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Erik Seedhouse

Space Radiation and Astronaut Safety

Springer

SpringerBriefs in Space Development

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ISSN 2191-8171 ISSN 2191-818X (electronic)
SpringerBriefs in Space Development
ISBN 978-3-319-74614-2 ISBN 978-3-319-74615-9 (eBook)
https://doi.org/10.1007/978-3-319-74615-9

Library of Congress Control Number: 2018933376

Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG part of Springer Nature.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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About the Author

Erik Seedhouse is a highly published author. After completing his first degree, he joined the Second Battalion of the Parachute Regiment. During his time in the "Para's," Erik spent six months in Belize, where he was trained in the art of jungle warfare. Later, he spent several months learning the intricacies of desert warfare in Cyprus. He made 30+ jumps from a C130 aircraft, performed more than 200 helicopter abseils, and fired more light anti-tank weapons than he cares to remember!

Upon returning to academia, the author embarked upon a master's degree which he supported by winning prize money in 100-km running races. After placing third in the World 100-km Championships in 1992, Erik turned to ultra-distance triathlon, winning the World Endurance Triathlon Championships in 1995 and 1996. For good measure he won the World Double Ironman Championships in 1995 and the infamous Decatriathlon, an event requiring competitors to swim 38 km, cycle 1800 km, and run 422 km. Non-stop!

In 1996, Erik pursued his PhD at the German Space Agency's Institute for Space Medicine. While studying he found time to win Ultraman Hawai'i and the European Ultraman Championships as well as completing Race Across America. Due to his success as the world's leading ultra-distance triathlete Erik was featured in dozens of magazine and television interviews. In 1997 *GQ* magazine named him the "Fittest Man in the World."

Erik's PhD in space medicine and background in space life sciences provided him with a keen insight into and understanding of the medical problems faced by long duration astronauts. In 1999 Erik took a research job at Simon Fraser University. In 2005 the author worked as an astronaut training consultant for Bigelow Aerospace. Between 2008 and 2013 he served as director of Canada's manned centrifuge and hypobaric operations. In 2009 he was one of the final 30 candidates in the Canadian Space Agency's Astronaut Recruitment Campaign. Erik has a dream job as an assistant professor at Embry-Riddle Aeronautical University in Daytona Beach, Florida. In his spare time he works as an astronaut instructor for Project PoSSUM, occasional film consultant to Hollywood, a professional speaker, triathlon coach, and author. This is his 27th book. When not enjoying the sun and rocket launches on Florida's Space Coast with his fiancée, Alice, he divides his time between his second home in Sandefjord and Mauna Lani on the Big Island of Hawai'i.

Abbreviations

AHARS	As high as reasonably acceptable
ALARA	As low as reasonably achievable
ARS	Acute radiation syndrome
AST	Attentional set-shifting task
BEO	Beyond earth orbit
BFO	Blood forming organ
BMD	Bone mineral density
CME	Coronal mass ejection
CMO	Crew medical officer
CNS	Central nervous system
CPDS	Charged particle detector
ESA	European Space Agency
EVA	Extravehicular activity
EV-CPDS	Extravehicular charged particle directional spectrometer
GCR	Galactic cosmic radiation
GOES	Geostationary operational environmental satellite
Gy	Gray
HSC	Hematopoietic stem cells
ICRP	International Council on Radiation Protection
ISS	International Space Station
ITS	Interplanetary transport system
IV-CPDS	Intravehicular charged particle directional spectrometer
JSC	Johnson Space Center
LEO	Low earth orbit
LET	Linear energy transfer
LOC	Loss of crew
LOM	Loss of mission
LPA	Lysophosphatidic acid
LSAH	Longitudinal survey of astronaut health
MORD	Medical operations requirements document
MPCV	Multi-purpose crew vehicle

MSL	Mars Science Laboratory
NAD	Nicotinamide adenine dinucleotide
NAS	National Academy of Sciences
NCR	National Cancer Institute
NCRP	National Council on Radiation Protection
NHP	Non-human primate
NMN	Nicotinamide mononucleotide
NOAA	National Oceanic Atmospheric Administration
PEL	Permissible exposure limits
PSD	Positron sensitive detector
RAD	Radiation assessment detector
RAM	Radiation area monitor
RBE	Relative biological effectiveness
REID	Risk of exposure-induced death
SAA	South Atlantic anomaly
SEC	Space Environment Center
SPE	Solar particle event
SRAG	Space radiation assessment group
SRHO	Space radiation health officer
TBI	Total body irradiation
TEPC	Tissue equivalent proportional counter
TLD	Thermoluminescent detector
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation