisis Management.”

Leo Cherne, executive director, Research Institute of America: “Television News and the National Interest.”

Hubert L. Kertz, formerly president and managing director, American Bell International, Inc., with Anthony G. Oettinger: “With AT&T in Iran.”

David McManis, National Intelligence Officer for Warning and Director, National Warning Staff: “Warning as a Peacekeeping Mechanism.”


(The seminar was not held during 1983.)

**Guest Presentations, Spring 1982.** [181 pages; December 1982/Incidental Paper: I-82-3]
This series of C3I sessions emphasized national security issues, exploring policy and planning as well as procurement and implementation perspectives. Guests discussed not only the impact within the defense community of rapidly expanding technology but also the public consequences—national and international—of intelligence gathering and use.

Richard D. DeLauer, Under Secretary of Defense for Research and Engineering: “The View from the Hot Seat.”

Hillman Dickinson, Director for Command, Control and Communications Systems, Joint Chiefs of Staff: “Planning for Defense-Wide Command and Control.”

Gerald P. Dinneen, corporate vice president, Science and Technology, Honeywell, Inc., formerly Assistant Secretary of Defense for Communications, Command, and Control, and Intelligence: “C3 Priorities.”

Richard H. Ellis, formerly commander in chief, Strategic Air Command: “Strategic Connectivity.”


Thomas H. McMullen, deputy commander, Tactical Air Command: “A Tactical Commander’s View of C3I.”

-xvi-
William G. Miller, associate dean and professor of international politics, Fletcher School of Law and Diplomacy, Tufts University: "Foreign Affairs, Diplomacy and Intelligence."


The perspective in this volume encompasses the Congress, combatant commands, defense contractors, and technological innovators. As part of an ongoing open forum on C3I, the sessions brought together the intersecting vantage points of industrial suppliers and innovators, government funders and decision makers, and principals in military intelligence.

William O. Baker, formerly chairman, Bell Laboratories, Inc.: "The Convergence of C3I Techniques and Technology."


Richard D. DeLauer, executive vice president, TRW, Inc.: "A Major Contractor's View of C3I."

B.R. Inman, Deputy Director of Central Intelligence: "Issues in Intelligence."

James M. Osborne, formerly senior vice president, E-Systems, Inc.: "Meeting Military Needs for Intelligence Systems."

David C. Richardson, vice admiral, U.S. Navy (ret.); consultant, Defense Intelligence Review Panel, the Defense Science Board, and other panels: "The Uses of Intelligence."

Charles Rose, U.S. representative; chairman, Policy Group on Information and Computers: "Congress and C3I."

Charles W. Snodgrass, vice president, Financial Planning and Management, Electronic Data Systems Corp., formerly assistant secretary of the Air Force for financial management: "Funding C3I."

These first presentations in the series described C3I principally from the perspective of national policymaking in the executive branch.

William E. Colby, counsel, Reid & Priest, formerly Director of Central Intelligence: "The Developing Perspective of Intelligence."

B.R. Inman, director, National Security Agency and chief, Central Security Service: "Managing Intelligence for Effective Use."

William Odom, military assistant to the President's assistant for National Security Affairs: "C3I and Telecommunications at the Policy Level."

Lionel Olmer, Director of International Programs, Motorola, Inc; formerly acting executive secretary, President's Foreign Intelligence Advisory Board: "Watchdogging Intelligence."

Lee Paschall, consultant, formerly director, Defense Communications Agency and manager, National Communications System: "C3I and the National Military Command System."

Raymond Tate, formerly Deputy Assistant Secretary of the Navy and Deputy Director of the National Security Agency: “Worldwide C^3I and Telecommunications.”

A.K. Wolgast, manager, Planning and Analysis Dept., EXXON International: “Oil Crisis Management.”

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# Table of Contents

Information Technology and Organizational Agility  
Charles J. Cunningham ................................................................. 1

Protecting the Financial and Payment System by Dispelling Myths  
Kawika Daguiro ................................................................. 17

Future Threats and Challenges  
Patrick M. Hughes ................................................................. 37

Critical Infrastructure Protection  
Peter H. Daly ................................................................. 61

Department of Defense Information Operations: A Critical Commentary  
Walter Jajko ................................................................. 77

Providing Global Information Services to the Warfighter  
David J. Kelly ................................................................. 89

Defensive Strategic Information Warfare: Challenges for the United States  
Gregory J. Rattray ................................................................. 133

Infrastructure Protection and Assurance  
Michelle K. Van Cleave ................................................................. 159

Critical Foundations: Protecting America's Infrastructure  
Robert T. Marsh ................................................................. 183

Whither the Elephant? Public-Private Sector Dynamics in the Information Realm  
Randall M. Fort ................................................................. 209
## Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA</td>
<td>American Bankers Association</td>
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<tr>
<td>ADP</td>
<td>automated data processing</td>
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<td>AOL</td>
<td>America Online</td>
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<tr>
<td>ARPA</td>
<td>Advanced Research Projects Agency; currently DARPA</td>
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<tr>
<td>ASD</td>
<td>assistant secretary of defense</td>
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<tr>
<td>ATM</td>
<td>asynchronous transfer mode OR automatic teller machine</td>
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<tr>
<td>ATO</td>
<td>air tasking order</td>
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<tr>
<td>AUTODIN</td>
<td>Automatic Digital Network</td>
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<tr>
<td>BITS</td>
<td>Banking Industry Technology Secretariat</td>
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<tr>
<td>C³I</td>
<td>command, control, communications, and intelligence</td>
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<tr>
<td>C⁴I</td>
<td>command, control, communications, computers, and intelligence</td>
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<tr>
<td>C⁴ISR</td>
<td>command, control, communications, computers, intelligence, surveillance, and reconnaissance</td>
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<tr>
<td>CEO</td>
<td>chief executive officer</td>
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<tr>
<td>CERT</td>
<td>Computer Emergency Response Team (Carnegie-Mellon University)</td>
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<td>CIA</td>
<td>Central Intelligence Agency</td>
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<tr>
<td>CIAO</td>
<td>Critical Infrastructure Protection Office (White House)</td>
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<td>CINC</td>
<td>commander in chief</td>
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<td>CIO</td>
<td>chief information officer</td>
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<td>CIWG</td>
<td>Critical Infrastructure Working Group</td>
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<td>CJCSC</td>
<td>chairman, Joint Chiefs of Staff</td>
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<td>CND</td>
<td>computer network defense</td>
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<td>CNN</td>
<td>Cable News Network</td>
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<tr>
<td>COE</td>
<td>common operating environment</td>
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<tr>
<td>CONUS</td>
<td>continental United States</td>
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<tr>
<td>CRA</td>
<td>Community Reinvestment Act</td>
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<tr>
<td>DARPA</td>
<td>Defense Advanced Research Projects Agency (occasionally ARPA)</td>
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<tr>
<td>DCI</td>
<td>director of central intelligence</td>
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<tr>
<td>DDCI</td>
<td>deputy director of central intelligence</td>
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<tr>
<td>DES</td>
<td>digital encryption standard</td>
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<tr>
<td>DIA</td>
<td>Defense Intelligence Agency</td>
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<td>DII</td>
<td>Defense Information Infrastructure</td>
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<td>DISA</td>
<td>Defense Information Systems Agency (formerly Defense Communications Agency—DCA)</td>
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<td>DSN</td>
<td>Defense Systems Network</td>
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<tr>
<td>EMP</td>
<td>electromagnetic pulse</td>
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<tr>
<td>EO</td>
<td>Executive Order OR electro-optical</td>
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<tr>
<td>EW</td>
<td>electronic warfare</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FASB</td>
<td>Financial Services Accounting Board</td>
</tr>
<tr>
<td>FBIS</td>
<td>Federal Bureau of Investigation</td>
</tr>
<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
</tr>
<tr>
<td>FDIC</td>
<td>Federal Deposit Insurance Corporation</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
</tr>
<tr>
<td>GAO</td>
<td>General Accounting Office</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
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</tr>
<tr>
<td>GBS</td>
<td>Global Broadcast System</td>
</tr>
<tr>
<td>GCCS</td>
<td>Global Command and Control System</td>
</tr>
<tr>
<td>GCSS</td>
<td>Global Combat Support System</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GII</td>
<td>global information infrastructure</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HUMINT</td>
<td>human intelligence</td>
</tr>
<tr>
<td>I&amp;W</td>
<td>indications and warning</td>
