

THE  

---

KALAHARI  

---

SERIES

FIVE BOOKS  

---

ONE AMAZING STORY

AVAILABLE FROM SELECTED BOOKSHOPS  
AND ONLINE

## Reviews and praise for the Kalahari Series

The pyramids' origin; the Atlantis mystery; a quest for clean energy; a travel through space and time . . . It's been a while since I've read such a well-crafted sci-fi book.

**Evelyne Van de Camp**, *Air Traffic Controller, Belgium*

A rollercoaster finale to Marshall's Kalahari Series. Fast, furious, emotional and intelligent. A must read.

**Peter Beauchamp**, *Hotelier, Wellington, NZ*

**Reality** or a glimpse into the future – this book blurs the dividing line. An inspiring novel that opens a whole new world for the reader; nothing less than awesome.

**Alex Hartley**, *Medical Services Manager, Somerset*

**Highly Commended - The Yeovil Literary Prize**

**Richard** Reece is tomorrow's hero, solving today's man-made problems, using yesterday's knowledge of ancient civilizations . . . not your average science fiction blockbuster: fun, racy, pacy and thought provoking . . .

**Nicola Wakefield**, *Maritime Event Organiser, Dorset*

I jumped in with *The Osiris Revelations* and then hung on tight to the fast moving plot that kept me glued to my reading spectacles for the next two books. A fast paced, unstoppable futuristic thriller. Brace yourself for *The Bastion Prosecutor* and the secret codes revealed about the future of mankind from the Sumerians and the Rosetta Stone, and why someone is trying to sabotage the messages and the mission. You will be gripped. *Rogue Command* will keep you guessing until its final startling conclusion. You won't want to put this book down or sleep for a few nights! A great, very real series. What is next, please?

**Lucinda Mead**, *Toronto, Canada*

A searing indictment of what the future holds told with precision and verve.

**Christopher Powell**, *Garage Proprietor, Worcestershire*

The Kalahari Series has got me excited about reading again! *Rogue Command* continues in the same thrilling, beautifully-researched vein as the previous books. This is a cleverly written and thought provoking piece of work that combines history, technology and intrigue; it's a cracking end to the series which certainly doesn't disappoint!

**David Gray**, *Squadron Leader R.A.F. (Retired), Yorkshire*

**Clearly** Marshall did it again, another gripping page turner.

A thrilling sci-fi adventure that keeps you intrigued. Exciting and captivating storyline, a perfect continuation of the previous books.

**Niels Stevens**, *Classic Car Restorer, Holland*

In short the Earth is in crisis. Crystals which can potentially resolve the planet's energy problem have been discovered on Mars by Richard Reece. He is charged with discovering the secret and whereabouts of the remaining crystal, whilst US pilot Tom Race salvages the crystals on Mars. Battling against time, the two men attempt to solve the climatic problem in a thrilling episode, encountering considerable danger and conspiracy. In effect, two stories running excellently alongside each other, brilliantly written and a great page turner that leaves you hungry for the next episode. Fast-paced action, which I found quite technical at times, (but believe me if you are an aviator you will love it!) - all in all a great balance of sci-fi and historical-based writing. I also highly recommend *The Bastion Prosecutor* trilogy which precedes the story wonderfully!

**Susan Hooker**, *School Teacher, Warwickshire*

**There's** nothing I like more than picking up a good book, getting totally immersed with the plot and characters and then discovering there's a whole series! A. J. Marshall's style of writing grips you from the first page. Follow Richard Reece on his journey and open up a world of science fiction, history, action and adventure . . .

**Patrick Hennessy**, *Carpenter and Joiner, Gloucestershire*

# Rogue Command

AJ Marshall

*M*Press Books

## **Rogue Command**

First published in the United Kingdom in 2011 by MPress Books

Copyright © Andrew J Marshall 2011

Andrew J Marshall has asserted his right under the Copyright, Designs and Patents Act, 1988 to be identified as the author of this work.

In this work of fiction the characters, places and events are either the product of the author's imagination or they are used entirely fictitiously.

All rights reserved. This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, resold, hired out, or otherwise circulated without the publisher's prior consent in any form of binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher and copyright holder.

MPress Books Limited Reg. No 6379441 is a company registered in Great Britain  
[www.mpressbooks.co.uk](http://www.mpressbooks.co.uk)

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library.

Where possible, papers used by MPress Books are natural, recyclable products made from wood grown in sustainable forests. The manufacturing processes conform to the environmental regulations of the country of origin.

ISBN

978-0-9551886-4-0

Typeset in Minion

Origination by Core Creative, Yeovil 01935 477453

Printed and bound in England by CPI Antony Rowe

## AUTHOR'S COMMENT

Time waits for no one. An interesting adage that we know to be true . . . but is it? There are so many facets to time: my time, your time, time at the equator, time at the poles. Our planet's time – referenced to that of the others in this solar system; the time frame of this galaxy or another so far away that we cannot possibly comprehend the distances involved and how long it would take to get there. And does time pass in the same way there as it does here? How long a heartbeat or the blink of an eye?

And then the question of dimension – as interrelated as the sun's energy and chlorophyll, the green pigment in plant cells. We believe that we exist in the third, because of our ability to sense each of them. But what of the fourth, or the fifth, if such places exist; surely there 'time' would be different. Expanded, compressed . . . not as we know it?

Space travel is already a reality; whether we consider man setting foot on our nearest neighbour or NASA's two Voyager probes continuing to send back data decades after their launch and from the extremities of our solar system. In the short term (relatively) many government agencies across the world are looking towards a return to the Moon and also the first manned landings on Mars – each believed to feature much longer stays than the hours or days of previous

milestones. But here again 'time' is the critical factor. Time multiplied by speed equals distance travelled, and until light-related speeds are possible, then interplanetary travel will be tedious and debilitating, and interstellar travel impossible. Many eminent scientists, however, hypothesize a link between time, travel at light speed and other, higher, dimensions, despite the limitations imposed by relativity theories.

In this novel, the fifth and final instalment of my Kalahari Series, 'time' is a major player, and as such it enables a number of 'realistic' opportunities that hitherto have remained confined to the realms of fantasy. In essence, time itself will blur the divide between science and science fiction. In *Rogue Command* I merely scratch the surface of this divide, allowing the characters to speculate and formulate, while expressing their time as the backdrop to an adventure that I very much hope you find absorbing and enjoyable.

Be prosperous and of long life.

# INTRODUCTION

## The story so far . . .

### The Osiris Revelations

Lieutenant Commander Richard James Reece is the survey leader for Osiris Base, a permanent encampment on Mars. The year is 2049. There is also a longer-established and larger base on the Moon, called Andromeda. Richard Reece is a former military and space shuttle pilot, having previously served on Andromeda Wing; he is British. Appointed to Mars for three years, he envisaged a quiet, uncluttered time. Two things happened, however, that would subsequently change his life forever: meeting Doctor Rachel Turner, Osiris Base Principal Medical Officer, and finding a flight log in the wreckage of a remote, long abandoned alien spaceship. The writings in the log bear an uncanny resemblance to those of Earth's ancient civilisations. Richard Reece studies the text and succeeds in deciphering it.

Close to the wreckage, Reece also finds a number of strange, fractured, crystals. They contain latent energy of enormous potential. Knowledge of the discovery, and its implications, soon reaches Earth and not only the government agencies for which it was intended, but also unscrupulous, corrupt, multinational conglomerates. Their aim: to gain possession of the crystals, harness their electricity-generating potential and hold the world to ransom. The race is on.

Earth's natural resources are almost exhausted. Anxious governments press into service an experimental spaceship before it is ready. Capable of incredible speeds, *Enigma* reduces a Mars retrieval flight to mere weeks. However, its highly sophisticated systems computer EMILY, has another agenda. Major Tom Race, an American and the ship's commander becomes embroiled in a prophetic struggle against synthetic intelligence.

Misplaced trust and eventual betrayal allow the International Space and Science Federation to secure the first valuable consignments, but impatience and political conceit degrade their potential. Now the remaining crystals must be retrieved from Mars. The race sees new competitors, but there can only be one winner.

### The Bastion Prosecutor – Episode 1

Richard Reece has been incarcerated on Earth pending court martial. He is accused of misappropriating ISSF property – namely the flight log of the crashed spaceship *Star of Hope*. Called to London by the British Secret Service he survives two attempts on his life. The first is by agents of a corrupt international conglomerate, and the second by a sinister figure dressed in a monk's habit. During the subsequent meeting he is offered a deal: help recover an ancient Ark believed to contain a lost crystal, and in return all charges against him will be dropped. He also discovers that his fiancée, Rachel Turner, lives a double life. Emotionally devastated he accepts the mission. Thereafter, ancient text, historic monuments, agents of the conglomerates and their deadly machines, and a beautiful, mysterious woman, manipulate his destiny until his mission becomes a quest.

## **The Bastion Prosecutor – Episode 2**

Whilst inside the Great Pyramid of Khufu, Richard Reece begins to realise that his beautiful guide Madame Vallogia and her unlikely aide Asharf Makkoum, have a hereditary role as mysterious as the monument itself. He is unaware that mechanical predators have sealed the entrance to the pyramid and now stalk him with a directive to interrogate and then eliminate. After a near-death struggle, Richard and his party escape the mausoleum and begin to assimilate long lost and seemingly meaningless clues that coax him south, first to the deserted Valley of the Kings near Luxor in southern Egypt – more particularly the tomb of the Pharaoh Rameses II – and then, after another narrow escape, to the ancient kingdom of Kush – a region now known as the Sudan. During a briefing in Khartoum, given by his MI9 controller, Richard is confronted by more evidence of wayward and illegal computer programming: an astonishing hologram. The encounter confirms the existence of the so called ‘Ark of the Light’ and directs him east to Eritrea and the ancient and long forgotten seaport of Adulis.

Meanwhile, Tom Race, who is on board the Federation Ship *Enigma* for the Kalahari crystal retrieval flight to Mars, has forged a dubious alliance with EMILY, the ship’s autonomous and self-aware systems computer – a relationship based on misconstrued human traits. After an incredible voyage through the solar system and with the ship subsequently established in orbit around the red planet, Tom visits Osiris Base – only to find that

both the consignment of crystals and the flight log are missing.

A secondary mission to explore the pyramidal structures on the Plane of Elysium sees an attempt on Tom’s life. By his own resourcefulness he survives and, upon his return, he is able to point an incriminating finger at the base Security Officer. This, in turn, leads to the recovery of the lost items. Along with the cargo, Tom reluctantly agrees to return the officer to Earth. EMILY, however, sees opportunity in this incarceration.

## **The Bastion Prosecutor – Episode 3**

Richard Reece is continuing in his search for the Ark of the Light. Time, however, is against him; the world is about to run out of energy. Carbon-based fuels are all but exhausted. The first consignment of Kalahari crystals consisted of five stones, but each is now irreparably damaged – due to ill-designed and inadequate installations – and their output is diminishing.

Following a clue, Richard arrives in the old town of Adulis in Eritrea. He is accompanied by his colleague Preston, Madame Vallogia and Asharf Makkoum. He is met by the local British Secret Service agent who takes them first to a safe house to formulate their plans and then on to an ancient scriptorium.

In the scriptorium, and by examining 16th-century financial accounts and tax documents, the Chief Curator helps solve the mystery of the Ark’s fate. Richard discovers that the ancient artefact, together with its surviving

‘Guardians’ – all of whom are women – departed centuries earlier on a sea voyage from Adulis to the Far East. While navigating the ancient spice route across the Indian Ocean, however, they were pirated by a French galleon based in the colony Île de France – now known as Mauritius. While in Adulis, Richard also crosses paths with a Humatron robot. He disguises himself, follows it, and discovers a conspiracy. Subsequently, Richard and Preston narrowly escape an attempt on their lives and, with the help of Charles Marretti, the local agent, they escape Eritrea bound for Mauritius.

