

Incidental Paper

**Seminar on Intelligence, Command,  
and Control**

**Guest Presentations, Fall 1997**

Robert R. Rankine, Jr., Victor A. DeMarines,  
Keith R. Hall, William R. Clontz, Kenneth A. Minihan,  
Henry A. Lichstein, John J. Sheehan

**Program on Information  
Resources Policy**

Harvard University  
Center for Information Policy Research  
Cambridge, Massachusetts

An incidental paper of the Program on Information  
Resources Policy

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and Control**

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Anthony G. Oettinger

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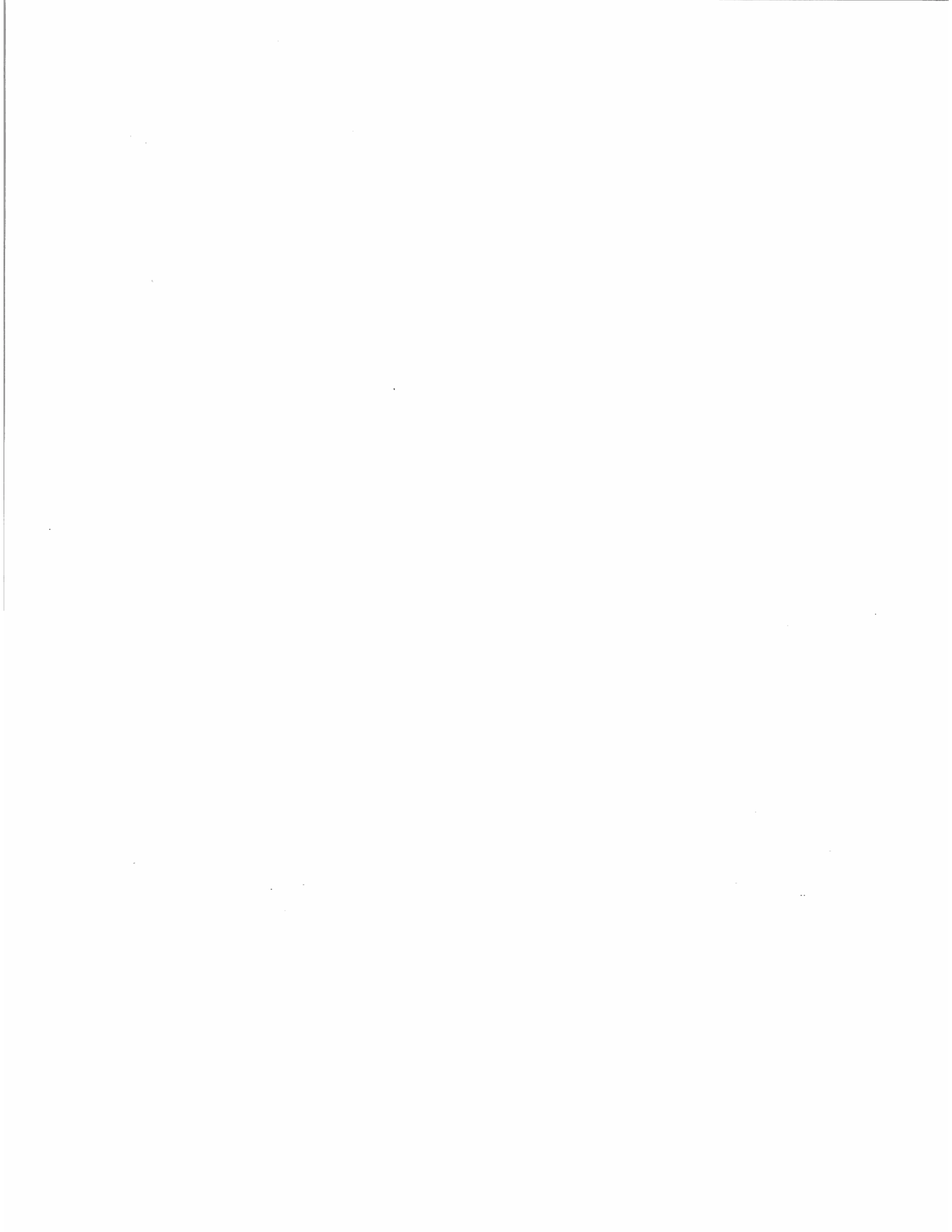
The responsibility for any sins of omission or commission nonetheless remains entirely mine.

