# Keeping watch: Monitoring, technology and innovation in UN peace operations

A. Walter Dorn

To those who gave their lives in the service of peace while on mission for the United Nations. When we improve upon their efforts to secure the peace, we honour their sacrifice.

# Endorsements

"In *Keeping Watch*, Walter Dorn makes a persuasive case for bringing the technology of UN peacekeeping into the 21st century – and not a decade too soon, because the time-honored approach of throwing ill-equipped troops at unstable places just is not working. With a unique mix of substantive and technical expertise, Dorn demonstrates how dozens of existing and emergent technologies – from thermal imaging to crowd-sourcing – could be vital force multipliers for peacekeepers, who can't keep the peace if they don't know the score. Anyone with an interest in peacekeeping should own this book and use it."
**William Durch**, *Director of the Future of Peace Operations Program, Stimson Center*

"As the senior editor of the international journal *Intelligence and National Security*, whenever I receive a manuscript on the subject of intelligence and international organizations, A. Walter Dorn is the first reviewer I turn to for help in evaluating the submission. In *Keeping Watch*, his deep knowledge is on display. This book is chock full of fascinating charts, tables, drawings, and photographs to accompany Dorn's signature careful analysis and flashes of original insight. He demonstrates in lucid prose how technology can be highly useful in monitoring, mitigating, and preventing international conflict. Here is a study that should be standard fare in every university course on international conflict and cooperation – indeed, one that citizens everywhere would benefit from reading."
**Loch K. Johnson**, *Regents Professor, University of Georgia*

"Walter Dorn is one of the most thoughtful and knowledgeable analysts of peacekeeping and security policy, and this book makes an important contribution to a field that needs far more public discussion."
**Bob Rae**, *Member of Parliament for Toronto Centre and Liberal Foreign Affairs Critic in Canada's House of Commons*

"Dr. Walter Dorn is the 'dean' of the peace intelligence scholars, having both founded and nurtured the field since his seminal work on UN intelligence successes in the Congo. This book covers the technical side of UN intelligence, and complements work on harnessing distributed human intelligence. From the Brahimi Report to the High Level Panels on Threats and on System-Wide Coherence, there has been a pattern of 'emerging intelligence'. This book is the newest contribution – an absolutely essential, practical, and inspiring contribution to help create a prosperous world at peace."
**Robert David Steele**, *CEO, Earth Intelligence Network*

"The engagement of the United Nations in peacekeeping has increased rapidly over the past decade. In the search for ways to enhance UN operations, the UN Special Committee on Peacekeeping Operations in 2006 requested a study on how technical monitoring and surveillance can be used to ensure the safety and security of United Nations peacekeeping personnel and improve the operational effectiveness of peacekeeping missions.

Dr. Walter Dorn, engaged by the UN's Department of Peacekeeping Operations as an independent expert, conducted research and came up with findings which successfully laid the grounds for further development of the idea of monitoring technology in UN peacekeeping. He continued to assist DPKO in establishing an action plan to systematize the knowledge, identify priorities, implement the proposed solutions and set the way forward, in close cooperation with member states.

Dr. Dorn's work was welcomed by the Special Committee. It helped the United Nations understand and appreciate the usefulness of modern technology in peacekeeping. What is also important is that it helped to overcome a psychological barrier which hindered efforts to bring these capabilities into the UN peacekeeping effort.

The book *Keeping Watch* expands on the author's *Tools of the Trade?* report to the Special Committee and his other papers on the subject. It provides a very interesting insight into UN peacekeeping operations from the perspective of the possible use of modern technology. It helps the

reader understand, for example, the issues that need to be considered when using technology such as unmanned aerial vehicles. This book will be a beacon for the use of modern technology in peacekeeping operations at a time when the UN seeks to overcome the complex challenges it faces in the field."