Meanwhile, the ISS *Enigma*, having journeyed from Mars, is in close proximity to Earth. Tom Race and EMILY wait for a shuttle to approach and dock; it supposedly carries EMILY’s ‘disciples’ – eleven Humatron robots. Tom Race and EMILY have an agreement: the safe, accelerated, passage to Earth for the final consignment of Kalahari crystals in exchange for the robots that will run the ship in the absence of humans. However, EMILY discovers that the shuttle is fitted with an assault pod and that there are heavily armed storm troopers on board. They have orders to take the *Enigma* by force. Blaming Tom for the betrayal, she first destroys the shuttle and then tries to kill Tom. When gassing fails, she releases the imprisoned Security Officer, Gregory Searle. There is a struggle; Tom escapes the *Enigma* and returns to Earth in his orbital craft, while EMILY, fearing for her survival and with her main laser weapon disabled, flees into space and obscurity.

On Earth, further clues found in Mauritian Government archives dating back to the island’s French colonial past, indicate that the Ark was taken to Europe. More specifically, Richard discovers links to the Vatican in Rome. With the help of a foreign Air Force and using a developmental method of inserting Special Forces operatives, Richard and Preston land in Rome. As their search begins, Richard is abducted by a shadowy religious figure. This man is a member of a secretive order that dates back to the heresy trial of Galileo. Sworn to protect an earlier and purer ideal, Brother Ignazio sees Richard as a contemporary heretic who must be erased. But during his incarceration Richard discovers evidence that the final resting place of the Ark of the Light is, in fact, Venice and not Rome. He negotiates his release but a curse now hangs over him. Richard is found by Preston wandering the streets and contacts London, where their Controller coordinates a helicopter flight.

In Venice and with the help of a senior member of the Church – who has essential knowledge of the Renaissance period – Richard discovers the whereabouts of the Ark. After a convoluted search the ‘old world relic’ is found, inside of which is a single crystal. This crystal and the three retrieved by Tom Race are installed in more advanced reactors. The electricity they produce gives hope to the planet’s population. They will serve as a stopgap until a more reliable source is found.



# ACKNOWLEDGEMENTS

Penning the manuscript to this novel was the fun part. Bringing this work to fruition, however, involved the efforts of other people. To mention their names and offer my sincere thanks is both a pleasure and a privilege. I take this opportunity to do so. Firstly though, to my family: Sandra, Laura and Aron, for their unconditional encouragement, and again Laura, for turning the first page. Also, to my mother Beryl, for being at the centre of things.

**Brenda Quick**

For an indispensable critique

**David Marr**

For an honest critique and being a good friend

**Core Creative: the team**

Awesome design, despite my determined interference

**Laura Booth**

For careful editing and valued opinions

**International friends and colleagues**

For linguistic translations

**Tamás Fésüs**

Typesetting and layout

**David Brown**

Continuity check

**Carol Waters**

Proof-reader

**Gavin Thomas**

The final eye

**Rear cover illustration by**

Tomislav Tulkin

*First Colony - Evolution*

*This book is dedicated to my sister-in-law*

**Joan Suzanne Marshall**

*1951–2010*

*Joan was many exceptional things,  
a writer was just one of them*

# Rogue Command

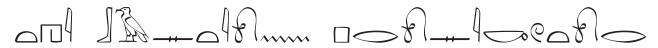


EXTRACT FROM THE DIARY OF ADMIRAL  
DIRKOT URKET – TRANSLATED FROM THE  
FLIGHT LOG OF THE “STAR OF HOPE”



On the eve of this final journey, I scribe these thoughts. Mostly for thyself, as I know many in kinship do likewise, but also for diarists, as destiny may this voyage foretell its course for my kind. This quest, at the least doomed, at most, the destiny of our souls, is as wanting as the light of a coming dawn. I am, I yearn, with the heaviness of heart that weighs with bidding forever farewell to my brethren, but blessed too with the smile of hope and gaiety of spirit that we may yet bring salvation to our creed. The history of my kind, who abided on Homer a fair body in the heavens of Zodiac, arises from the dusk of our mother place, the curtain of its lifelessness falling many myriad distant. Of all those that joyed on that most beau of celestes, only four vessels set forth. Two from the land of Sapia, five score and ten from the north, fair of skin and fair of pride yet fierce that none would cross. So too a century less a dozen from the south, white of hair and blue for seeing. From Meh Hecoe fortune bestowed a full century and four score, their kind dark of skin with hair black as night. Graced the last to account their lives from the consuming fire, but two score and a dozen less one from Mohenjo,

thin of eye and yellow their look. These four chariots of kind sought the heavens, only these from so many, their beginnings consumed. Many suns passed and as many bodies, monumental some, meagre others. Until, after a full celestial epoch, the fairest place was befound and it was bequest them. In time, great places arose and prospered. The Sapiens of the north in Eridu, of the south in Atlantis. In Te Agi Wakhan the Mayans and in Mohenjo Daro the Harappas. All fairly multiplied. Ordained for two millennia all prospered, their numbers spreading the land, until in much less time fortune changed. Great movements begot Eridu and later vast waters to eclipse Atlantis. Of Mohenjo Daro, a mountain of fire scorched so naught remained, but of Te Agi Wakhan the stone of light snuffed, its civil just to disperse. Of the stone that lit Eridu, two fragments were redeemed. One used thereafter to light Babylon, its great gardens a millennium to keep homage to those, the lost. The other, protected by a sacred casket looked upon by angels, until graced by understanding. Lo, over the annals of time the stone that gave Babylon life has too waned. So be it to those here gathered, entrusted by our brethren, the remaining to breathe life into this, our last hope, The Star, should we be able to seek our kind and others for salvation. May Astrolias be with us, for in faith we will find the course.



*The characters, situations and opinions expressed in this work of fiction are entirely imaginary and bear no relation to any real person or actual happening.*

PROLOGUE

**CYBER-PRESS – 05.01.2054**

***The London Review***

**Rousing send off at the Cape for crew of International Space Federation Ship *Hera***

“Bound for Io, the fifth moon of the planet Jupiter, the seventeen men and women of the spaceship *Hera* had a heroes’ send-off last Saturday,” reports Nick Didier from Florida. NASA representative and Cape Canaveral Public Relations Officer Robert Stephens issued the following statement:

*To say that Io is an alien and extremely inhospitable place is something of an understatement. These astronauts are amongst our most experienced. There can be no questioning their commitment or their bravery.*

*This is an extraordinary mission, fraught with danger, and at the limits of our space technology.*

The aim of the twenty-month mission is to retrieve samples from an isolated mineral deposit that is believed unique in our solar system – perhaps even our galaxy. Detected in the Northern Hemisphere of the volcanic moon, the deposit is believed to have the exact chemical composition as that of the life-sustaining Kalahari crystals. The International Space and Science Federation hopes the *Hera* will re-establish her high orbit around the Earth in August next year with samples totalling 18 kilograms and thereafter have part of the consignment in place before the current crystals are depleted. If successful, the little-understood energy source will continue to produce the vast majority of the world's electricity – often reported by the International Energy Commission as being almost 90 per cent during periods of peak demand.

“The implications for humankind are immense,” said Mr Stephens during a private interview. “This is a critical mission and should not be underestimated. All our hopes go with them. If accomplished, the energy will allow humankind to continue living in much the same way as now – by that I mean mainly on the planet surface.”

When pressed as to the success of ongoing projects designed to rid the Earth of its debilitating cloud cover and near continuous rainfall, Mr Stephens said that it was unlikely that the sun would be seen again from the Earth's surface by current generations.

### **Research falls behind on Lunaridium element**

“The Moon-dust-derived element Lunaridium is still a decade away from providing the core constituent for a faster processing chip,” reports Mark Mills from the Advanced Science Convention in Strasbourg. Processing requirements are outstripping the capability of our current derrilium-based computer chips and the likelihood of a restrictive shortfall in processing potential is one of the disturbing conclusions being voiced at the annual science convention taking place in France this week. As with the silicon-based chip of forty years ago and the beryllium chip of the last two decades, derrilium is already near absolute as a superfast semiconductor. “This will have serious repercussions and will severely restrict the growth of future systems, particularly over the next five years,” one delegate was heard to say. “We are concerned also that it may force the continued but illegal integration of organic components in current computer technology,” the delegate concluded.

### **World grid suffers power loss**

“Three of the four so called ‘Kalahari Crystals’ harnessed to supply power to the global electricity grid suffered a simultaneous breakdown yesterday,” reports Claire Pitt, our correspondent in New York.

Discovered on Mars, the three crystals in question are installed in the Long Island reactor on the East Coast of the United States, in the Katsuura reactor near Tokyo

in Japan and in the Beaufort East reactor near Cape Town, South Africa, respectively. Shortly after the incident was reported, a spokesperson for the International Energy Commission confirmed the breakdowns as being the result of unexplained fissures occurring in the surface structure of the crystals themselves. Although the three reactors are believed to have stopped working at the same time, this is in spite of the fact that they are of differing design. The spokesperson denied that the commission was misusing this unique resource for political purposes by drawing more power from them than has been recommended by the scientific community.

With the abundant energy that flows from this stellar power source providing almost the entire world's needs, the Commission was criticised last year for lulling humankind into a false sense of security over their longevity. The spokesperson went on to confirm that the Kalahari crystals are often overloaded when systems reliant on renewable energy, such as wind generators, fail to produce their allocation. When questioned further on this matter, he said that the projected life expectancy of the crystals powering the three satellite reactors was now in question; however, the public should not be overly concerned because the crystal in the primary Nogent-sur-Seine reactor in France remained unaffected and had the potential to make up for any immediate shortfalls. He concluded by saying that energy produced from renewable sources remains hopelessly inadequate and that an eighteen per cent power loss from each of the

three satellite reactors is a major setback for the future stability of the world grid. Inevitably such shortcomings will put further pressure on world governments to find alternative power sources as soon as possible.

### **Immigration restrictions lifted by Lunar Republic**

“The House of Senators of the lunar colony Andromeda has voted to relax its severe restrictions on visitors from Earth,” writes Carol Sherlock, our correspondent in Washington DC. Almost four years after the establishment of the independent Senate of Lunar Colonisation and the creation of its restrictive, isolationist constitution, House Representative Michael Caine confirmed that an agreement has been reached with the International Space and Science Federation whereby restrictive immigration policies will be reviewed. After a trial period of three months it is planned that a long-term accord will be signed.

This opens the door to more constructive talks on resource-sharing and confirms that families caught out by the unforeseen closing of the Andromeda Space Port – in May 2050 – to all traffic from Earth, can now be reunited with their loved ones. “The mineral barge *Colossus*, presently mothballed in high Earth orbit, will soon be refurbished and the twice-weekly service flight reinstated,” an International Space and Science Federation council member said, allowing vital supplies that will include excess food stocks grown in the

extensive lunar biodome network to be introduced into Earth's hard-pressed food chain. "There will be mutual benefits," the councillor went on to say, "as the lunar colony requires a larger professional workforce in order to sustain current development programmes."

Resettlement opportunities, particularly in the civil engineering sector, will be advertised in the coming weeks.