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.

Rather than focusing on a single theme, the speakers in the fall of 1997 addressed a variety of topics centering on evolving information needs in the 21st century. Underlying all these presentations was the recognition that information, with the capabilities it creates, has become not only the driver for effective military strategy and tactics, but also the "center of gravity" that the developed nations must protect. The speakers, who represented both the military and civilian communities, illustrated this principle through examples that ranged from satellite-based intelligence collection to a smartcard system that would further reduce dependence on cash for commercial transactions.



# Proceedings of the Harvard Seminar on Intelligence, Command, and Control

## John F. Kennedy School of Government Harvard University

Anthony G. Oettinger, 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.

*Guest Presentations, Spring 1997.* [220 pages; April 1998/Incidental Paper: I-98-2]

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.

**David S. Alberts**, Director of Advanced Concepts, Technologies, and Information Strategies at the Institute for National Strategic Studies, National Defense University: "21<sup>st</sup> Century National Security Challenges."

**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."

**Douglas D. Buchholz**, Executive Director for Command, Control, Communications and Computer Systems (J-6) on the Joint Staff: "Ensuring Interoperability in Military Communications Systems: The J-6 Campaign Plan."

**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."

**Anita K. Jones**, Director of Defense Research and Engineering: "Defense Science and Technology: Foundation of the Future."

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

***Guest Presentations, Spring 1996.*** [297 pages; January 1997/Incidental Paper: I-97-1]

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 Vredenburgs: "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."

**Martin C. Libicki**, Senior Research Fellow at the Institute for National Strategic Studies, Advanced Concepts and Technologies, National Defense University: "Information War: Ready for Prime Time?"

**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."

**Richard T. Reynolds**, Chief of Plans for U.S. European Command in Stuttgart, Germany: "The Pitfalls of Peacetime Military Bureaucracy."

**Robert A. Rosenberg**, Executive Vice President and General Manager, Washington Operations, of Science Applications International Corporation (SAIC): "Defense Science Board Recommendations on Information Architecture for the Battlefield."

**Julie J. C. R. Ryan**, Senior Associate with Booz-Allen & Hamilton, Inc.: "Information Warfare: A Conceptual Framework."

***Guest Presentations, Spring 1995.*** [232 pages; January 1996/Incidental Paper: I-96-2]

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.

**R. C. M. (Mark) Baker**, Vice President of Global Strategy and Operations in AT&T's Communications Services Group: "The Globalization of Telecommunications."



**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."

**Albert Edmonds**, Director of the Defense Information Systems Agency, and Manager, National Communications System in Arlington, Virginia: "Integrated Information Systems for the Warrior."

**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."

***Guest Presentations, Spring 1994.*** [267 pages; January 1995/Incidental Paper: I-95-3]

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.

**Col. William R. Clontz**, USA, Military Adviser to the U.S. Permanent Representative to the United Nations: "C<sup>3</sup>I Issues from a United Nations Perspective."

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

**Lt. General Albert Edmonds**, USAF, Director for C<sup>4</sup> Systems (J6), The Joint Staff: "C<sup>4</sup>I Issues."

**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."

**Thomas P. Quinn**, Deputy Assistant Secretary of Defense for Command, Control & Communications: "Acquiring C<sup>3</sup> Systems for the Department of Defense: Process and Problems."

**Col. Richard T. Reynolds**, USAF, CADRE/RIR: "Formal and Informal C<sup>3</sup>I Structures in the Desert Storm Air Campaign."

**John E. Rothrock**, (Col. USAF, Ret), Director—Center for Global Security Planning, SRI International: “The Challenge of Leverage in the Post-Cold War Era.”