**Zbigniew Szlek**, *Senior Military Adviser, Permanent Mission of Poland to the United Nations*

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# Abbreviations

| | |
|---|---|
| AH | attack helicopter |
| ALR | artillery-locating radar |
| AMSTAR | Advanced Man-portable Surveillance and Target Acquisition Radar (also known as Australian Man-portable Surveillance and Target Acquisition Radar) |
| ASR | Air Surveillance Radar |
| AU | African Union |
| AWACS | Airborne Warning and Control System (aircraft) |
| C4ISR | Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance |
| CCTV | closed-circuit television |
| CIT | communications and information technology |
| CITS | Communications and Information Technology Service |
| CNDP | Congrès national pour la défense du peuple (National Congress for the Defence of the People) |
| COB | Contingency Operating Base |
| COE | Contingent-Owned Equipment |
| CSI | commercial satellite imagery |
| DCOS | Deputy Chief of Staff |
| DDR | disarmament, demobilization and reintegration |
| DFS | Department of Field Support |
| DMZ | demilitarized zone |
| DPA | Darfur Peace Agreement |
| DPKO | Department of Peacekeeping Operations (UN) |
| DRC | Democratic Republic of the Congo |

| | |
|---|---|
| DSS | Department of Safety and Security (UN) |
| DVN | digital video network |
| DVR | digital video recorder |
| ELINT | Electronic intelligence |
| EOD | Explosive Ordnance Detachment (of MFO) |
| EUFOR | European Union Force |
| FAC | Forward Air Controller |
| FARDC | Forces Armées de la République Démocratique du Congo |
| FLIR | forward-looking infrared |
| FWF | former warring factions (in Bosnia) |
| GIS | geographic information system |
| GoS | Government of Sudan |
| GPR | ground-penetrating radar |
| GPS | Global Positioning System |
| GSR | ground surveillance radar |
| HD | high-definition |
| HUMINT | human intelligence |
| IAEA | International Atomic Energy Agency |
| ICC | International Criminal Court |
| IDF | Israel Defense Forces |
| IDP | internally displaced person |
| IED | improvised explosive device |
| IFOR | Implementation Force (NATO force in Bosnia) |
| IP | Internet Protocol |
| IR | infrared |
| ISTAR | Intelligence, Surveillance, Target Acquisition and Reconnaissance |
| IT | information technology |
| JAM | Joint Assessment Mission |
| JMAC | Joint Mission Analysis Centre |
| JOC | Joint Operations Centre |
| LAN | local area network |
| LPR | license plate recognition |
| LSX | Ledra Street Crossing |
| MAC | Mixed Armistice Commission |
| MFO | Multinational Force and Observers |
| MOSS | Minimum Operating Security Standards |
| MOU | Memorandum of Understanding |
| NATO | North Atlantic Treaty Organization |
| NEO | network-enabled operation |
| NEW | National Election Watch |
| NGO | non-governmental organization |
| NVD | night-vision device |
| NVE | night-vision equipment |
| OMIK | Organization for Security and Co-operation in Europe Mission in Kosovo |
| OP | observation post |
| OPFOR | opposing force |

| P5 | the five permanent members of the UN Security Council |
|---|---|
| PIR | passive infrared (sensors) |
| PKO | peacekeeping operation |
| PLO | Palestine Liberation Organization |
| POC | protection of civilians |
| PTZ | Pan Tilt Zoom (cameras) |
| REMBASS | Remotely Monitored Battlefield Sensor System |
| RFID | radio frequency identification |
| ROE | Rules of Engagement |
| SAR | synthetic aperture radar |
| SFM | Sinai Field Mission |
| SFOR | Stabilisation Force in Bosnia and Herzegovina |
| SIGINT | signals intelligence |
| SLA | South Lebanon Army |
| SMS | Short Message Service |
| SOFA | Status-of-Forces Agreement |
| SOP | standard operating procedure |
| TCC | troop-contributing country |
| TOE | Table of Organization and Equipment |
| TOW | tube-launched, optically-tracked, wire-guided (type of missile) |
| TRA | Threat and Risk Assessment |
| UAV | unmanned/uninhabited aerial vehicle |
| UGS | unattended ground sensor |
| UN | United Nations |
| UNMO | United Nations Military Observer |
| UNMOVIC | United Nations Monitoring, Verification and Inspection Commission |
| UNOSAT | United Nations Operational Satellite Applications Programme |
| UNPOL | United Nations Police |
| UNSAS | United Nations Standby Arrangements System |
| UNSCOM | United Nations Special Commission |