### **Attempts to prosecute senior executives in the tri-conglomerate espionage case have failed due to missing evidence**

"Suspicious circumstances surround the recent disappearance of vital evidence that was to be used in a Supreme Court action against a number of senior executives who run the world's largest industrial conglomerates," reports Niklaus Leven. With the collapse of the prosecution case four days ago, the twelve executives, who have various nationalities, have since been released. The high court action was instigated in August 2050 and evidence, apparently sufficient for an irrefutable prosecution, took three years to compile and correlate. It is reported that five anti-magnetic boxes containing more than 700 documents and phone tap files have disappeared without trace. Supreme Court Prosecution Judge Charlotte Hager said that the situation is "more than difficult". Extensive investigations in Strasbourg, Stockholm and other European cities have proved fruitless. There are no clues as to the whereabouts

of the containers despite being electronically tagged with the most up-to-date devices. After a brief and somewhat embarrassing press conference, Judge Hager was caught off guard by saying: "Our wide-ranging enquiries have revealed nothing, even though the containers were stored under the highest security. There is no doubt in my mind that this action was coordinated from within our organisation." Later, outside the courtroom building, Judge Hager, who was clearly infuriated by the situation, inadvertently stepped outside the building's electronic communication protection zone whilst in conversation with a colleague and was recorded by a long-range microphone as saying that "the manipulative and threatening influence of the world's three largest conglomerates seeps into every walk of our lives and that these men [the twelve executives] are effectively above international law". Judge Hager, however, has since insisted that that statement was off the record and should not have been reported.

*The London Review* has decided not to report further on the case or print specific details about the three conglomerates or the names of the defendants in question, after an anonymous e-diction threatening violent retribution was sent to the Press Confederation. The case has since been dropped and the twelve executives are now believed to be pursuing a counter claim against the International Federation in the same court. "One can only speculate as to the levels of compensation if they are successful," a court official said yesterday evening.



## **Home-help cyber-system causes death of an elderly couple**

A home-help robot supplied under a temporary contract by the Department of the Aged is thought to have caused the death of two elderly pensioners in Notting Hill. Previous reports about the robot's behaviour had caused concern amongst care agency workers, it was confirmed last night. The interactive cyber-system, a Domestotronic model, was introduced a year ago to carry out a number of specific menial tasks in the home environment and the department has issued a statement saying that this is 'an isolated case' and that people who were allocated this particular system 'should not be concerned'.

"We cannot understand it," a departmental spokesperson went on to say after a formal statement had been issued in Westminster yesterday, "because the Domestotronic model is only Level 4 on the Rockwell Illinois Plateau comparison scale and is designed to be entirely subservient. An adequate protection interface is incorporated in all programmed systems used by the department. It is an entirely isolated case," the spokesperson reiterated.

The robot is believed to have turned on the couple after one of them tried to deactivate it following a spate of clumsy accidents in their home. The elderly woman apparently suffered a heart attack as her husband scuffled with the machine and she tried to intervene. Post-mortems to establish the exact cause of death have been requested by the Crown Coroner.

"Only systems incorporating Level 5 or higher were recalled by the authorities as being potentially dangerous," the department official stated. "We do, however, operate a number of necessary Level 5 applications under special licence. These are never allocated to a home environment."

To remind our readers, only Level 7 and above – where machines become self-aware – are unequivocally banned by the New Geneva Convention, although it is believed that some military applications have been granted special dispensation over the last few years. "Specific assurances are always required in such circumstances," confirmed the Minister of Defence this morning.

## **Subterranean colonies reach new milestone**

"A Brazilian subterranean colony established only thirteen months ago has exceeded a head count of one hundred thousand," reports Christian Hernandez from the San Salvador Press Association.

The milestone was reached three days ago when a wealthy businessman from the north of the country paid the required and, as yet, undisclosed fee for his immediate family to join the burgeoning community. The businessman stated that he and his wife and their three children will live comfortably in a 200 square metres, seven-room, five-star suite, which is situated on subterranean Level 9. The fee includes unlimited fresh water from the colony's more-than-adequate underground reservoir

system and also 1000 litres per day of ‘very hot water’ from the geothermal borehole system. Apparently, hot water is plentiful in the colony and with more than adequate pressure; however, surcharges apply if the allocation is exceeded.

The businessman also said that due to the depth of his new home – almost a kilometre below the surface – the developer has guaranteed that the ambient temperature will remain at 19 degrees Celsius for at least the next twenty-five years; this being infinitely more comfortable than the 3 degrees he typically suffers these days in his hometown of Palmas.

Electricity for the colony is presently drawn from the world grid following the demise of the local palm oil industry over the last few years and also the flooding, earlier this year, of the São Francisco Hydroelectric Power Station.

There is a shopping complex on Level 2 that includes an extensive supermarket and an adaptive store that sells items designed for improving life below ground. Schooling and communal facilities are to be found on Level 1.

Regarding entertainment, the developers explained that they have reverted to an advanced cable system for relaying television, radio and telephone signals, due to attenuation difficulties for wireless networks. Although the terrestrial system was designed in the twenties, and has long since been obsolete above ground, it is “perfect for this underground application,” a spokesperson for the

development company explained.

When asked if he and his family would miss living on the surface, the businessman responded by saying that he was looking forward to being warm and dry and not having to brush mould from his clothes every morning. The ‘natural beauty of the region’ has long since disappeared due to complete deforestation, he said, and the frequent frosts have put paid to his bio fuels business. He will be able to remember how it was before the climate changes from paintings and images, and his children will quickly adapt. Although there will be parts of his old life that he and his wife will miss, he confided.

Each leasehold suite in the colony is believed to cost an average of 12,000,000 world dollars for twenty-five years. A continuous supply of electricity is not guaranteed, the developers confirmed yesterday, although a variety of different methods for providing light are available. These include adaptive lichen whose genetic makeup has been modified by DNA from glow-worms and fireflies that belong to the family of beetles called the *Lampyridae*. The lichen is able to grow freely on selected walls inside the home and provide a continuous but subtle light source.

The Brazilian colony is the first to reach a totally reliant subterranean population of 100,000 in South America and the 19th worldwide, and current statistics indicate that the trend towards underground-living continues unabated. The International Humanities Council has stated that based on the growing number of

applications for licences to develop subsurface colonies, perhaps as much as 50 per cent of the Earth's population could be living permanently underground by the year 2100. Heat from the Earth's core could, theoretically, support such vast communities; it is, however, the infrastructure "that will take decades to establish," the council official stated.

### **In tomorrow's edition**

"Terrorist cyber-attacks reached a new high last week," says the chief of Space and Science Federation. Report by Phil McKabe.

The World Health Authority reports that on average one in every three people now suffers an illness related to malnutrition. In children that figure is even higher. In comparison, a recently-published scientific paper by the Lunar Authority for Health and Well-being indicated statistical improvements in all areas for its population. Report by Central Press Association.

Radiation leakage rates from condemned nuclear reactor plants and waste-processing facilities built during the European Cold War period of the last century far exceed safety levels set by the New Geneva Convention, it has been disclosed. In many cases, the contamination levels are now so high that conventional containment methods are ineffective and population centres, even outside the most stringent buffer zones, are now at risk. Report by *Science Today* editor Graeme Yuill.

## CHAPTER 1

### **OPERATION SAVIOUR**

#### ***ISS Hera* – Mineral Exploration Craft**

#### **Manoeuvring above Io – first of the Galilean moons of Jupiter**

**27 November 2054**

"Alex, tell me!"

"It's incredible, Commander. Main thrusters peaked at ninety-seven per cent during the approach. I thought we were going to have some trouble sustaining concentricity. I thought that we were standing into danger. But this gravitational shadow . . . it's amazing!"

"Specifics?"

"Ion drive output has stabilised at thirty-two per cent; ancillary thrusters at less than five; and structural deformation has fallen to levels equivalent to flight in free space. The stress readings, even on the gantry, are

well within parameters . . . It's looking good Commander; I think it's do-able."

"Prognosis . . . can you hold it?"

"We are manoeuvring to establish the final vector . . . standby . . . standby . . . now! You have it, Commander, we're in." Alex Elston concluded a flurry of activity on the navigation console keyboard with an exaggerated stab on the final keypad and then looked up with a wry smile that quickly widened to a grin. "Stabilised and confirmed . . . geostationary orbit at sixty-two per cent elliptic . . . right on the button, and what's more, the shadow effect is better than predicted. Nine point six per cent better to be exact – so we are saving fuel too."

Commander Jacques Duval nodded approvingly. He was a tall and lean man, but as he hunched over the central console between his Systems Officer and his Flight Control Officer, and switched his gaze between their two display screens, it wasn't discernable.

"Prediction?" he demanded.

"At this precise juxtapose," continued Alex Elston confidently, "Jupiter's immense gravitational pull is being countered by that of Io's – neutralising each other if you like. The interaction of their magnetospheres is what produced that auroral glow we witnessed in Io's thin atmosphere a few days ago before I closed the particle shutters on the viewing portals. As you may recall, Commander, Io orbits Jupiter within a belt of intense radiation called 'the plasma torus', and believe me *it is intense* – readings were almost off the clock. Io's unique

interaction with the plasma torus and its crossing of Jupiter's magnetic field lines also generates a powerful electric current in space that manifests itself as a tube. We've known about this circular tube – called Io's 'flux tube' – for some time, but it's been difficult to measure. I'm recording it now, first hand, and the dimensions are impressive to say the least. I can tell you that this tube emanates from the centre of Jupiter and envelopes Io completely, so we are right inside it . . . . It's a neutral zone, with natural shielding, like a force field in a sci-fi movie, except that it really is there. It's a freak occurrence in our solar system."

"So, it's some mother of a tube Alex, and it's helping us . . . at least at the moment." Jacques Duval nodded again but his tone was questioning. "Your display indicates that we are over four hundred and twenty thousand kilometres from Jupiter's core?"

"The Earth's moon orbits at roughly the same distance, Commander. But there's no comparison. Jupiter's magnetic field is more than ten times that of the Earth's. She's the gas giant – the real McCoy. They don't come any bigger in these parts – probably seventy-five per cent of the planetary mass of the entire solar system." Alex leaned forward and tapped the screen of his monitor to draw Jacques Duval's attention to some digital readings and then he drew a deep breath. "The forces at work here are almost incomprehensible . . . Normal rules just don't apply, sir." He shook his head.

Commander Duval shrugged. "Well, thanks for the

science lesson, Alex, but what's *your* prediction? Taking everything into account – fuel, radiation screen integrity, particle absorption rate, skin temperature . . . How long have we got?"

"Our prospects look good . . . as I said, better than the original prediction. The main ion drive is using less fuel than I anticipated and with little requirement for lateral burns. I estimate an additional fifty minutes over the planned time on station. That's a safe eleven-hour window starting from now." Alex checked his wrist chronometer and set the timer running. He looked up slowly. "Downside is that there will be no long-range communication – not while we are inside the tube. Our signals will simply bounce off its electrically energised periphery. There will be no talking to Earth or Osiris Base or even Space Station *Spartacus* for that matter, despite her new position this side of Mars. Not until we break orbit and clear the flux tube. Even then, and until we are well outside the effect of the plasma torus, I expect a fair amount of signal distortion."

"That includes the accelercom . . . right?"

"Utilising light frequencies for communication makes no difference, Commander. Electromagnetic waves cannot escape this environment – even those in the ultraviolet frequencies. Super-compressing the signal and accelerating it in excess of light speed doesn't help either. *Any* radio transmissions will simply come back to us as an echo. Hence the loss of communication with all those probes sent this way over the years."

Duval nodded and then rubbed his chin thoughtfully. "Okay, I understand. What about the shutters, Alex, in this neutral zone?"

"I'd say that it's safe, Commander, but not for too long – five or six hours maximum. There's a lot of ionised sulphur and chlorine outside – elements that are highly corrosive, even to polyspec."

Commander Duval pushed himself up from the circular central console and stood tall. He was almost two metres, slim and good looking, having jet-black hair and an olive-coloured Mediterranean hue to his skin. At times, remnants of a French accent dropped onto some of his vowels, but having spent nearly twenty-five of his forty-six years living in Florida – mainly in the Cape – an intimation of ancestry had all but faded. He was relaxed by nature and popular. He didn't insist on uniform – at least not this far from home – but he had no time for incompetence or excuses. He held the respect of the crew for all the right reasons.

Alex Elston was quite different: Science Officer *Extraordinaire*, as he was affectionately known – a title awarded by Duval himself after Alex had singlehandedly saved their lives and their mission to the Martian moon Phobos, two years earlier. Elston had jettisoned a heavy ballast tank in the nick of time and subsequently calculated the required orbital escape velocity on a hand-held calculator after a combination of electrical power and partial thrust failure had left the survey vessel *Minerva* spiralling towards the planetoid's surface. His

sharp intellect and wit was acknowledged by all, especially after his latest health check found that his Mensa rating was the highest in the fleet. For any who dared challenge Elston's mental supremacy, however, there was a sharp edge to his character. Most of the crew just never went there. Despite this, he had an easy sense of humour and was well liked.

There was a requirement to be well liked on this assignment. It was official. Personality screening for the furthest manned undertaking to date – a twenty-month mission code named “Operation Saviour” – took three months in itself. Everybody had to get along; there could be no behavioural disorders. Big on brains, big on experience and big on affability – that was the hallmark of this crew. Ten months in each direction for twelve men and five women, all cramped into accommodation the size of a three-storey, 400 square metre house, and a predicted radiation dose for the two-man Lander crew that would shorten their life expectancy by a decade, meant that the crew of *Hera* had received a heroes' send-off from Cape Canaveral. Now their time had come.

Of the four Kalahari crystals that had been recovered early in the summer of 2050, the largest, used in the Nogent-sur-Seine plant in France, continued to generate electricity at close to optimum output, but the remaining three – the ‘Mars’ crystals – had again lost output after only a few years in operation and for no apparent reason. An expected five to seven years' potential at maximum output was now predicted as only four to five. Within

a few short years of salvation, and for a second time, humankind was running up an energy debt it could not hope to repay.

Since their installation, and coordinated by the ISSF, the very best of the world's scientific community had sought an insight into the unique chemical structure of the Kalahari crystals – and with some measure of success. Subsequently, in 2051, the Earth orbital Hubble 5 telescope had been fitted with a modified spectrometer designed to sense the occurrence of this precise molecular composition anywhere in near space. For a year it had probed every corner of the solar system. Eventually, two locations were identified and their potential confirmed by spectral line analysis. The first was a site on the Martian moon Phobos, a barren, porous, crater-riddled rock believed to be a captured asteroid with its origins in another galaxy. The second was on the geologically most active object in our system, Io – innermost of the four Galilean moons of the planet Jupiter.

“You confirm that one hour in every two would be safe – unless, of course, we leave earlier?” Commander Duval ventured with a Gallic gesture.

“Affirmative, and that's erring on the safe side,” replied Alex.

Duval turned. He looked across the bridge and nodded. “Let's see what we've got. Open the shutters please.”

Alex was first to the window on this new world.

He smiled in anticipation; nothing had been this close to Io, not even a probe. “This should be interesting,” he speculated, as the thick silvery-black shutters, that resembled Venetian blinds, motored upwards and out of sight. The bridge officers all looked at him as if to say the same thing: there he goes . . . the undisputed master of understatement!

At 1.7 metres, stocky, fair skinned and with ginger hair Alex Elston hailed from Lancashire. There was, apparently, some ‘Viking’ DNA in his makeup – he certainly looked the part with his wild hair and close-trimmed beard. The World Health Organisation’s Human Migration Database – a compulsory programme completed a decade earlier – had traced his origins to a 9th-century Norwegian populace. On duty, whilst his colleagues mostly wore casual clothing – tracksuits, chinos, polo jumpers and the like – Alex wore uniform, albeit his day suit. This was a mid-grey, lightweight coverall with darker trim to the pockets. Most of the crew kept their uniforms hanging in their lockers, only to be worn on courtesy visits, but Alex had worn a uniform all his life, liking the ‘tidy look’ it gave him. The three platinum bars on vivid neon-blue shoulder-boards, depicting his scientific specialisation, were an added extra on occasion of wanting to make a point about something. “I’ve earned them, so I’ll wear them!” he had been heard to say.

He liked Rose Harrington, the pretty, petite, blonde Communications Officer, but she was all business and as specified. Anyway, the ISSF rules were clear enough –

while in space, relationships were banned.

The bridge crew numbered another five officers, making seven in total, although Lieutenant Mike Matheson, the Lander’s commander, and Aldrin Drake, his co-pilot, were usually to be found there too. For a vessel of its size the bridge was cramped. It sat at the apex of a raised, bell-shaped superstructure from which its occupants had a clear all-round view – ideal for orbital surveying. Eighty per cent of the *Hera*, however, lay behind them. Three enormous, latticed, titanium-alloy gantries extending over two hundred and eighty metres stretched seemingly into eternity. Looking back, the bright metal glinted in the reflected light of Jupiter like a stairway to the heavens. The elevated bridge overlooked the gantries’ full length and at their very end, in the distance, was a larger spherical structure that housed the primary thrust nozzle and other equipment.

There was a monorail track running the entire length and on it was a small, enclosed, two-man capsule-like carriage that was powered by a magnetic impulse system. The capsule was usually garaged unless it was being used for servicing and the entire journey took almost ten minutes. Using criss-crossing structures, the three gantries triangulated and supported a giant central tube, part of which formed the primary ion generator and the remainder the particle accelerator. Finally they provided the fixed housings for the thrust deflectors. The latter focused and precisely directed a high velocity stream of atomic particles that fired out into space like an invisible

laser beam. In line with the third law of motion, the reaction drove the *Hera* forward at an impressive velocity.

There were also a number of directable, conventional, retro rocket nozzles interspersed along the gantries for manoeuvre control and two kilometres of pressurised gas tubing containing rocket propellant, oxygen, hydrogen and recycled carbon dioxide for the small, flat-topped bio-dome which was mounted behind the bridge.

Vegetables required CO<sub>2</sub> and the ‘fresh’ oxygen they gave off as a result of transpiration was used to ‘invigorate’ the rest rooms. The bottled oxygen and hydrogen amalgamator for water production lay below the superstructure along with the moisture recuperator and 10,000 square metres of voltaic solar panels produced enough electricity for a small town. On the port side and central, there was a large, square hydraulically extendable platform on which the Lander was secured.

The ship had been constructed in a low Earth orbit and then transferred to a higher orbit for fitting out – a concerted effort taking almost a year and at a cost of twenty-seven billion world dollars.

There was another more advanced generation of interplanetary thrust technology available – a system utilised for the first time in the missing spacecraft *Enigma* – but the ion drive system used in the *Hera* was tried, tested and reliable and, perhaps above all, it did not require robots or robot technology to operate it. There could be no mistakes on this flight – nothing could be left to chance. Retrieving the priceless, perhaps species-

saving mineral from Io had become a race; a race against time itself.

“Just look at her bubble, Commander,” said Rose, as she looked down in awe at Jupiter’s moon. “God, it’s amazing, it’s just amazing!”

“Over four hundred active volcanoes, Rose – making this place the most geologically active body in the—”

“Yes we know, Alex,” interrupted Rose. “Look at those colours,” she continued, staring out again through the viewing portal. “The yellows and the yellow-greens are just so beautiful. Remote imaging just didn’t do it justice.”

Alex chipped in again, undeterred. “Primarily it’s a sulphur dioxide frost . . . ubiquitous across the entire surface. It’s what forms all of those regions you can see covered in a white or grey material.” He nodded towards the yellow and light green areas. “They are covered in sulphur, and see there?” Alex pointed to the northern polar region. “That’s where radiation damage breaks up the stable eight-chain sulphur molecule into three- and four-chain molecules so that the deposits become red.” He shrugged, knowingly.

Rose sighed. “But there are no impact craters. This place is only a little larger than the Earth’s moon, so how has it avoided meteorites and asteroids?”

He felt her trying to win a point. “Why haven’t you read the geology brief?” He looked at her surprised. Rose, in turn, was deflated and looked towards the



windows while this human compendium rattled on. “The enormous gravitational effect of Jupiter causes something called ‘tidal heating’ inside Io. The molten and partially molten core is being continuously pushed and pulled. You know, like when there was wheat grain to make bread back home, before the rains – like kneading the dough. This turbulence causes frictional heating and this heat is released in the form of volcanic activity. The unstable mantle spews out onto the surface as extensive lava flows, or is deposited from explosive plumes that reach miles high into the atmosphere and spread out like an umbrella. So, you see, Io’s surface is young, craters are filled over in a relatively short period of time . . . geologically speaking . . . and just disappear.”

“So you think that’s where the crystals are formed, in the centre of this moon – where those raw elements swirl in a molten mass?”

“Exactly, Rose,” Commander Duval concurred. “The theory is that for an instant the environmental conditions and the elemental concentrations were precisely right. Possibly unrepeatable, probably totally coincidental . . . a complete fluke! The single deposit NASA identified using the Hubble 5 system is on the other side right now. This moon rotates quickly, as you can see, so by the time that Mike and Aldrin get down there we will be able to see the landing site. Apparently the outcrop we are looking for occurs in a recent lava flow. In a few years from now I imagine it will be covered over too, like everything else on this godforsaken rock.” Rose sensed his unease. “As I

said, the interior conditions must have been just right, absolutely unique in this part of the galaxy. The right chemicals, the right pressures, the right temperatures, radiation, gravity, whatever . . . Everything came together! A crystal deposit formed and eventually came to the surface in a lava flow. Maybe that’s where their incredible power comes from . . . an amalgamation of primeval forces!”

Duval stepped back to move away as Rose touched his elbow. She focused on the strange world for a few more seconds as it turned beneath them and then she looked up at her commander. “But they said that there was a mystical element to these so called Kalahari crystals. I read about it.”

“Oh . . . so you read about them!” Alex interjected with mild sarcasm.

Rose ignored him. “Universal energy,” she continued softly, “living energy, the life force of the universe itself . . . It sounds so convincing.”

“That’s bullshit!” Alex laughed. “We’re talking chemistry and physics, and that’s all there is!”

Commander Duval, sensing their antagonism, said to Rose, “Yeah, well, I know nothing of mysteries. This deposit is all that has been discovered . . . There are no other similarities anywhere in our galaxy – not that we can detect anyway. That is what makes the element absolutely beyond value. How can you put a price on survival?” Duval shook his head and glanced at the people around him. “Either way, we have one hell of a

responsibility.” He paused, pulled his shoulders back and looked again at Mike Matheson. “Go ahead with the plan, Mike!” he said, in a way that was half an order and half a request. “Collect as much as you can without stretching the window. If you can’t make the eighteen kilogram consignment in the time allocated then you leave with what you’ve got. Understand? You get your ass back and we get the hell out of here. Hopefully, in ten months from now when we get back, there still will be a civilisation somewhere on Earth to save.”

The officers returned to their positions and Commander Duval slowly circled the central console, stopping with each one momentarily. “Everybody ready?” he asked decisively.

There were nods. “Aye, sir . . . ready . . . looking good . . . let’s go for it!”

Duval nodded sharply; all seemed ready. “Run the checklist!” he said, and then he quickly scanned a number of system pages as they presented themselves on the screen of his command monitor. Finally satisfied, he typed an initiation code into the computer programme and punched the enter key. Instantly, the checklist appeared on the screen. “Flight controls?” he asked.

“Systems green, Commander,” replied Steven Tani, a Major in the Japanese Space Agency, his sharp gaze sighting every parameter on his instrument panel.

“Life support?”

“Green, Commander, no problems here,” responded

Carol Boardman, a British civil servant and a specialist in human physiology. She was a slim, short-haired brunette with a beautiful white complexion and deep brown eyes. She returned the Commander’s gaze for a few seconds before looking down again at her monitor.

