

# Spies in the Sky

Surveillance Satellites in War and Peace

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Pat Norris

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 **Springer**

Published in association with  
**Praxis Publishing**  
Chichester, UK

 PRAXIS

Mr Pat Norris  
Byfleet  
Surrey  
UK

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SPRINGER-PRAXIS BOOKS IN SPACE EXPLORATION  
SUBJECT *ADVISORY EDITOR*: John Mason, M.Sc., B.Sc., Ph.D.

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ISBN 978-0-387-71672-5 Springer Berlin Heidelberg New York

Springer is part of Springer-Science + Business Media ([springer.com](http://springer.com))

Library of Congress Control Number: 2007929435

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Printed in Germany

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Cover design: Jim Wilkie  
Project management: Originator Publishing Services Ltd, Gt Yarmouth, Norfolk, UK

Printed on acid-free paper

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# Preface

This is a story of intelligence estimates of weapons of mass destruction being wildly inflated, and of politicians using these inflated estimates to win elections. It's about the development of systems to detect weapons of mass destruction during which scientists have their careers destroyed by government cover-up. These could well be stories from the first 5 years of the 21st century, but in fact they come from the late 1950s. They are part of the story of the greatest contribution satellites have made to the world since the dawn of the space age.

The space age has now been with us for half a century, since Sputnik blasted into orbit on October 4th 1957 opening up an era of enormous excitement and anticipation—excitement at the discoveries and images returned by each new satellite; anticipation as mankind took the first tentative steps into the solar system.

In the short time since, satellites<sup>1</sup> have delivered many amazing achievements. The first ones were expensive and limited in performance. Now they are the cost-effective way to collect weather information or deliver TV to homes or tell you your position. Satellites are truly part of our everyday lives.

The greatest achievement of those first 50 years was clearly Neil Armstrong and his fellow Americans landing on the moon in 1969–1972—many people would say. Or was it the pictures from Jupiter, Saturn, and the surfaces of Mars, Venus, and Titan, changing forever our image of Venus from beauty to beast, and of Mars from bloody warrior to future tourism destination? Or surely the detection of global change including deforestation in the Amazon and shrinkage of the Antarctic ice cap must rank as the most important achievement of satellites?

Personally, I rank highly the role of telecommunication satellites in shrinking the globe. Thanks to these satellites the plight of famine victims in Africa, of earthquake and flood victims in Asia, and of war casualties in Iraq and Afghanistan is brought into our living rooms as it happens. The statements, actions, and follies of politicians

\* Sometimes a “satellite” should be called a spacecraft, as explained in Chapter 2.

and celebrities on another continent can be watched as if next door. Sporting events that unite the world are witnessed by billions as they happen. Thanks to satellites, we now take for granted the ability to phone the other side of the world without having to pay half a week's salary for a crackly line. And while developed countries increasingly rely on undersea cables for inter-continental communications, Third World and isolated countries—in the Pacific Ocean, for example—are totally dependent on satellites for communication with the rest of the world. Not to mention seafarers and aviators for whom satellites are the only reliable form of communication when far from land.

So, we could certainly debate the most important contribution satellites have made to our life since 1957. In this book I hope to persuade you that the accolade as the most crucial role played by satellites since Sputnik was none of the achievements mentioned above, but was instead the relatively unsung role played by American and Soviet spy satellites in helping to prevent a nuclear holocaust during the Cold War.

The origins of this book lie in my own career. I have had the good fortune to work in two dynamic industries for the last 40 years—computers and satellites. Computers are at the heart of all major hi-tech endeavors these days, and through that fact I have had the opportunity to participate in several of the most exciting space programs of the first space half-century including the Hubble Space Telescope, the Apollo moon landings, Europe's first weather satellite, the landing of Huygens on Titan, the failed landing of Beagle 2 on Mars, the early telecommunications satellites, and the latest positioning satellites. Whether that experience makes me any more qualified to choose the most important space contribution of the half century I leave for you to decide.

Many people have helped me in the preparation of this book—one of the main challenges being to not impact my day job in the Space Division of LogicaCMG. My wife first encouraged me to write my opinions down. Others who have helped include (in alphabetical order) Richard Blott, Mike Cutter, Bob Kelley, Bill Levett, Martin Littlehales, John Mason, Ian Pryke, and Nick Veck. My publisher Clive Horwood has been a constant source of encouragement. Special thanks to David Harland and to Dwayne Day who provided many of the images. To these and others whose contribution has been important I offer my thanks, but I accept that the opinions and (hopefully rare) errors in the book are mine alone.