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

***Guest Presentations, Spring 1993.*** [164 pages; August 1994/Incidental Paper: I-94-5]

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. Sheaffer**, 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.”

***Guest Presentations, Spring 1992.*** [186 pages; August 1994/Incidental Paper: I-94-4]

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: “C<sup>3</sup> 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.”

**James J. Hearn**, Deputy Director for Information Systems Security, NSA: “Information Systems Security.”

**Frank B. Horton**, Deputy Chief of Staff/Intelligence, HQ Strategic Air Command: "Command Plan and C<sup>3</sup>I."

**Richard J. Kerr**, Deputy Director of Central Intelligence: "The Evolution of the U.S. Intelligence System in the Post-Soviet Era."

**Albert R. Lubarsky**, Director, C<sup>3</sup>I for Counternarcotics, Department of Defense: "C<sup>3</sup>I in Transition."

**Richard C. Macke**, Director, Command, Control, Communications and Computer Systems, The Joint Staff: "C<sup>4</sup>I for the Warrior."

**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."

*Guest Presentations, Spring 1991.* [208 pages; February 1993/Incidental Paper: I-93-1]  
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. Col. C. Kenneth Allard**, USA, Special Assistant to the Under Secretary of Defense (Acquisition): "Thinking About Command and Control."

**Duane P. Andrews**, Assistant Secretary of Defense (C<sup>3</sup>I): "Restructuring the World of C<sup>3</sup>I."

**John H. Cushman, Sr.**, Lt. Gen. USA (retired): "Desert Shield/Desert Storm and the Future of Force Projection."

**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."

**Charles L. Stiles**, President, Technology and Planning Assoc. Inc.: "The U.S. Sinai Support Mission."

**Joseph S. Toma**, Chief, Special Action Division, Joint Staff J6-A: "C<sup>3</sup>: 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."

**Major Gen. C. Norman Wood**, Assistant Chief of Staff/Intelligence, U.S. Air Force: "The Policy Aspect of Intelligence."

**Col. Joseph Zadarecky, II**, Chief, Tactical Command and Control Division, Directorate of Operations, HQ U.S. Air Force: "The Role of the Air Force in U.S. Counternarcotics Policy."

***Guest Presentations, Spring 1989.*** [132 pages; August 1990/Incidental Paper: I-90-3]

This year's presentations included continuing assessments of the Defense Reorganization Act of 1986, a look at the impact of new technologies on C<sup>3</sup>I 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."

**Robert T. Herres**, General, USAF, and Vice Chairman, Joint Chiefs of Staff: "The Role of the Joint Chiefs After the 1986 Defense Reorganization Act."

**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 C<sup>3</sup>I."

**David Y. McManis**, Director, Operations Security Organization, National Security Agency: "National Security and the 'Democratization' of Information."

**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 C<sup>3</sup>I."

***Guest Presentations, Spring 1988.*** [176 pages; March 1989/Incidental Paper: I-89-1]

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 C<sup>4</sup>I<sup>2</sup> Department/Director of Intelligence: "Getting in Front of C<sup>4</sup>I<sup>2</sup> Problems."

**Ruth M. Davis**, President, Pymatuning Group, formerly an Assistant Secretary of Energy and Deputy Under Secretary of Defense: "Putting C<sup>3</sup>I 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."

**Robert C. Kingston**, General, USA, (ret.), formerly Commander-in-Chief, United States Central Command: "The Special Operations Command: Structure and Responsibilities."

**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."

**John F. McLaughlin**, Executive Director, Program on Information Resources Policy, Harvard University: "The Rise in Low Intensity Conflict: A Theory."

**Richard L. Thornburgh**, Director, Institute of Politics, Kennedy School of Government, Harvard University, formerly Governor of Pennsylvania: "Three Mile Island: A Case Study in C<sup>3</sup>I for Crisis Management."

**Jerry O. Tuttle**, Vice Admiral, USN, and Director, Command, control and Communications Organization of the Joint Chiefs of Staff (J-6): "Tailoring C<sup>3</sup>I Systems to Military Users."