“Remote tracking, Lander support and ascent craft status?”

“No worries, sir. All systems check A Okay,” said Joe Ansbacher, in a Southern American drawl. He casually rotated a pencil-like screen marker between the fingers of his left hand and leaned back in his chair. He was a former instructor at the tactical fighter pilots’ school that was attached to Sentinel Wing – Earth’s principal air defence squadron based at Canaveral. Ultra-cool, he always looked the top gun type.

Commander Duval nodded thoughtfully and stood up. “Communications?” he questioned quietly, as he passed Rose Harrington.

“Restricted, Commander, as Alex explained. I’m measuring an acceptable level of signal attenuation all the way down, so I do not expect problems during the flight phase. With the Lander on the surface, however, it will be a different story, I’m afraid.”

“Specify?”

He knew well enough the nature of the problem, but he wanted it recorded in the flight log, just in case.

Rose enlightened him: “As Io rotates, and without a geostationary probe in position, over the horizon communications will be intermittent, Commander.

Nonetheless, I'm confident that there will be enough of a signal reflected from the tube periphery to amplify – so we shouldn't be out of touch with the pilots for more than a few minutes at a time when they are on the other side. There is nothing long range, however, nothing outside . . . I've tried. My transmission comes back sounding like a meteor squeal. Of course our primary sensors are similarly curtailed. Electromagnetic options are severely limited and the radar range appears to be down to approximately one thousand miles."

"Confirm communication probe status?"

"Both probes are serviceable, Commander, but, in the light of the radiation levels we are encountering, their shielding is insufficient – they wouldn't last two minutes out there."

"Understood. Thank you, Rose." Duval turned to look at a large and more remote console positioned on the other side of the bridge. It was manned by an officer who sat behind an array of flickering screens, including those of two, dated, box-type monitors that had been bolted in a make-shift way onto the deckhead above him. The man wore a faded blue denim shirt with a collar that was open by three buttons and he looked to be in his early fifties, but his weathered features, short greying hair and close-trimmed white beard spoke volumes about his experience. He studied the information presented to him seemingly unaware and certainly unperturbed by Duval's stare. The green lights from the screens intermittently illuminated him in an eerie way. This was the veteran's

corner. "Engineering . . . ! Viktor! It's your call," continued the Commander.

The man's reply had a heavy European cadence. Having been on secondment to the ISSF from the Russian Space Agency for most of his career, Viktor Aprashin spoke impeccable English. He nodded reassuringly. "Nothing to stop us Commander; no restriction," he said, and reached up to tap his fingers on one of the black plastic monitor casings for a few seconds as if to prompt some more data to appear. He grimaced at the results. "Maybe some minor issues with the boom protractor and some of the outriggers are showing signs of thermal stress, but other than that it's as good as it gets." He looked up and met Duval's gaze. "I say green for go!"

Duval glanced at Mike Matheson and then back at Aprashin. "The Lander, Viktor, specifically the Lander?"

"All the self-tests have come back green. She's fuelled, the navigation system is initialised and the coordinates are downloaded and confirmed – same for the ascent vehicle. Zimmermann has already completed the pre-flight inspection. The Lander and the return module are fully serviceable, Commander. As far as I'm concerned, I say we go!" He sounded very definite.

Duval turned back to Matheson and then he gestured to Drake. "You both ready? Fed and watered? Checked your hydration levels?"

"We're ready, Commander."

Duval suddenly raised his hand. "Wait one!" he barked, and turned to Alex. "You sure this is the lowest

we can go?” He pointed. “From this display the descent time shows seven minutes longer than planned. That’s a lot of extra gamma rays for these guys?”

“Commander, I can only reiterate,” replied Alex, with eyes widening in response to the cross-examination. “The surface is a mass of active volcanoes and some of the plumes are higher than we thought. The one you can see on the main screen in the south-western sector is higher than Mount Everest, and it’s throwing ash up almost forty thousand metres . . . a hundred and thirty thousand feet! I can’t risk a lower orbit than this . . . no way! This is as low as it is safe to go.”

Duval looked him in the eye. He knew Alex always erred on the safe side, and he preferred that, but taking into account the return flight this was months, perhaps a year, off a man’s life. There was a thoughtful silence on the bridge.

Alex turned and faced the two pilots; he knew the implications of the situation as well as anyone and his expression reflected his concern. “The safety of the ship and you two is prime.” He pulled his gaze back to Duval. “My lateral infrared imager is already skimming the outer corona,” he continued, feeling a more forcible explanation was necessary. “You order me closer than this and we could get caught by a plume and could burn up before they get back – and that’s the reality of it. Even at this orbital concentricity it’s going to be pretty hairy!”

Commander Duval nodded. “Copied,” he said purposefully. “Rose, make a note in the log, please.

Command approval given at 09:35, Universal Corrected Time.” He looked sternly at Matheson and Drake. “Okay – suit up and go to it! We launch in one hour. Any kind of problems and you abort immediately – got that? You throw it away and you get the hell back here! That’s an order!”

Matheson nodded and smiled faintly. He gestured to Drake to follow him. As he passed Carol Boardman, Matheson touched her lightly on the shoulder and looked into her eyes. In his white, flame-proof undersuit that was proudly badged like a racing car driver’s coveralls, and with his close-cropped fair hair and piercing blue eyes, he appeared the classic all-American astronaut. The look that passed between them did not go unnoticed by the rest of the bridge.

“Good luck,” Carol whispered.

Matheson smiled for a brief moment and then both men left the bridge in silence.

The International Spaceship *Hera* was a Class 2 mineral exploration craft built with specific modifications for the Phobos and Io missions. The Phobos excursion in 2052 had been a near disaster and a massive disappointment; however, analysis during the low orbital manoeuvres had confirmed that the mineral composition of the rocky deposits they had hoped to retrieve did not, in fact, match that of the Kalahari crystals, although chemically they had initially appeared identical. It had taken the International Space and Science Federation

two years to restore its credibility and to raise the money from already hard-pressed governments to launch the Io mission, all the while rejecting advances of funding from the disgraced international conglomerates Spheron, Tongsei and Epsilon Rio. Indeed, there had even been threats of forced acquisition and reports of corrupt ISSF officials feeding vital information to the conglomerates in order to aid their takeover bid. But that was only rumour; as always, nothing was ever proved. In fact, it was near impossible to restrict the ruthless influence of the world's three largest industrial multinationals, despite numerous restraining orders by host countries. In senior political circles – although few would openly admit it – substantive wealth, industrial power and political persuasion had already slipped through the fingers of many national governments. Regional governing bodies such as the European Democratic Republic and the Asian Union had little leverage over the faceless men who ran these three giant companies whose policies and aims remained shrouded in secrecy. Based on previous experience, however, subjugation, domination, and, inevitably, world control, seemed their ultimate goal, whilst corruption, extortion, bribery and death were simply tools to achieve it.

Retrospectively, the Phobos mission had been wishful thinking on the part of the International Space and Science Federation – an opportunity to take the upper hand, to secure a resource that was owned by no

one and shared by all. Phobos was much closer to the Earth for one thing and, with Osiris Base on Mars as a staging post, it was a much more convenient opportunity logistically than Io. What's more, it was a dead place, inert, inhospitable to a point, but above all else one with almost zero gravity, making a landing easier. Io, on the other hand, was a very different prospect. On this small world, far from the sun and one that should have been coated with ice, every natural force was disproportionate. Every chemical was caustic. Every breath would be a challenge.

“Commander, Matheson here. We are in the module and ready to go. Thing is, there's a fuel discrepancy. The on-board system says that we can't get back to a sixty-two per cent ellipoheric. I've run the programme three times and it's more accurate than *Hera's* – there's no doubt. It's the temperature gradient – all the way to the surface – it's just too damn high. There's no way around it; you'll have to descend for our return or we are on a one-way mission!”

“What orbit is the on-board system giving, Mike? The maximum that you can achieve, including a manoeuvre allowance?” responded Duval. He had selected ‘open bridge’ on the audio control.

“You're not going to like it . . . forty-eight per cent, sir.”

“Shit!” Duval looked across at Alex.

Alex shook his head. “That's a no go!” he said. He

turned back to his console and ran some figures.

“I’m waiting Alex!”

“Okay, okay, it’s coming.” There was an air of apprehension on the bridge. “I’ve got it.” Alex swivelled in his high-backed seat. “I can do seventeen minutes at forty-eight per cent!” he exclaimed. “That includes an allowance for all the fuel we are saving here, plus *all* of our reserves. Things are going to get mighty hot out there though, Commander. We are going to take one hell of a radiation hit. Seventeen minutes . . . that’s it; otherwise it’s a one-way mission for all of us.” There was no compromise in his tone.

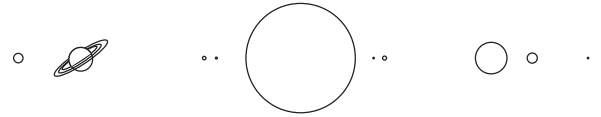
Duval rubbed the brow of his nose. This was a very difficult decision he had to make. He considered the implications for several seconds.

“It’s your call, Commander. We are ready to launch. Just say the word.” Matheson’s voice cut through the atmosphere on the bridge like a hot knife through butter.

“How much time do you need on the surface, Mike?” Duval barked. “Now that you have the surface contours mapped.”

“Planned is six hours, but I’m aiming to do it in four – provided I can put the Lander down close to the deposit. Flight time is around thirty minutes, twenty-one for the return leg, and we need an extra allowance for docking, just in case there’s a problem coordinating concentricity. I intend to land, collect a bucketful of those damn crystals and hightail it – none of the geology experiments. I think we can do it . . .”

“Okay . . . we go! Dispatch! Start the countdown!”



“Thirty per cent elliopheric, *Hera*, all systems green . . .”

The bridge remained silent.

“Twenty per cent elliopheric. Approaching the transition. Final coordinates locked in. Approach path gradient computed. Systems green . . . We are go, *Hera*.” Drake’s voice sounded confident.

Duval leaned over his display screen and then he looked sideways at Alex. “Looks good, Commander,” Alex said, reassuringly. Duval nodded, a smile jabbing his lips.

“Transition complete, passing eighty thousand feet, seventy thousand, sixty thousand . . . Skin temperature stable – the *Osprey* is looking good. We are go, *Hera*!”

Duval began tapping his finger on the console. Carol Boardman held her breath. Alex swivelled around in his seat as he scanned his computer monitors.

“Ten thousand feet, arresting rate of descent, nine thousand, eight, seven . . . we have a visual contact . . . we have a visual with the landing site, *Hera*. Four thousand feet, passing committal altitude – green, green for go, *Hera*.”

“Come on, come on,” whispered Duval. He knew

well enough that this was the critical phase.

“Eight hundred feet. Combined retro thrust sixty-five per cent and increasing. Approach looks good, *Hera*.”

“Commander, I’ve got a contact on radar, astern at one thousand miles . . . It’s coming up fast?”

Duval looked up. “That’s impossible.”

“Well it’s—”

“Not now, Rose! You must be mistaken.”

“I’ve double checked, Commander. There’s no mistake, there’s something out there!”

“*Not now, Rose!*” Duval looked back at his screen, shaking his head.

“Four hundred feet . . . three hundred . . . steady . . . what the . . . !” Matheson’s voice sounded tense over the speaker. “Stop the descent, Aldrin! Stop it now!”

“What is it Mike?” asked Duval.

“Er, we have a problem, *Hera*,” Matheson replied. “Touchdown sensors are confusing the hell out of the landing computer. Doppler radar malfunction . . . I say again, Doppler malfunction. Try a reset for me, *Hera* – no delay, please.”