</tr>
<tr>
<td>ICANN</td>
<td>International Corporation for Assigned Names and Numbers</td>
</tr>
<tr>
<td>IMINT</td>
<td>imagery intelligence</td>
</tr>
<tr>
<td>INFOSEC</td>
<td>information security</td>
</tr>
<tr>
<td>INR</td>
<td>Bureau of Intelligence and Research (State Department)</td>
</tr>
<tr>
<td>IP</td>
<td>information processing</td>
</tr>
<tr>
<td>IPO</td>
<td>initial public offering</td>
</tr>
<tr>
<td>IPTF</td>
<td>Infrastructure Protection Task Force</td>
</tr>
<tr>
<td>ISAC</td>
<td>Information Sharing and Analysis Center</td>
</tr>
<tr>
<td>ISP</td>
<td>Internet service provider</td>
</tr>
<tr>
<td>IT</td>
<td>information technology</td>
</tr>
<tr>
<td>IW</td>
<td>information warfare</td>
</tr>
<tr>
<td>JCRD</td>
<td>Joint Capstone Requirements Document</td>
</tr>
<tr>
<td>JCS</td>
<td>Joint Chiefs of Staff</td>
</tr>
<tr>
<td>JMNS</td>
<td>Joint Mission Needs Statement</td>
</tr>
<tr>
<td>JP</td>
<td>Joint Publication</td>
</tr>
<tr>
<td>JTF</td>
<td>joint task force</td>
</tr>
<tr>
<td>MASINT</td>
<td>measurement and signatures intelligence</td>
</tr>
<tr>
<td>MI</td>
<td>military intelligence</td>
</tr>
<tr>
<td>MITI</td>
<td>Ministry of International Trade and Industry (Japan)</td>
</tr>
<tr>
<td>NAERC</td>
<td>North American Energy Research Council</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>NATO</td>
<td>North Atlantic Treaty Organization</td>
</tr>
<tr>
<td>NCA</td>
<td>National Command Authorities</td>
</tr>
<tr>
<td>NCS</td>
<td>National Communications System</td>
</tr>
<tr>
<td>NFIP</td>
<td>National Foreign Intelligence Program</td>
</tr>
<tr>
<td>NII</td>
<td>National Information Infrastructure</td>
</tr>
<tr>
<td>NIPC</td>
<td>National Infrastructure Protection Center</td>
</tr>
<tr>
<td>NIPRNet</td>
<td>Nonsecure Internet Protocol Router Network</td>
</tr>
<tr>
<td>NIST</td>
<td>National Institute of Standards and Technology</td>
</tr>
<tr>
<td>NRO</td>
<td>National Reconnaissance Office</td>
</tr>
<tr>
<td>NS/EP</td>
<td>national security/emergency preparedness</td>
</tr>
<tr>
<td>NSA</td>
<td>National Security Agency</td>
</tr>
<tr>
<td>NSC</td>
<td>National Security Council</td>
</tr>
<tr>
<td>NSD</td>
<td>National Security Directive</td>
</tr>
<tr>
<td>NSTAC</td>
<td>National Security Telecommunications Advisory Committee</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations and maintenance</td>
</tr>
<tr>
<td>OASD</td>
<td>Office of the Assistant Secretary of Defense</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OPSEC</td>
<td>operational security</td>
</tr>
<tr>
<td>OSD</td>
<td>Office of the Secretary of Defense</td>
</tr>
<tr>
<td>OSINT</td>
<td>open source intelligence</td>
</tr>
<tr>
<td>PC</td>
<td>personal computer</td>
</tr>
<tr>
<td>PCCIP</td>
<td>President's Commission on Critical Infrastructure Protection</td>
</tr>
<tr>
<td>PDD</td>
<td>Presidential Decision Directive</td>
</tr>
<tr>
<td>PERT</td>
<td>program evaluation and review technique</td>
</tr>
<tr>
<td>PIN</td>
<td>personal identification number</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>PKI</td>
<td>public key infrastructure</td>
</tr>
<tr>
<td>PRD</td>
<td>Presidential Review Directive</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>RMA</td>
<td>Revolution in Military Affairs</td>
</tr>
<tr>
<td>SAC</td>
<td>Strategic Air Command</td>
</tr>
<tr>
<td>SCADA</td>
<td>supervisory control and data acquisition</td>
</tr>
<tr>
<td>SEC</td>
<td>Securities and Exchange Commission</td>
</tr>
<tr>
<td>SECDEF</td>
<td>secretary of defense</td>
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<tr>
<td>SIGINT</td>
<td>signals intelligence</td>
</tr>
<tr>
<td>SIPRNet</td>
<td>Secret Internet Protocol Router Network</td>
</tr>
<tr>
<td>SIW</td>
<td>strategic information warfare</td>
</tr>
<tr>
<td>SONET</td>
<td>synchronous optical network</td>
</tr>
<tr>
<td>SPACECOM</td>
<td>U.S. Space Command</td>
</tr>
<tr>
<td>STEP</td>
<td>Standardized Tactical Entry Point</td>
</tr>
<tr>
<td>TEMPEST</td>
<td>program to accredit electronic equipment for secure military use</td>
</tr>
<tr>
<td>TIARA</td>
<td>Tactical Intelligence and Related Activities</td>
</tr>
<tr>
<td>TPED</td>
<td>technical, processing, exploitation, and distribution (DOD)</td>
</tr>
<tr>
<td>TRADOC</td>
<td>Training and Doctrine Command (USA)</td>
</tr>
<tr>
<td>TRANSCOM</td>
<td>U.S. Transportation Command</td>
</tr>
<tr>
<td>UAV</td>
<td>unmanned aerial vehicle</td>
</tr>
<tr>
<td>UHF</td>
<td>ultrahigh frequency</td>
</tr>
<tr>
<td>UPI</td>
<td>United Press International</td>
</tr>
<tr>
<td>URL</td>
<td>universal resource locator</td>
</tr>
<tr>
<td>USA</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>USAF</td>
<td>U.S. Air Force</td>
</tr>
<tr>
<td>USAFE</td>
<td>U.S. Air Force Europe</td>
</tr>
<tr>
<td>USAREUR</td>
<td>[commander], U.S. Army, Europe</td>
</tr>
<tr>
<td>USD(A&amp;T)</td>
<td>under secretary of defense (acquisition and technology)</td>
</tr>
<tr>
<td>USD(P)</td>
<td>under secretary of defense (policy)</td>
</tr>
<tr>
<td>VTC</td>
<td>video teleconferencing</td>
</tr>
<tr>
<td>WWMCCS</td>
<td>Worldwide Military Command and Control System</td>
</tr>
<tr>
<td>Y2K</td>
<td>year 2000</td>
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