***Guest Presentations, Spring 1987.*** [192 pages; May 1988/Incidental Paper: I-88-1]

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."

**Greg Foster**, senior fellow, Institute for National Strategic Studies, National Defense University: "The National Defense University's Command and Control Program."

**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."

**Rodney B. McDaniel**, executive secretary, National Security Council: "C<sup>3</sup>I: A National Security Council Perspective."

**Michael J. Zak**, vice president, marketing, Concord Communications, Inc.: "Coming of Age in C<sup>3</sup>I."

*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 (C<sup>3</sup>) 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: "C<sup>3</sup>I 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."

*Guest Presentations, Spring 1985.* [180 pages; April 1986/Incidental Paper: I-86-1]

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."

**Richard D. DeLauer**, president, Orion Group Limited, formerly Under Secretary of Defense for Research and Engineering: "A Consultant's View."

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

**Robert T. Herres**, Commander in Chief, unified U.S. Space Command, Aerospace Defense Command, and North American Aerospace Defense Command, and Commander of the Air Force Space Command: "A CINC's View of Defense Organization."

**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."

**Richard G. Stilwell**, chairman, Department of Defense Security Review Commission; formerly Deputy Under Secretary of Defense for Policy: "Structure and Mechanisms for Command and Control."

*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.

**Richard S. Beal**, until his death in 1984, Special Assistant to the President for National Security Affairs and Senior Director for Crisis Management Systems and Planning: "Decision Making, Crisis Management, Information and Technology."

**Stuart E. Branch**, 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."

**Robert A. Rosenberg**, Vice Commander in Chief for the North American Aerospace Defense Command and Assistant Vice Commander for the U.S. Air Force Space Command: "Strategic Defense: A Challenge for C3I."

**James W. Stansberry**, formerly Commander of the Air Force Electronic Systems Division: "Cost-Effective Rearmament."

**W. Scott Thompson**, director of programs for the American Security Council Foundation and president, Strategic Research Associates: "U.S. - U.S.S.R. Information Competition."

(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.”

**R. Thomas Marsh**, commander, Air Force Systems Command: “Air Force C3I Systems.”

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

**William G. Miller**, associate dean and professor of international politics, Fletcher School of Law and Diplomacy, Tufts University: “Foreign Affairs, Diplomacy and Intelligence.”

**Richard G. Stilwell**, Deputy Under Secretary of Defense for Policy: “Policy and National Command.”

**Guest Presentations, Spring 1981.** [214 pages; December 1981/Incidental Paper: I-81-9]

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.”

**John H. Cushman**, lieutenant general, U.S. Army, (ret.), management consultant, : “C3I and the Commander: Responsibility and Accountability.”

**Richard D. DeLauer**, executive vice president, TRW, Inc.: “A Major Contractor’s View of C3I.”

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**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.”



**Guest Presentations, Spring 1980.** [183 pages; December 1980/Incidental Paper: I-80-6]  
These first presentations in the series described C3I principally from the perspective of national policymaking in the executive branch.