I have tried to attribute copyrights for the images used where they were evident. If anyone wishes to claim an image, I will happily amend the appropriate caption in the next edition of the book.

*Pat Norris*  
July 2007



*For Amy, Ciarán, and Valerie*

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**Front cover**

- 1 B-52 over Afghanistan. Credit: U.S. Air Force photo by Master Sgt. Lance Cheung
- 2 CORONA KH-4 schematic. Credit: Maxwell AFB

**Rear cover**

- 1 Artist’s impression of CORONA KH-4B. Credit: National Reconnaissance Office

## Abbreviations and acronyms

ABM	Anti-Ballistic Missile
AEHF	Advanced Extremely High Frequency
AIRSS	Alternative Infrared Satellite System
ASAT	Anti-SATellite [missile]
BBC	British Broadcasting Corporation
CCD	Charge-Coupled Device
CCTV	Closed Circuit TeleVision
CD	Computer Disk
CIA	Central Intelligence Agency
COMINT	COMmunications INTelligence
CSI	Crime Scene Investigation
DC	District of Columbia
Defcon	Defense Condition
DIA	Defense Intelligence Agency
DMS	Defense Meteorological Satellite
DoD	Department of Defense [US]
DSP	Defense Support Program
ELDO	European Launcher Development Organization
ELINT	ELECTronic INTelligence
ESA	European Space Agency
EU	European Union
FIA	Future Imagery Architecture
GCHQ	Government Communications Head Quarters
GDP	Gross Domestic Product
GEOS	Geodetic Earth Orbiting Satellite
GPS	Global Positioning System
H-bomb	Hydrogen bomb
HDTV	High Definition TeleVision

Hex	Uranium hexafluoride
IAEA	International Atomic Energy Agency
ICBM	Inter-Continental Ballistic Missile
IGS	Information Gathering Satellite
INF	Intermediate-range Nuclear Forces [Treaty]
IRBM	Intermediate-Range Ballistic Missile
IRS	Indian Remote Sensing [satellites]
JPL	Jet Propulsion Laboratory
KH	KeyHole
LBJ	Lyndon B. Johnson
Li	Lithium
MAD	Mutually Assured Destruction
MFN	Most Favored Nation
MHz	MegaHertz
MIRV	Multiple Independently-targeted Reentry Vehicle
MIT	Massachusetts Institute of Technology
MoD	Ministry of Defence [UK]
MOL	Manned Orbiting Laboratory
MOX	Mixed-OXide
MRBM	Medium-Range Ballistic Missile
Musis	Multinational Space-based Imaging System
N-POESS	National Polar-orbiting Operational Environmental Satellite System
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NCIS	Navy Criminal Investigation Service
NGO	Non-Governmental Organization
NOAA	National Oceanographic & Atmospheric Administration
NORAD	NORth American Aerospace Defense Command
NPT	Nuclear non-Proliferation Treaty
NRO	National Reconnaissance Office
NSA	National Security Agency [US]
OTH	Over The Horizon [radar]
Pan-STARRS	Panoramic Survey Telescope and Rapid Response System
PC	Personal Computer
Pu	Plutonium
RORSAT	Radar Ocean Reconnaissance SATellite
RPM	Revolutions Per Minute
SALT	Strategic Arms Limitation Treaty
SAM	Surface-to-Air Missile
SAOCOM	SATellites for Observation and COMmunication
SAR	Synthetic Aperture Radar; Search & Rescue
SBIRS	Space-Based Infra-Red System
SDI	Strategic Defense Initiative
SDS	Space Data System

SIGINT	SIGnal's INTelligence
SLBM	Submarine-Launched Ballistic Missile
SLR	Single Lens Reflex
SPOT	Satellite Pour Observation de la Terre
SR	Space-based Radar
START	STrategic Arms Reduction Treaty
TAT	Trans-Atlantic Telephone
TNT	TriNitroToluene
TRW	Thompson Ramo Wooldridge
TSF	Télécoms Sans Frontières
TV	TeleVision
U	Uranium
UAV	Unmanned Aerial Vehicle
UK	United Kingdom of Great Britain & Northern Ireland
UN	United Nations
US/USA	United States of America
WW-II	World War II