# Foreword

Lieutenant-General The Hon. Roméo A. Dallaire (Retired)

I am pleased to contribute the Foreword to Professor Walter Dorn's important book on improving UN peace operations. These operations are much needed in today's world and are in need of constant innovation. Violent extremism, whatever its origin and wherever it raises its ugly head, is everyone's business. Peace operations have become one of the most important tools the international community has to achieve conflict resolution. We can no more abandon peace operations than we can turn our back on dying children in catastrophes or give up our hopes for a more peaceful world.

The past failures of the international community in UN peacekeeping should catalyse new commitments to peace rather than a withdrawal from UN operations. Rather than discard peacekeeping altogether because of its chequered history, we need to learn from its failures as well as its successes. The lessons of the 1990s should be incorporated into the current generation of operations.

Peace operations have evolved considerably and more resources are now dedicated to them than ever before. The annual UN peacekeeping budget of US$8 billion is more than twice as large as when I commanded a peacekeeping force in Rwanda in 1993–1994. The number of uniformed peacekeepers deployed in UN missions has now surpassed 100,000. The mandates of the new missions are generally stronger – though still not strong enough. The Security Council explicitly requests its twenty-first-century missions to protect civilians, an enormous task that requires the use of robust force and detailed intelligence on all manner of threats.

The United Nations Assistance Mission for Rwanda (UNAMIR) in 1993–1994 showed the problems of a lack of intelligence and analysis in peacekeeping. We found ourselves working in an information vacuum, at times groping in the dark to identify and confront shadowy forces and unofficial networks that became apparent only after the genocide began.

Information needs to come not only from human sources but also from modern intelligence, surveillance and reconnaissance technology. From hand-held metal detectors that are used to detect underground weapons caches to satellite imagery that helps paint the big picture, the United Nations needs to make better use of modern technology. It needs to be aware of the enormous potential of advanced technology to save lives and alleviate human suffering. To this end, practical studies and in-depth research are extremely valuable.

Dr Walter Dorn is well qualified to write on this subject. He has been studying the United Nations for decades. Because of his training in physics and chemistry and his leadership in the Canadian Pugwash movement of scientists, he is well acquainted with applications of science and technology. He has a multidisciplinary background and a depth of knowledge that are rare, even in the present-day era of technological advancement. He also has practical experience in field operations and, as a professor at the Canadian Forces College, is in daily contact with military officers from around the world. Moreover, as is evident in this book, he is deeply dedicated to UN peace missions and to the cause they serve. It remains only for the international community to summon the political will to act on the sage advice offered in this book, and to implement Dr Dorn's timely recommendations.

# Preface

Wars and conflicts exact a terrible toll on people well beyond those caught in the cross-fire. Massive human displacement, lost lives and livelihoods, deteriorating health and governmental services, the demise of justice and broken societies are all results of endemic violence. The cycle of insecurity empowers warlords and militarists, emboldens combatants and inflates military budgets in regions unable to afford such diversions. As well, it has repercussions around our interconnected world.

The world desperately needs *effective* peacekeeping. Helpless civilians caught in conflict need impartial forces to protect them. War-weary fighters need opportunities to stop their shooting and lay down their weapons. Moderates need outside assistance to sustain fragile cease-fires. Durable peace agreements backed by credible verification and enforcement by the international community are the best means for progress in local governance, for implementing the rule of law, for fostering greater prosperity and for a return to normalcy. But all too often the international forces deployed by the United Nations are unprepared and under-equipped, unable to meet the challenges in the field, unaware of emerging threats and unable to take proactive action to prevent escalations of conflict.