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

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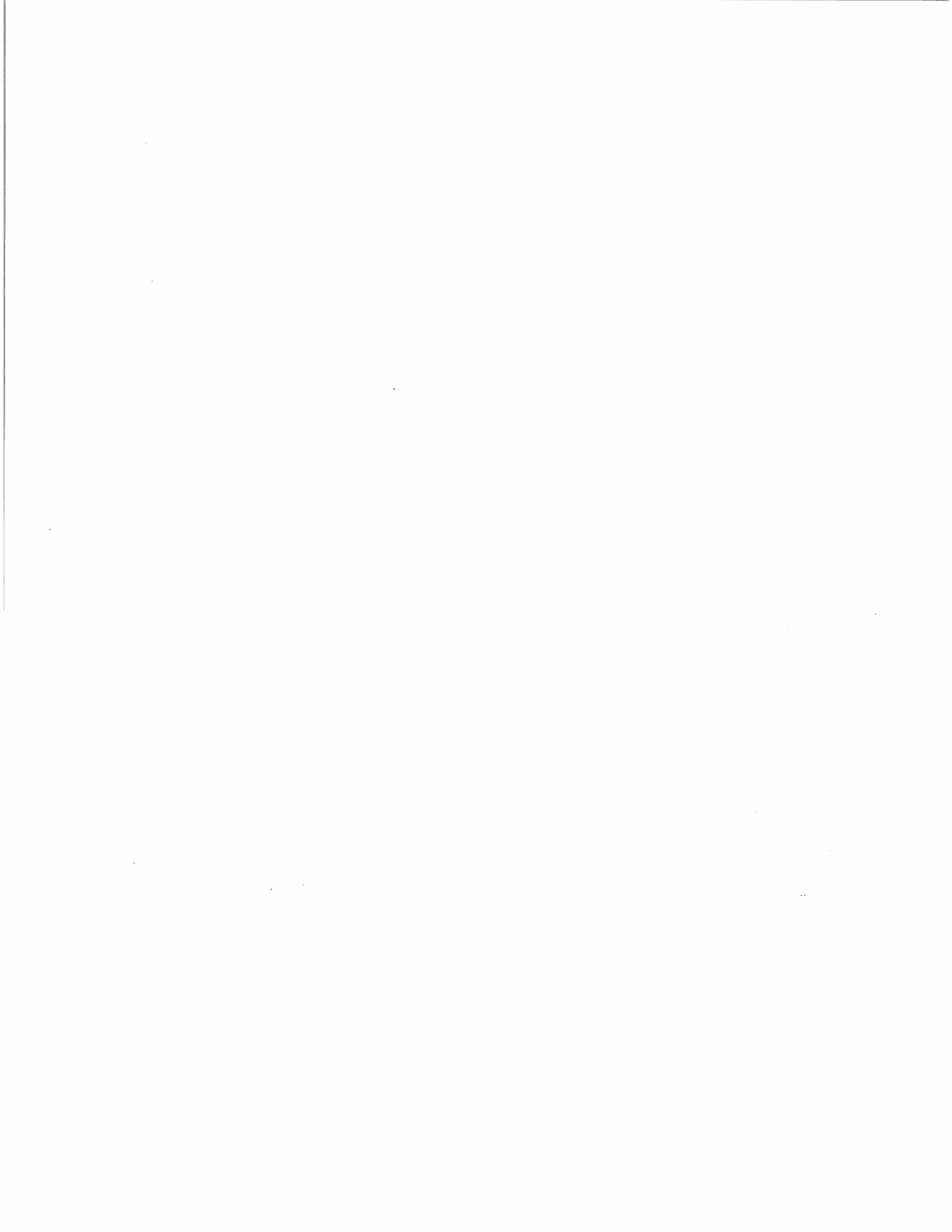