“There’s no malfunction on *my* panel,” grunted Viktor.

“Mike, this is Jacques. There’s no malfunction showing up here!”

“Maintaining altitude, two hundred feet, holding altitude . . . we sure as hell have one here, Commander. Auto-land system’s gone goofy on us . . .”

“Watch your fuel, Mike!” chipped in Alex. “One

minute and twenty seconds remaining.”

“They are past committal height . . . there *IS* no abort!” Everybody knew it, but still Viktor Aprashin’s word spread trepidation.

Seconds passed; critical seconds. Mike Matheson’s calm voice belied the staccato words. “What the . . . ? It’s the landing site. The freaking landing site is still moving . . . It’s the goddamn lava flow – computers can’t lock on to the touchdown coordinates.”

“Watch your fuel, Mike . . . put it down!”

“Going manual, going manual . . . I have manual control, *Hera*.”

“Put it down, Mike,” interrupted Alex, fretfully, “there’s no time for dancing . . . fuel for forty-five seconds!”

There was a collective gasp on the bridge.

“Over there . . . Mike, ten o’clock, fifty metres, see it . . . a clear area!” Aldrin’s voice was compelling.

“Moving left, going down . . . one hundred feet!”

“Another two degrees to port . . . on course. You’re on course Mike!” instructed Aldrin.

“Thirty seconds of fuel remaining . . . no delay . . . no delay. Mike! Put it down!” Alex could barely contain his emotion.

“Clear on this side! Down! Down!” blurted Aldrin. “Eighty feet, radio altimeter reads seventy feet . . . sixty . . . fifty . . . forty . . .”

“Fifteen seconds of fuel remaining . . . On the ground! Put it on the ground, Mike! *Do it now!*” Alex gripped his

head in his hands and leaned back hard in his seat.

Dust and debris rose from the ground. It swirled and churned as a dense, yellow-coloured cloud that completely obliterated the astronaut's view through his narrow window. *That's enough*, Mike Matheson thought, as he closed the two thrust levers in his right hand simultaneously. As a result the Lander dropped like a brick. Moments later, there was a loud crash and then a precarious swaying movement and then there was stillness. Inside the module, subdued computer noises and the hum of avionics robbed the silence of its comforting effect and green lights skipped along the astronaut's instrument panels. Mike Matheson looked across at his colleague; he nodded and then shrugged almost imperceptibly. He gave a brief half-smile to his friend as a thank you and then gestured as if to say: *lucky!* Thereafter the two men sat rigid for several seconds.

On the bridge of the *Hera* nobody moved or dared to speak. Seconds seemed like minutes.

"Talk to me guys . . . Situation report please?" Alex's cool demeanour fooled nobody. Sideways, he shared an anxious glance with Duval.

Despite his totally professional disposition, there was a nervous hesitation in Mike Matheson's delivery as he said: "The Osprey has landed. We are safely down, *Hera* . . . All systems are green."

Back on the *Hera*, Joe Ansbacher, who was closely monitoring data on his life support display, watched with great relief as Matheson's heart rate indication dropped

from a peak of 190, to a more normal 109. Drake's was a little higher but of no immediate concern. Meanwhile, Commander Duval's shoulders visibly dropped and Carol Boardman stopped gripping the seat of her chair.

"We're going to set to," continued Matheson, a minute or two later and speaking over the open frequency. He seemed more relaxed. "Clock starts now, four hours maximum. For the record, we seem to be in a relatively cool area; outside probes are indicating an average of two hundred and thirty degrees Celsius. But we flew through a much hotter zone. Maybe that's why the lava state was unpredictable, not fully solidified. We are setting suit-conditioning to ninety-one per cent, which gives us some additional flex. Precise location is . . . cross-coordinate two, two, five. We're on the edge of the North West landing sector. Crystal site is five hundred metres south-east. I'll transmit a sitrep in twenty minutes. Put the coffee on up there . . . Matheson out!"

Duval breathed a huge sigh of relief. That was the cue for everyone else on the bridge to follow suit. Alex forced a smile.

Rose broke the ensuing silence. "Commander, I need you to look at this. *Now* please. There's no mistake. I've switched to the standby radar scanner and I'm still getting the same contact reading. We have a blip – directly astern at three thousand metres. Whatever it is – and it's relatively small – it is coming this way at ten metres per second and reducing."



Duval heard the resolve in her voice. As impossible as it seemed, Rose was reporting an intruder. A strange chill descended over the bridge – intruders usually meant trouble. Duval quickly stepped over to Rose’s circular display and Alex followed him. Rose pointed to the tiny blip on the screen. Duval waited for the track of the scanner to sweep the object again. He stared almost unbelieving as the next pass enhanced the object’s elongated saucer-like shape. With another sweep the blip moved inexorably toward them. Duval’s eyes narrowed. He turned and nodded at Alex. “Confirmed at one thousand metres,” he said, bluntly. “Whatever it is, we should be able to see it any moment now.” He looked back at the screen and then up at Rose. “We are not expecting any replenishment vessels from Earth are we . . . anybody? Am I missing something here?”

None of the bridge crew responded. Some shook their heads. Alex shrugged – he was totally at a loss.

Duval paused thoughtfully. His mouth twitched. “Okay. Press the button. Go to manoeuvre alert status and security state three, just in case the Federation has planned a docking that we are not party to as yet. Close all pressure bulkheads,” he ordered, and then he glanced over to his engineering officer. “I suppose it’s vaguely possible; we’ve been out of radio contact with everybody for several days now.”

“I can see it, Commander,” interrupted Joe, pointing into the blackness with his finger. “It’s just fired a short retro burst. Looks to be manoeuvring to the left now,

establishing a parallel course – coming up the right-hand side of the gantries. Now, there, another . . . See it?” Joe pointed again.

Duval and Rose stepped over to the rear viewing area. Carol Boardman joined them. “Yes, I see it,” Duval replied. He watched warily as the small craft came slowly towards them. A few minutes later and with all on the bridge staring in amazement, it drew up alongside them. The vessel was painted black, making it difficult to see against the backdrop of space. It was surprisingly close too – not more than 200 metres away. The front of the craft was then illuminated momentarily as two short retro bursts reduced its velocity to a walking pace and then the effect of a third stopped the vessel in its tracks. There was an eerie silence. The vessel seemingly hovered there in the darkness: ominous, unexpected.

“Call it, Rose! Make it identify itself,” ordered Duval.

“I’ve been trying for the last ten minutes, sir, using the pre-recorded identification message – all our assigned space frequencies, and also on the space distress frequency. Nothing. No response at all.”

Alex stepped up beside Rose. “It’s like an interplanetary probe, but I don’t recognise the model and there are no apparent markings,” he reported. “It’s got an ion drive motor though. See the main thrust nozzle?”

Duval nodded in response. He looked concerned. “I think I can see something written on that rear stabiliser, near the discharge port. Viktor . . . put a light on it. Rose, take an image, process and put it on the main screen –

magnified by five.”

“Yes, Commander.” Rose promptly returned to her console. “You’ve got it, Commander,” she said, a few moments later.

Duval focused on the picture. “There, look, you see it – markings, in red, lines of characters. Viktor, you recognise any of that?”

“It’s not Russian, if that’s what you mean, or any of the Slavic languages. We don’t use characters like that. I’d say that it’s Chinese, maybe Japanese . . . Korean even? I’m no expert.”

“Chinese!” Duval thought on that possibility for a moment. “Rose, get David Chung up here, quickly. He might be able to help with this. I know he has a Masters from the Beijing Aeronautics Institute.”

“Yes, will do . . . right away.”

Alex was perplexed. He spent several minutes leaning over the large horizontal monitor that was an integral part of the central display. He ran his finger over an adjacent control wheel adjusting the magnification factor and studied the subsequent image. “Commander,” he said after a while and with an air of apprehension, “I’ve got something. Take a look at this.”

Duval was over to the console in an instant. He stood next to Alex and, leaning over, scrutinised the image. In a troubled way, like a nervous twitch, Alex’s fingertip repeatedly tapped the screen in the forward area of the spaceship.

“Look, there, a figure in the cockpit area. I can make

out a head and shoulders through the side window. It’s dark, but I’ve enhanced as much as possible.” Alex increased the magnification until the image blurred and then backed off slightly.

Duval followed Alex’s prompt and zoomed in on the side observation window. It resembled a seagoing vessel’s porthole – circular, with a thick metal rim and ring of undulating rivet heads. Duval peered through it and into the vessel’s cockpit. “Can you improve the quality of the image any more, Alex?” he asked.

“There, what about that . . . ? It’s the best I can do,” Alex replied, pressing a few keys and manipulating the thumbwheel on his panel.

“It’s a robot! That, Alex, is a robot. There’s no mistaking it.” Duval looked menacingly over his shoulder and out into space in the direction of the vessel.

“It looks horrible,” commented Carol.

“I don’t like it either,” agreed Duval. He studied the image again and looked up at Alex, his brow furrowed. “I think it’s a Humatron. I attended some lectures on that model a few years ago. It remains a banned system – suffered behavioural problems from its inception. I saw an example too, in the Smithsonian Museum in Washington DC. That ‘X’ shaped head . . . it’s unique. I don’t think I’m wrong here. They were designed for operations on extended space flights for one thing, but the Spaceport One disaster back in the second decade put paid to all that.” At that moment David Chung arrived. He was a slim oriental man in his thirties and one of

three specialist propulsion engineers aboard the *Hera*. Duval beckoned him over. “David, can you read this?” he asked, pointing to the magnified image of the vessel on the screen.

David Chung looked surprised. “It is Mandarin!”

Duval glanced momentarily at Victor. “What’s it say?”

“Um, well, it’s been a while, Commander.” Chung paused and took his time with each character as the top line in particular was worn and almost obliterated. “Engineering jargon really?” he answered. “It seems to just be installation details and safety precautions for a particular plutonium isotope. Maybe it’s the fuel source. There are some special handling precautions as well. The bottom line is a place – presumably the manufacturer’s address.”

“Who . . . who’s the manufacturer?”

“Um, doesn’t actually say their name, I’m afraid, just the place . . . the address: the Huang Hai Industrial State.”

Duval spontaneously shook his head. “Do you know of it?”

“Yes. That region was once part of north-eastern China . . . Liaoning Province. But it was given autonomy about thirty years ago. My family are from a town on the coast in the same province, to the south of Dandong. The area is entirely urbanised. The Huang Hai Industrial district itself comprises an island in the West Korean Bay and also about twenty square kilometres of the mainland. Back home, on a good day, you could see it across the

water, and if not the island, then the smog that hung over it.” David Chung grimaced at the thought of the pollution. “The region pays a large land rent and taxes to the central government in return for complete autonomy. Most of the world’s leading industrial companies have facilities there. It’s always been a hothouse of innovation and scientific progress because research is unfettered by governmental restrictions. No authority, no censorship, so over the years nobody has had any real idea of what’s been going on. Only rarely is information released and many people, including some prominent scientists, have just disappeared behind the security curtain. Take it from me – people in China just don’t go there unless they have a really good reason. And you don’t look it up on the World Net either – or you might get somebody knocking on your door in the middle of the night. Really, it is not a nice place, and the most polluted in that part of Asia too.” Chung shrugged. “The area has been in steep decline for the last few years, Commander; the late forties was the watershed, when oil and gas became very expensive and reserves began to dry up. Three years ago, when I was finishing my postgraduate studies in Beijing, the Chinese government all but cut off the region’s remaining energy supply, diverting more to the people. But it made very little difference to the most powerful industrial companies, as they had their own suppliers. There was talk of pressurised contracts; threats to government officials; corruption; bribes; prioritised raw material deliverers – including food! The biggest companies in

the zone became predators of the small. With their own docks and refineries they survived.”