Since truth is the "first casualty" of war, I posit that winning back the truth is the first job of the United Nations peacekeeper. Piercing the "fog of war" is critical to any response. Conflicts are routinely fuelled by rumour, false reports, misinformation, disinformation and propaganda. The peacekeepers serve as the eyes and ears of the international community, and often its limbs as well, frequently placing themselves in harm's way

to monitor threats, protect civilians and create some order from bloody chaos. But the challenges of monitoring conflicts are many. Over large areas, at night and in difficult terrain, the human eye is insufficient, especially for border surveillance, sanctions monitoring and detecting early signs of violence. Spoilers of fragile peace processes try to keep their plans and preparations for attack secret, often using the cover of darkness; the United Nations must make use of all possible tools to keep watch over shadowy forces and conditions in the field.

With this challenge in mind, I ask how modern science and technology can help peacekeepers maintain their watch and carry out robust peace operations. This book is one answer to the issue I have been pondering since I was an undergraduate student in the physical sciences. If the reader permits me to describe the relevant personal background, I start with the words that inspired me to try to link the fields of physical science and political science. The scientist-sage Albert Einstein (Lynd 1939) told his students at Princeton University (United States):

> Concern for man himself and his fate [humanity itself and its fate] should be the chief interest of all technical endeavours. Never forget this in the midst of your diagrams and equations.

As a physical sciences student at the University of Toronto in Canada in the 1980s, I asked myself how the subjects I was studying (chemistry and physics) could make a difference in a world weary of the Cold War. Technology to support arms control verification seemed like a fruitful area, so I directed my graduate work to help develop sensors for the detection of chemical and biological warfare agents. In parallel, I served as the UN Representative of the Canadian organization Science for Peace, making bimonthly trips to New York. This allowed me to become familiar with the world organization, carefully observing UN operations and practices, gathering information from experienced contacts inside and outside of the organization. I watched with sadness and alarm as important UN operations became stuck in Somalia, Rwanda and Bosnia. I wondered what could be done better. I visited several conflict areas and in 1999 served on the UN mission administering a referendum in Indonesia-occupied East Timor. Although the UN mission proved successful, it was accompanied by tragedy, including of a personal nature. Several friends, colleagues and a member of my team were killed in the Suai massacre of 6 September 1999. This experience reinforced my conviction that the United Nations needed a strong intelligence architecture and much better technical tools to gather information for preventive action.

I sought to convey this link between technology and peacekeeping by developing and teaching courses at the Pearson Peacekeeping Centre in

Nova Scotia, Canada, in particular a course titled "Live, Move and Work: Technology and Engineering in Modern Peacekeeping". I also conducted research at Yale and Cornell universities on improving the capacity of the United Nations. Building a research bridge from the physical to the social sciences brought me to a professorship at the Royal Military College of Canada, where I was able to broaden the research. During a sabbatical in 2006, Canada's Permanent Mission to the United Nations in New York offered the opportunity to carry out a study for the United Nations on surveillance technology for peacekeeping. I presented the preliminary results to the United Nations Special Committee on Peacekeeping Operations in 2007, which welcomed the report. A year later, when the United Nations' Department of Peacekeeping Operations needed help in implementing the general proposals, I was given a golden opportunity to study how specific technologies could be applied to particular operations. With financial support from the Department of Foreign Affairs and International Trade (DFAIT) Canada, the United Nations sent me on research trips to UN missions in Haiti, Cyprus and the Democratic Republic of the Congo.

This book is the culmination of the field experiences and trips, interviews at UN headquarters and a quarter-century of studying UN peacekeeping. It incorporates and publicizes the findings of the two reports I have written for the United Nations and of work done at Sandia National Laboratories. Through the research I discovered just how far behind the United Nations is in employing modern technology. I joked with UN staff that I wanted to help bring the United Nations into "the 1990s"!

I observed a growing "monitoring technology gap" of several dimensions. This gap exists between the United Nations' mandates and its means, between the nations contributing to UN operations (especially between developed and developing nations), between the United Nations and some of its important partner organizations in the field (for example, the European Union and the North Atlantic Treaty Organization), and even between the United Nations and some parties it is supposed to be watching closely. Some warring governments, rebels and criminal gangs have better surveillance technologies than either the United Nations or the national police/military forces with which the United Nations works in war-torn lands.