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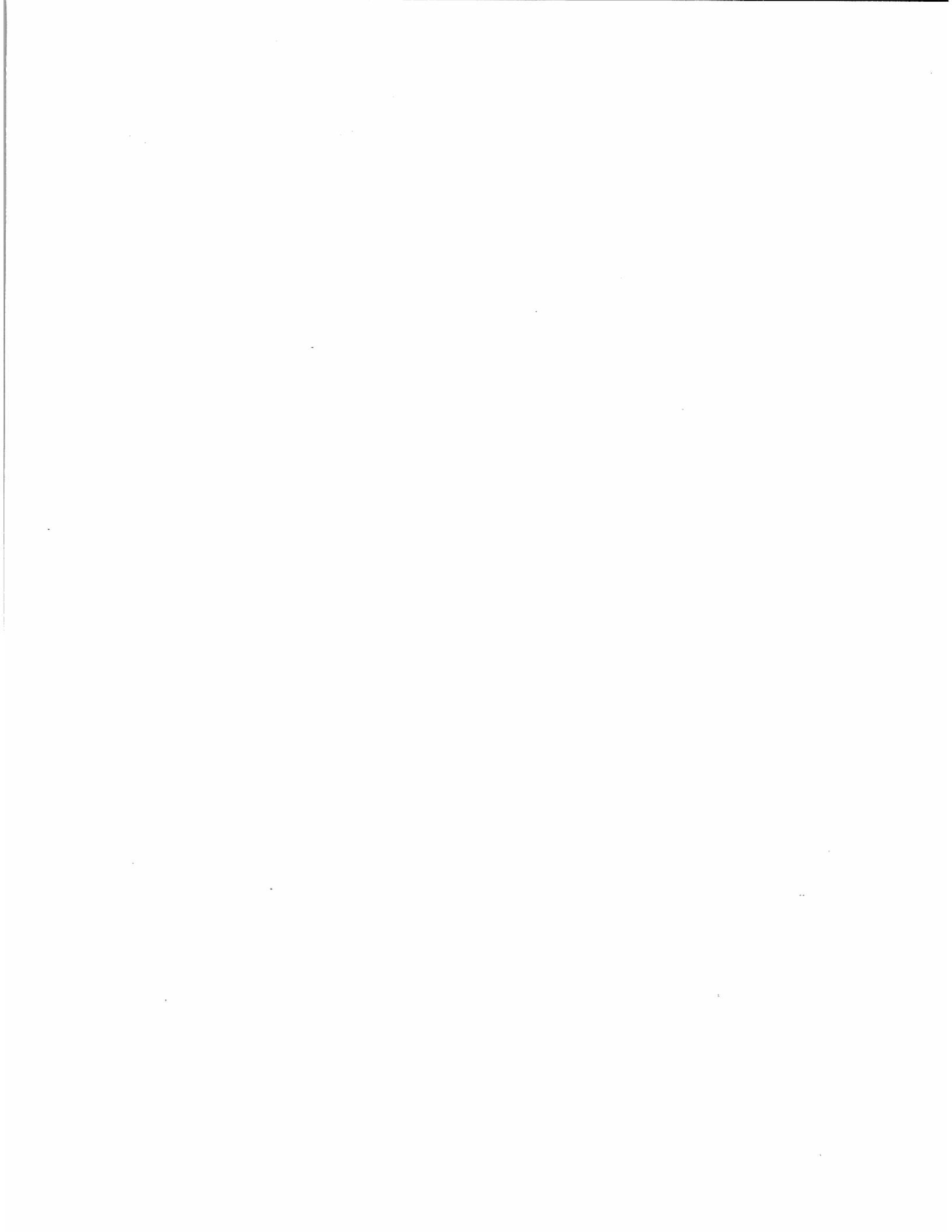
**A.K. Wolgast**, manager, Planning and Analysis Dept., EXXON International: "Oil Crisis Management."