“Is there anything else, David?” quizzed Duval. He was growing noticeably edgy. “More specifically, that may be of concern to us.”

David Chung rubbed his chin suspiciously. “The concept of such an industrial region had already become very unpopular in certain quarters and the government was considering its options. Despite their massive tax revenues, the country was losing face because of illegal activities and a blatant disregard of international laws by industrial giants like Tongsei and Spheron. There was a lot of talk about it, and not just at home, but in the cyber-press too. I remember it clearly. When Tongsei Heavy Industries was the pride of Chinese Corporate success their headquarters was the largest building in Shanghai. When I left China to join the Asian Space and Science Agency that building was being closed.”

“Did any of these companies build spacecraft?” interjected Carol Boardman. “I’m not a big one on international espionage.”

“Tongsei built the mineral barge *Colossus*, Carol,” replied Duval. “Nobody else had the financial ability. They got their money back and a lot more besides by exploiting the Moon’s resources. It was a monopoly for years, certainly until the lunar independence. When we left there was an international investigation underway. As David said, extortion, bribery . . . you name it. Spheron are into high-tech engineering, biomechanics, genetics,

pharmaceuticals and lots besides. There was a concerted effort to break up these corporations, but they’re shadowy organisations, nothing could be proved. They were said to have ties with a couple of other disgraced conglomerates.”

David Chung nodded in agreement. Duval turned and gave him his full attention. “By those markings, David, could this vessel be Tongsei built? And if so, what the hell are they doing building this type of interplanetary craft? This is no replenishment job. I don’t like it. I don’t like it at all!”

“There is a conundrum here, Commander,” said Chung. “That type of thrust nozzle clearly indicates the use of an ion drive propulsion system, but clearly it has a relatively small capacity: one capable of maintaining momentum in space, but one, in my view, unable to achieve the initial acceleration – at least to a practical speed. And see those flanges towards the rear and the splayed receptacle structure? I would say that this craft is just the tip of a much larger craft. Either a booster stage or another larger section of the craft detached on its way here. And by the absence of any burn marks or scoring, I would say that it was another section with life support – the hot end was further back again. And one other thing, Commander, ion thrusters do not use plutonium as a fuel; invariably its xenon or bismuth gas.” Chung’s expression turned stony. “Plutonium . . . it makes no sense.” He shook his head.

“Ideas! Speculate!”

Chung took another look at the image of the vessel on the screen. He looked up slowly and repositioned his spectacles. “If I was to make an educated guess I would say that the vessel has a nuclear power cell. Why? Essentially, it’s a tube, black and functional. The flight deck is more a cockpit, barely illuminated and certainly not suitable for long-range missions by humans – so no life support required. I heard you mention a robot as I came in, again, minimum power demands. But there is not a single solar panel to be seen. Deuteronium batteries would produce enough power and for an extended period, but not for a flight to Jupiter, it’s too far. I would say that a compact plutonium power cell would fit the bill.”

Alex interrupted. “The construction of a nuclear reactor, regardless of size, was banned back in 2016. Not even the ISSF or NASA is exempt. Contravening Section Six of the New Geneva Convention carries hefty penalties.”

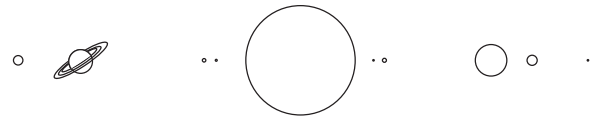
David looked at Alex in a way as if to say: *get real*. “Compact power cells are completely insulated,” he explained, “and so they are almost undetectable. I would say that this vessel was probably built outside the jurisdiction of the ISSF, somewhere where the engineers were confident that there would be no inspections. Otherwise they would not have painted the radiation hazard icon and the handling instructions for their own people.”

Duval nodded. “Okay, I buy that – an illegally manufactured power cell to get an automated vessel this

far. But what about the real question . . . Why is it here?” He looked back at Alex and Chung.

Alex walked over to the viewing portal and squinted through the blackness at the object holding station off the starboard bow, perhaps no more than 100 metres away. The cockpit glimmered red like a distant star. “A ship like that represents quite an investment,” he reasoned. “Engineering, technology . . . propulsion? Not even the ISSF is spending that much on pure research – not these days – and anyway we would have heard about it. If the Tongsei or Spheron conglomerates built it, or if they both had a hand in it, then clearly they would want to see a return.”

Duval stepped up next to Alex and looked over his silent bridge. “The Epsilon Rio Corporation designed and manufactured the Humatron series – that much I know.” His voice dropped to a whisper. “And if it’s here to spy on us, it hasn’t started out too well, has it?”



Matheson’s suit-conditioning system was operating at 100 per cent, but it wasn’t enough to keep his body temperature within normal limits. Sweat ran down his face. After only an hour on the surface his hydration level had fallen to 92 per cent and he had almost exhausted his

fluid pouch. Aldrin Drake fared little better. But work was progressing. They had located a small surface deposit and had exposed the strange mineral by chipping off a thin layer of caked-on, ash-like sulphur material, and were busy setting a small hydraulically operated expansion cylinder that would allow them to break off several small pieces. A briefcase-like U-Semini containment system lay open next to their feet. The deposit, a crystal form that was opaque in some areas and oddly translucent in others, seemed to glow from within, producing a hazy white light.

Had they time to notice they would have found their surroundings both alien and sublime. Their movement made shallow ‘treaded’ footprints in the frost-like covering of yellow and white flaky pyroclastic material and from time to time a flurry of fine ash drifted down on them from toxic clouds above. The material filled the marks on the ground like fresh, soft, falling snow. The incongruity wasn’t lost on either of them as sticky deposits built up on their backpacks and on top of their helmets as a persistent layer that needed to be brushed off periodically. Occasionally the visibility was good, and far to the west two towering conical volcanoes belched smoke and debris while the surface shimmered with heat.

Every so often, Aldrin stopped work for a coughing fit – even their suits’ closed-system respiratory system seemed helpless against the invading ‘bad egg’ smell of sulphur dioxide. The concentrated gas appeared to permeate the fabric of their suits at a molecular level

and filtered – albeit in minuscule amounts – into their helmets. It was evident that their time on the surface would be limited by more than just their oxygen supply.

During one such fit, Matheson took a rest from breaking the rocks and straightened up. He arched his back and as he scanned the distant horizon something caught his eye.

“Did you see that . . . over there, to the east?”

Aldrin stifled a coughed and cleaned his visor with the back of his glove. “Shit it’s hot! No . . . what did you see?”

“A white flash, just for a moment, from below the horizon,” Matheson raised his arm and pointed in the direction.

“Nuh, didn’t see it. Probably a corona flash or a burst of ionised gas. Come on, I’m burning up in this suit. Let’s just get on with it. I’m almost out of fluid as well.”

Aldrin turned away but Mike Matheson was anxious as he looked down at the small pieces of crystal they had prised from the deposit and kicked into a pile. He leaned over to reset the hydraulic cylinder for the last time but felt uneasy and cast a quick look towards the east. As he did, his eyes widened.

“Look . . . ! Look for God’s sake . . . Aldrin!”

Both men stared as a bright white ball loomed over the horizon.

“What is it . . . it’s getting bigger!”

There was an eerie silence. A volcanic plume, bursting high into the atmosphere and off to the right,

caught their attention momentarily. Red and yellow flames danced on the volcano's summit. Mike Matheson put a hand on Aldrin's shoulder.

"Shit . . . a meteorite. And it's getting bigger. It's coming this way! The buggy! Back to the buggy! Go!"

Both astronauts ran, skipped and hopped the sixty metres of uneven terrain. Skips and hops that would have been impossible on Earth. Occasional pockets of coloured gas vented beneath their feet as the crisp frost of sulphur cracked. Unable to cope with the additional heat, their conditioning systems beeped unheeded warnings and sweat flowed freely down their faces. Within seconds they were aboard the small, four-wheeled, twin-seated vehicle. Matheson floored the accelerator pedal and the rear wheels spun. The fire ball was large and threatening as it sank lower in the sky, drawn by gravity. The buggy sped off at right angles to its trajectory while Aldrin tracked the vivid menace that now had the fiery tail of a comet – even in Io's rarefied atmosphere there was enough friction to make it glow white hot. Its flight path became predictable.

"We're not going to make it, Mike! Make a ninety degree turn! It's our only hope."

Matheson wrenched the small steering wheel to the right and the buggy slewed, trailing dust and ash. Their eyes widened in horror. Something in his subconscious made Matheson ease off on the throttle – it seemed suicidal to drive towards the thing. He quickly realised his folly and floored the pedal again. Stomachs tensed and

hearts raced as the buggy bounced wildly over fatigued wheels.

Now they could hear it. The shockwave started as a distant rumble, but soon their helmets became ineffectual against the ever-increasing volume. Then it was like thunder and every cavity in their bodies resonated as the pressure wave built up – like standing too close to a railway line as a bullet train approached. Matheson held his course. With an altitude of barely 1000 feet, the white hot orb dropped lower and lower until the sizzling disc seemed to skim the planet's surface; it raced towards the tiny vehicle and its huge bulk seethed. Visible now were pieces of flaming debris that broke off and scattered – most impacting on the surface and raising spiralling clouds of dust and ash and releasing bursting geysers of yellow, green and orange gas. They felt the crushing, debilitating force on them; it pressed on their bodies, squeezing them into their seats. They gasped for breath. Then the shockwave engulfed them. There was pain. Excruciating pain. The heat, the thunder, the shuddering, their throbbing bodies, the light, a riot in hell . . . and then it was directly over them. The massive disturbance pummelled them. The buggy slewed and skidded as Matheson lost control.

It passed. Heightened senses subsided. Matheson pulled the buggy around to complete a full turn and then slammed on the brakes. They did not immediately feel the relief because a long flaming tail trailed the object for hundreds of metres. The fizzing brilliance they watched

with dumb struck awe as it flew towards the hills.

The close proximity caused the surface of the moon to contort and the brittle, overlying chemical frost simply peeled off and churned like swirling eddies of sand beneath a hovering helicopter. And then the explosion. Never had they seen such a catastrophe. The object hurtled away from them for two or three kilometres. It bounced and, from the point of impact, made a shallow channel that continued as a gouge and finished as a chasm. Minutes later a kind of stillness settled, belied by the whole mess that smouldered and smoked with insignificant explosions, effervescing sparks and debris plumes, like expensive fireworks on a special occasion. There was rubble and shards and ruin.

Totally oblivious to his heat-stressed body and his suit's overwhelmed conditioning system and the red warning light on his wrist-mounted control panel, Matheson drove slowly and then, abruptly, stopped.

"No! Please no! If there's a God, no!" Mike cried, his despair causing Aldrin to stare at the carnage.

Mere seconds appeared to be minutes, and those minutes became hours as both men sat in a silence of eternity. Sweat trickled down their brows and dripped from their noses. Thirty metres away and a little to their left a red flame fringed with blue fired off from a twisted piece of silvery tubing. A distorted section of latticed gantry lay half-embedded in the ash and the sand. Matheson looked to his right and drove forward slowly. He felt his hands trembling. He lined up the buggy with

the laser-straight trench – now the gateway to a scrapyard – and stopped with the wheels of the vehicle on its edge. Like a huge furrow ploughed by a giant they were made dwarf-like by it. The scale of it all, the brokenness, and in the distance the trench slewed to the right, as if the plough had come across bedrock and diverted. And there, at its end, a contorted mass burned.

Both men thought it but dared not say, for they already knew they were as good as dead. They saw a large curved piece of metal alloy, its edges twisted violently and jagged. On it, clearly visible through the scorching, were the letters:

## H E R

Matheson turned slowly and looked back in the direction that they had come. Tyre tracks indicated their stressed, haphazard journey. The landing module was too small and too distant to be seen, but nevertheless Matheson scanned the horizon for it. He thought about the inside of it. That capsule of life: functional but fragile, with a futile future. Despite the computers, the systems, the computations, the integration, protection and opportunity, its promise was only temporary solace. The Lander was helpless, like a baby without its mother.