Through this life work, I hope to help advance the technological capacity of the United Nations, making practical and forward-looking recommendations without appearing too critical of UN staff struggling to make do with what they have. I have sought to illustrate the centrality of the monitoring functions in United Nations' operations, and describe the capabilities and drawbacks of the range of technologies based in outer space, in airspace or on the ground. I hope to increase awareness not only

of the United Nations' deficiencies but also of its future potential. The world organization can strengthen its "information power" using both human and technological sources, including social media based on the Internet, to better serve as an instrument of peace.

In this book I develop the main thesis about the tremendous utility of technologies for monitoring in peacekeeping (Chapter 1) before providing a background overview of the evolution of peacekeeping (Chapter 2), showing the expansion of monitoring requirements over time. I assess the United Nations' many needs for impartial information and intelligence (Chapter 3) and survey the broad range of technologies that can be applied to the problem (Chapter 4). Aerial surveillance (Chapter 5) turns out to be a key information-gathering method but one that is greatly underutilized in UN missions, like many other technologies. This was borne out in case studies of both traditional and modern multidimensional missions in the field, with some notable and encouraging exceptions (Chapters 6 and 7). What UN headquarters' policies and standards exist for the creative use of monitoring and surveillance technology? The subtitle of Chapter 8, "Starting from near zero", points to the answer. Why is the United Nations so far behind most modern militaries? Several answers are found by looking at the challenges and problems in deploying technology (Chapter 9). Given the United Nations' sputtering efforts at improving its technological proficiency, I make a series of recommendations (Chapter 10) on general capacity-building and on deploying specific technologies for specific missions. My conclusions (Chapter 11) are prefigured in this preface but I also suggest a few ways forward.

A physical scientist by training and a political scientist by current profession, I tried to marry the two fields while pursuing a convoluted career. Benefiting from a decade of teaching officers in the Canadian Forces and other militaries, I incorporated their experiences into the research. I was able to test some ideas on officers with experience using technology in the field. As an "operational professor", I also sought to go to the field to observe UN operations first-hand. Through this work, I have sought to determine how peacekeeping can make effective use of modern tools. This research experience has enhanced my conviction that, with better technological means and connectivity, the United Nations can save more lives, alleviate more suffering and foster more of the harmony that is so desperately needed in this world.

# Acknowledgements

I have many people to thank for helping me in this intellectual adventure – exploring the theory and practice of peacekeeping and the applications of technology. Professor John Polanyi at the University of Toronto first propelled me in this direction with an inspiring speech and a personal interview in 1982 on a proposed International Satellite Monitoring Agency. George Ignatieff, as President of Science for Peace, encouraged me to look at how science and technology could assist arms control and the United Nations, where he had served as Canadian ambassador and earned the moniker "peacemonger", of which he was rightly proud.

When I was consulting for UN Studies at Yale, the distinguished Jim Sutterlin, formerly with the US State Department and the United Nations, provided invaluable encouragement and insights, especially on early warning proposals. At Sandia National Laboratories, David Barber of the Cooperative Monitoring Centre gave me support and wise advice when I spent three months there as a Visiting Scholar looking at possible peacekeeping technologies. At Cornell University, Professor Matthew Evangelista gave tremendous support as I began the long book-writing journey.

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The Chief for Aviation Projects, Kevin Shelton-Smith, provided great insights into the United Nations' procurement process, especially when I served as a consultant on a project for unmanned aerial vehicles (UAVs). Despite Kevin's herculean efforts over three years, the initiative to equip the UN mission in the Congo with advanced UAVs sadly ended without success, though valuable lessons will be learned for the future.

Among the Military and Police Advisers community in New York, I am especially appreciative of Colonel Zbigniew Szlek of the Polish mission, who spearheaded the acceptance of my first study (*Tools of the Trade?*) in the Special Committee on Peacekeeping. Colonel Mike Hanrahan, the military adviser of the Canadian mission, is to be thanked for first suggesting to DPKO in 2006 that I serve as a consultant on monitoring technologies, resulting in that first study.

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