

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

University of Nebraska Press -- Sample Books and
Chapters

University of Nebraska Press

2017

Nanoweapons

Louis A. Del Monte

Follow this and additional works at: <http://digitalcommons.unl.edu/unpresssamples>

Del Monte, Louis A., "Nanoweapons" (2017). *University of Nebraska Press -- Sample Books and Chapters*. 387.
<http://digitalcommons.unl.edu/unpresssamples/387>

This Article is brought to you for free and open access by the University of Nebraska Press at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in University of Nebraska Press -- Sample Books and Chapters by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NANOWEAPONS

[Buy the Book](#)

NANOWEAPONS

A GROWING THREAT TO HUMANITY

LOUIS A. DEL MONTE

Potomac Books

AN IMPRINT OF THE UNIVERSITY OF NEBRASKA PRESS

[Buy the Book](#)

© 2017 by Louis A. Del Monte

All rights reserved. Potomac Books is an imprint of the University of Nebraska Press.

Manufactured in the United States of America.



Library of Congress Cataloging-in-Publication Data

Names: Del Monte, Louis A., author. Title: Nanoweapons: a growing threat to humanity / Louis A. Del Monte. Description: Lincoln, NB: Potomac Books, an imprint of the University of Nebraska Press, [2017] | Includes bibliographical references and index.

Identifiers: LCCN 2016043320 (print) | LCCN 2016043925 (ebook)

ISBN 9781612348964 (cloth: alk. paper)

ISBN 9781612349121 (epub)

ISBN 9781612349138 (mobi)

ISBN 9781612349145 (pdf) Subjects: LCSH: Military art and science—Technological innovations.

| Military weapons—Technological innovations. |

Nanotechnology—Risk assessment. Classification:

LCC U39 .D447 2017 (print) | LCC U39 (ebook) | DDC

355.8/2—dc23 LC record available at [https://lcn.loc.](https://lcn.loc.gov/2016043320)

[gov/2016043320](https://lcn.loc.gov/2016043320)

Set in Scala OT by John Klopping.

To my loving wife and lifelong partner, Diane Cuidera Del Monte

CONTENTS

Acknowledgments . . ix

Introduction . . xi

Part 1. The First Generation of Nanoweapons

1. What You Don't Know Can Kill You . . 3
2. Playing LEGOS with Atoms . . 17
3. I Come in Peace . . 29
4. The Wolf in Sheep's Clothing . . 45
5. The Rise of the Nanobots . . 79
6. The "Swarm" . . 91

Part 2. The Game Changers

7. The "Smart" Nanoweapons . . 101
8. The Genie Is Loose . . 111
9. Fighting Fire with Fire . . 123

Part 3. The Tipping Point

10. The Nanoweapons Superpowers . . 139
11. The Nano Wars . . 153
12. Humanity on the Brink . . 169

Epilogue . . 181

Appendixes . . 189

1. Institute for Soldier Nanotechnologies
2. Nanoweapons Offensive Capability of Nations
3. The Events Leading to the Chernobyl Disaster

Notes . . 211

Glossary . . 225

Index . . 235

ACKNOWLEDGMENTS

I want to recognize the contributions of Diane Cuidera Del Monte. As a Renaissance woman, teacher, editor, and writer in her own right, Diane is capable of performing in numerous Arts mediums. As an intelligent wordsmith and art historian, she suggested editorial and structural changes to the book. She freely shared her talents, education, and insights on psychology, history, and human nature, which helped guide the completion of this work. She has always helped me dream larger and achieve greater. She thinks outside the box, outside the room that holds the box, and outside the house, which includes the room. She always refuses to be constrained by “artificial boundaries” and continually encourages our family and extended family to follow her lead.

I also want to thank my closest friend, Nick McGuinness, whose knowledge of history and the “real world” we live in astounds me. Finding a good friend is difficult. Finding a friend with knowledge and talent honed through “real-life” experience is extremely difficult. I believe it is rare to have a friend, like Nick, who will donate his time and talents to provide chapter-by-chapter editorial guidance, and I will forever be in his debt.

This book would never have found a publisher without the hard work and dedication of my agent, Jill Marsal, who is a founding partner of the Marsal Lyon Literary Agency. With her skillful guidance, we were able to construct a proposal that attracted the interest of several publishers. I found working with her a pleasure and an educational experience.

Lastly, I want to thank the excellent team at Potomac Books that worked to make this book available to the public, including Elaine Durham Otto, the freelance copyeditor.

INTRODUCTION

Nanoweapons are the most likely military weapons to render humanity extinct in this century. This is not a philosophical issue. This is about whether you and yours will survive through this century. Having made such a dire assertion, you may wonder if I am being an alarmist. Consider this. The events that most people consider likely to cause humanity's extinction, such as a large asteroid impact or a super-volcanic eruption, actually have a relatively low probability of occurring, in the order of 1 in 50,000 or less. In 2008 experts surveyed at the Global Catastrophic Risk Conference at the University of Oxford suggested a 19 percent chance of human extinction by the end of this century, citing the top four most probable causes:

1. Molecular nanotechnology weapons: 5 percent probability
2. Superintelligent AI: 5 percent probability
3. Wars: 4 percent probability
4. Engineered pandemic: 2 percent probability

Obviously nanoweapons are at the top of the list, having a 1 in 20 probability of causing human extinction by the end of this century. Notice that biological weapons (item 4), which have been a mainstay apocalyptic theme in both fiction and nonfiction, come in as a distant fourth, with only a 1 in 50 probability of causing human extinction.