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**To the Memory  
Of  
John F. Jacobs  
1923-1998**

**Whose ideas, encouragement and support  
helped launch and sustain this seminar**

## Glossary

|                   |  |
|-------------------|--|
| AIA               | Air Intelligence Agency                                |
| AMSC              | American Mobile Satellite Corporation                  |
| ATM               | automatic teller machine                               |
| BBC               | British Broadcasting Corporation                       |
| C <sup>2</sup>    | command and control                                    |
| C <sup>2</sup> W  | command and control warfare                            |
| C <sup>3</sup>    | command, control, and communications                   |
| C <sup>3</sup> CM | C <sup>3</sup> countermeasures                         |
| C <sup>3</sup> I  | command, control, communications, and intelligence     |
| C4                | command, control, communications, and computers        |
| CENTCOM           | U.S. Central Command                                   |
| CIA               | Central Intelligence Agency                            |
| CINC              | commander in chief                                     |
| CJTF              | combined joint task force                              |
| CMS               | Community Management Staff (CIA)                       |
| CAN               | Center for Naval Analysis                              |
| CNN               | Cable News Network                                     |
| COTS              | commercial off-the-shelf                               |
| DCI               | Director of Central Intelligence                       |
| DIA               | Defense Intelligence Agency                            |
| DISA              | Defense Information Systems Agency (formerly DCA)      |
| DME               | distance measuring equipment                           |
| DOD               | Department of Defense                                  |
| DPKO              | Department of Peacekeeping Operations (U.N.)           |
| DSCS              | Defense Satellite Communication System                 |
| EHF               | extremely high frequency                               |
| ESC               | Electronic Systems Center (USAF)                       |
| FAA               | Federal Aviation Administration                        |
| FBI               | Federal Bureau of Investigation                        |
| FFRDC             | Federally Funded Research and Development Center       |
| FSS               | fixed satellite service                                |
| GBS               | Global Broadcast System/Service                        |
| GNP               | gross national product                                 |
| GPS               | Global Positioning System                              |
| HCI               | Hughes Communications Inc.                             |
| HDTV              | high-definition television                             |
| HUMINT            | human intelligence                                     |
| I&W               | indications and warning                                |
| ICBM              | intercontinental ballistic missile                     |
| IDA               | Institute of Defense Analyses                          |
| IFOR              | Implementation Force (Bosnia)                          |
| IMINT             | imagery intelligence                                   |
| INR               | Bureau of Intelligence and Research (State Department) |
| IO                | information operations                                 |
| IPR               | integrated processing requirement                      |
| IR                | infrared   |
| IR&D              | independent research and development                   |
| IW                | information warfare                                    |
| JCS               | Joint Chiefs of Staff                                  |
| JDISS             | Joint Deployment/Defense Intelligence Support System   |

|          |   |
|----------|---|
| JSTARS   | Joint Surveillance and Target Attack Radar System       |
| kbps     | kilobytes per second                                    |
| LMI      | Logistics Management Institute                          |
| LOCE     | Linked Operational Centers Europe                       |
| MASINT   | measurement and signatures intelligence                 |
| Mbps     | megabits per second                                     |
| MIT      | Massachusetts Institute of Technology                   |
| MRBM     | medium range ballistic missile                          |
| MRC      | major regional conflict                                 |
| MTI      | moving target indicator                                 |
| NACA     | National Advisory Commission on Aeronautics             |
| NASA     | National Aeronautics and Space Administration           |
| NATO     | North Atlantic Treaty Organization                      |
| NDP      | National Defense Panel [to the Secretary of Defense]    |
| NGO      | nongovernmental organization                            |
| NIMA     | National Imagery and Mapping Agency                     |
| nmi      | nautical miles  |
| NRO      | National Reconnaissance Office                          |
| NSA      | National Security Agency                                |
| NSC      | National Security Council                               |
| OODA     | observe, orient, decide, act                            |
| OSD      | Office of the Secretary of Defense                      |
| PC       | personal computer                                       |
| PDD      | Presidential Decision Directive                         |
| POS      | point-of-sale   |
| ROTC     | Reserve Officer Training Corps                          |
| RPV      | remotely piloted vehicle                                |
| SATCOM   | satellite communications                                |
| SBIRS    | space-based infrared system                             |
| SEAL     | member of a Sea-Air-Land unit (USN)                     |
| SECDEF   | Secretary of Defense                                    |
| SEI      | Software and Engineering Institute                      |
| SHF      | super-high frequency                                    |
| SIGINT   | signals intelligence                                    |
| SOCOM    | U.S. Special Operations Command                         |
| SOP      | standard operating procedure                            |
| STRATCOM | U.S. Strategic Command                                  |
| TENCAP   | tactical exploitation of national capabilities          |
| TRANSCOM | U.S. Transportation Command                             |
| TT&C     | telemetry, tracking and control                         |
| UHF      | ultra-high frequency                                    |
| UNPROFOR | U.N. Protection Force (Bosnia)                          |
| USA      | U.S. Army   |
| USAF     | U.S. Air Force  |
| USAT     | ultra-small aperture terminal                           |
| USD(A&T) | Under Secretary of Defense (Acquisition and Technology) |
| USMC     | U.S. Marine Corps                                       |
| USN      | U.S. Navy   |
| VOR      | very high-frequency omni range                          |
| VSAT     | very small aperture terminal                            |