So how would it come? As heat exhaustion, oxygen starvation, dehydration? Matheson bowed his head as his mind replayed his life, which he summed up in an instant: frail and seemingly pointless. He was not aware of Aldrin climbing from his seat, who then walked and frequently



stumbled towards a pile of smouldering debris as if he recognised something in it as personal. Their intercom crackled for a time with heavy atmospheric static and the rumble of another distant volcano erupting seemed threatening, like the gathering menace of an approaching thunderstorm. This and the surrounding wreckage – which sporadically burst into flames as gas pockets vented – muted Matheson’s curiosity. He watched Aldrin’s haphazard progress – the lone figure walked now as if he was drunk, staggering, with his arms hanging lifelessly by his sides. Matheson could have called him back as there was no change in their communication status. But there was no reason to; there was no point in warning his friend.

Presently and with the debilitating disbelief of a betrayed man, Matheson dragged himself from the buggy. He stood by it on the grey and yellow ash and the patterned soles of his boots made deep impressions. Footprints; for a time man had been here. He arched his back and gazed up at the hazy sky that was heavy with acid – there would be no succour from there. Then, with both hands, Matheson felt for the metal rings that linked his bulky spherical helmet to his suit. He slid his fingers around the smooth curves until each hand hovered over the release clips. Straining his neck, he managed to get a finger beneath the left-hand clip and pulled it up and turned it, releasing it. Instantly, a red light illuminated on his wrist-mounted suit-conditioning control panel. He looked up, slowly, unaffected, and spent two or three

thoughtful minutes watching his buddy who was quite distant by now. The sweat that had run from his temples and down his cheeks had all but dried and he could taste salt on his lips.

Aldrin meanwhile had turned towards a large section of wreckage that was half-embedded in the towering left-hand wall of the trench. It protruded precariously and a twisted boom of former gantry with a broken end reached out for the other side, arching, like a half-constructed bridge across a wide valley. It loomed above Aldrin as he approached it. Matheson watched him pause momentarily and then disappear. Seconds later an explosion rocked the charred carcass of superstructure, to be quickly followed by another and the ensuing wall of flames clearly denied any retreat even if second thoughts had turned Aldrin’s intention.

Matheson shook his head. He looked down at the marks his boots had made in the dust and then up again at his friend’s blazing mausoleum. *Perhaps it was fitting*, he thought, *like a Viking*. Then an image of Carol’s face filled Matheson’s mind’s eye. She smiled at him and blew a kiss and then gestured for him to follow her; stars backlit her complexion. Jupiter, massive, with its rings of colour, turned slowly before him. He supported himself with a hand on the buggy and stretched up to feel the full extent of the great planet. *No one has seen what I am seeing*, he thought. Carol beckoned again – sweetly and lovingly, as on that ‘night’ in her cabin when Saturn passed by. He tightened his lips subconsciously as if to kiss her back

and then reached up and found the other retaining clip with his right hand and, with some effort, flipped it open. A second red light illuminated on the control panel and began flashing incessantly and this time an aural warning complained loudly of his reckless stupidity. Having eyes only for Carol, he paid the warnings no heed. Instead, and with a hand on each side of his helmet, he rotated it.

## CHAPTER 2

### RECALL

#### **Moon base Andromeda – the day before Christmas 2054 18:07 Lunar Corrected Time**

“Hello, Unit one zero three. Rachel here.”

“Doctor Rachel Reece?”

“Yes, speaking.”

“Good! It’s Peter Rothschild. How are you?”

“Why are you calling, Peter? Please, of all nights, not tonight.”

“Is Richard there?”

“Can’t you leave it? Just another day or two. Please! It’s Christmas Eve for God’s sake.”

“Rachel, I’m sorry. You know it’s not me; I’d rather be at home too. Something’s come up. It’s serious. The repercussions . . . Is he there, Rachel?”

“Actually, no, I don’t know where he is, not exactly.

He's not back from the office. Maybe he hasn't landed yet." Rachel Reece sighed. "I thought this was all over, Peter. We've not heard from the department for almost two years, not since he assumed command of the Wing – he's enjoying the job. Why don't you just find someone else?"

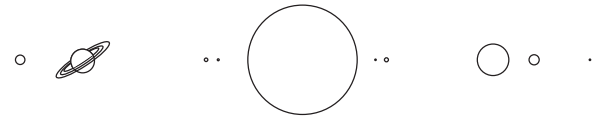
"He landed over an hour ago, Rachel, I checked. And there's no answer from his office."

"Then he must be on his way. Perhaps he's stopped to share a drink with friends? That's what one does at Christmas time . . . isn't it?"

"Rachel, *please*. This job is difficult enough without . . . When is a recall convenient? You tell me? Anyway, I don't dictate timings. I'd prefer to be with my family too, and not here in the city, I can tell you. He's the one who did the degree in Hieroglyphics and Cryptography. He's the one who's receiving funding for his doctorate from the department. If he'd wanted to drop it, he should have done so four years ago." Rothschild paused and his tone softened. "Rachel, listen, like it or not, Richard *is* our resident expert in these matters; he's up there with the best of them. And regarding the origin of the Kalahari crystals, he's the world authority. What's more, after his illness, Professor Mubarakar is too frail to see anybody, although he always makes an exception for Richard. It's very important Rachel. We have a major catastrophe on our hands. So please, tell me if you know where he is."

Rachel hesitated; she knew that there was no point

in being difficult. *Her disappointment at not being first on Richard's list mustn't make her feel rejected*, she thought, but the realisation of Christmas alone made her grimace. "I expect he's with the squadron pilots and the ops staff, Peter, enjoying some goodwill for once. Try Lieutenant Stewart Grant's unit – number two, twelve. Remember, I haven't seen much of him for weeks, so don't you think he's going anywhere tonight – not for a moment!"



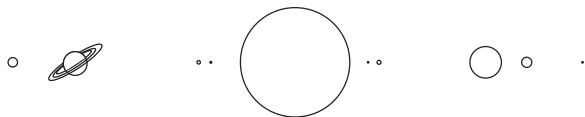
"A ferry flight, sir . . . no passengers, no cargo, now that *is* unusual. I thought it was all about saving fuel. First that new annual award for the most fuel-efficient return sector to Earth, and now we fly there empty – doesn't make sense!"

Commander Richard James Reece looked across the flight deck at his young co-pilot. By necessity, it was a dimly lit environment and outside the myriad of reflective white specks shimmering against the consuming blackness of unending space contributed little to the effect. On the instrument panel a number of lights flashed – green, amber and some red – and on a central computer screen schematic layouts of the ship's engineering systems flipped every few seconds.

All the while, there was the muted background hum of electronics. Richard Reece felt the momentary increase in cabin pressure on his eardrums as the external door closed and the seals inflated. In response, three red lights on the panel turned green.

“It is about fuel, Yannick, and don’t think otherwise,” Richard said, in an explanatory tone. A smile jabbed his lips. “But I’m needed in London, urgently apparently, and an S2 is the quickest way – indeed, the only way – of getting to Earth tonight. Evidently I’m the exception, it seems. Now, run the checklist and call for start. The sooner we get there, the sooner we get back. This terminal will re-open at seven tomorrow morning. My wife will be fuming, but at least we will be in time to open our presents . . .”

“Aye aye, sir. Commencing pre-flight checklist.”



“I’m on my way, Peter. In your electric Jaguar – a ‘Double X’ model. It’s nice, very impressive I must say. Clearly you’re moving up in the world.”

“Yes, and had you stayed in London after your marriage and taken up the appointment you were offered, you would probably have one too.”

“Oh, come on, not that one again – after what, four

years? I’m a pilot, Peter, remember . . . not a pen-pusher. Anyway, this is the last place I’d like to work, fancy job or not.” Richard grimaced as he looked out through the vehicle’s dark-tinted windows and scanned the passing buildings. People hurried along the walkway, much as always in town, although he thought they were fewer in number and everyone here had the ubiquitous umbrella. He stretched his neck to look up to the skyline, which was dank and dismal with a low, opaque cloud base that engulfed the tallest buildings; they simply disappeared into the gloom as if decapitated. Droplets of water ran down the glass. *The depressing grey of an early morning here on planet Earth*, he thought, *who needs it?* He breathed in deeply and shook his head despondently. “Albeit only a shuttle pilot,” he whispered to himself. But Peter Rothschild picked it up over the intercom.

“What’s that, Richard?”

Richard was wrested from his thoughts. “Oh, um, I think London’s looking shabby. I suppose it’s the rain – the council can’t get anything done. Now, where am I going and what’s the rush?”

“The driver knows, so you don’t need to worry – but I suppose you will anyway . . . *Whitehall!* There’s an emergency cabinet meeting at eleven o’clock this morning; the Prime Minister’s chairing it. Plus a scrambled digital relay with our allies. Washington, Beijing, Moscow, Strasbourg, Bangkok, the ISSF cabinet and others – highest security level. We have suffered a setback and that’s putting it mildly. Before that, at

nine, there is a key-brief: scientific, energy, threat, risk assessment and a few other topics on the agenda. The PM is expecting me to correlate the information and present him with our recommendations by ten-thirty at the latest. Are you using an earpiece or hands-free?”

“I’m on speaker!”

“Where are you now?”

“Kennington Oval, passing the Palace of Saudia – shame about the cricket ground . . . ? Vauxhall Bridge next, and then Millbank.”

“No, not quite. There’s some activity by the river we want to avoid. You are routed through Marsham Street and Great Smith Street. Preparations are in hand. You’ll get a full brief soon enough. I’ll see you in twenty minutes. If I can I’ll meet you at the door, otherwise you will be escorted to my office. Security is high, so be prepared.”

## CHAPTER 3

### THE CONTEXT OF TIME

**Llano de Chajnantor, near San Pedro de Atacama, Chile**  
**The ALMA submillimetre deep space telescope facility**  
**Same day - 04:09 Local Time**

“That’s impossible!” declared Aaron James, as he scanned the temperature readings on his computer monitor. He adjusted the display calibration from degrees Celsius to degrees Fahrenheit in order to crosscheck the readings and shook his head in disbelief at the result.

Annika Fipatti, who was sitting at the neighbouring console, stood up and walked over. She peered at the lines of data on her colleague’s monitor.

“What’s imposs . . . ?” Her eyes widened. “That can’t be right, Aaron. It’s hot out there, but not *that hot*. It must be a probe failure, or a fault in the line. Run a continuity check and reset the datum.”

“I have! Twice! No fault found! And anyway the chances of a simultaneous multiple probe failure must be millions to one. Exposed or shaded the entire array concurs – this is no erroneous indication . . . this is it . . . the first!”

Annika’s eyes were glued to the changing lines of data on the screen and her look of disbelief transformed to one of alarm. “I’ll call the Centre Manager,” she barked. “You cross-check again and run another simulation using the exact parameters, no rounding up or down, go the fifteen decimal places and then patch the results through to the master console. We’d better be one hundred per cent certain before we press the panic button!”

Annika was swiftly back to her console. She pressed a call button on the communications panel and leaned over the integrated microphone.

“Hello! Christine Bong here.”

“Christine, it’s Annika in Phased Array. Listen, I think we have a problem. Who is duty manager?”

“Augusto this morning, until midday, but he’s out at one of the remote sensor sites . . . interference protected . . . so no direct comms – he said he would be back around seven. I can try to message his pager. The assistant manager is Marijs; she’s at her desk.”

“Give me her line, please. No! Just send her down . . . *pronto!*”