Almost every book on nanotechnology speaks to the enormous benefits it will yield. Few mention the inherent risks associated with nanotechnology. Even fewer mention nanoweapons. You

may ask, Why do books on nanotechnology rarely ever mention nanoweapons? The answer is that nanoweapons are “classified,” meaning the technology and its military applications are either “Secret” or “Top Secret.” The technologists involved in their development cannot publish their research in scientific journals, speak about it at scientific conferences, or give media interviews about it.

It is one thing to read a scholarly Oxford study that proclaims nanoweapons threaten human extinction. Philosophers often ponder esoteric issues that never come to fruition. Thus it is reasonable to ask, Just how real are nanoweapons? Let us address this question using a time-tested technique, namely, “follow the money.” In 2000, under President Bill Clinton, the U.S. government launched the National Nanotechnology Initiative (NNI), a research and development initiative involving the nanotechnology-related activities of twenty-five federal agencies with a range of research and regulatory roles and responsibilities. Since its inception, the government has allocated over \$20 billion to developing nanotechnology. The actual amount that is spent on nanoweapons remains Top Secret. However, based on publicly published budget allocations, it is reasonable to estimate that anywhere between a third to half of all nanotechnology-based materials and systems under NNI are destined for military application. Indeed, several are already deployed and deemed combat ready. The initial examples I provide in chapter 1 will sound like they are right out of *Star Trek*. Factually, a new arms race is under way. Nanowerk.com, the leading nanotechnology portal, reports, “All major powers are making efforts to research and develop nanotechnology-based materials and systems for military use.” Based on publicly available information, China, Russia, and the United States are competing in a multibillion dollar nanoweapons arms race. Other nations, like Germany, are close on their heels. A new paradigm fuels this race. The superpowers of the future will be those nations with the most capable nanoweapons. Given the above facts, the existence of nanoweapon development and deployment is beyond dispute, but it is appropriate

to ask, Why do nanoweapons threaten the survival of humanity? The simple answer is “control.” Controlling nanoweapons is as problematic as controlling biological weapons.

Let us understand the control issue using an example. Assume one nation develops artificially intelligent nanobots, tiny robots about the size of insects, capable of numerous military missions from surveillance to assassination. The size of nanobots makes them easy to transport and difficult to detect. In addition, by mid-century, current nanotechnology projections suggest artificially intelligent self-replicating nanobots will become a reality. These nanobots are capable of replicating themselves by literally seeking the right atoms and assembling a clone. In effect, they are the technological equivalent of biological weapons. Imagine such technology in the hands of a rogue state or terrorist group. Weaponized self-replicating smart nanobots would represent the ultimate doomsday device. Once released, their mission would be twofold: kill humans and replicate. Assuming the self-replicating smart nanobots are equivalent to a deadly biological pandemic, 90 percent of the human race could fall victim to their attack in a matter of weeks. All this may sound like science fiction, but it is not. This will become evident in the chapters that follow.

Nanoweapons will describe this new class of military weapons in layperson prose. Assertions are annotated, making their source apparent. To assist comprehension, please consult the glossary. This book will enable you to trace the emergence of nanoweapons from concept to current deployment. It will discuss the nanoweapons in development and close to deployment. It will project the nanoweapons most likely to dominate the future battlefield in the second half of this century. Most important, it will raise the control issue by addressing the question, Will it be possible to develop, deploy, and use nanoweapons in warfare without rendering humanity extinct?

Many books offer concerns about technology, but provide no actionable plan. This book will propose strategies that could form the basis to ensure nanoweapons do not render humanity extinct.

I do not claim to have all the answers. But the pages that follow will clearly define the threat. I also believe the proposed strategies to address the threat are worthy of consideration.

I admit my forecasts on nanoweapon timing may be off, perhaps by as much as a decade. The development of nanoweapons continues under a cloak of secrecy by every nation involved. This makes delineating an exact timeline challenging. However, by researching the available information, it is possible to connect the dots to make an educated guess regarding when specific classes of nanoweapons will become available. Let me provide an example. When I was a boy, I enjoyed building small plastic models, especially military models. In 1954 the U.S. Navy launched the *USS Nautilus (SSN-571)*, the world's first atomic submarine. Because it made headlines, it became a common topic of conversation. As a model builder, I wanted to build it, as did many other hobbyists. Revell Hobby Kits was aware of the demand for a plastic model build kit and quickly offered one. The Revell model of the *USS Nautilus* was apparently accurate, pinpointing the almost exact location of the atomic reactors on the *Nautilus*, which at the time was classified Top Secret. This started some people speculating that Revell had the Navy's secret plans. Apparently the Revell's model engineers knew how to piece various elements of their research together even without the Internet. This childhood memory impressed me so deeply that it is still with me to this day. My friends and I thought it a joke. Obviously the U.S. Navy likely found it frustrating at the very least. My point is simple. Collating available information can yield surprisingly accurate insight into classified information. Using this approach, let us peek under the cloak of secrecy to see the nanoweapons that currently exist and those likely to exist in the coming decades. Let us understand how they threaten humanity's survival. Most important, let us consider what strategies are necessary to ensure they do not become our undoing.