
EXPLORING NEW TECHNOLOGY
THROUGH USEFUL FICTION
STORIES
FROM
TOMORROW
PW SINGER + AUGUST COLE

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PW SINGER + AUGUST COLE

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The stories contained within are fiction; they have been produced with the aim to spark discussion and creative insight which might challenge established thought. The events, statements, and views expressed are similarly fictitious and should not be taken as a definitive or indicative view of, nor an endorsement by, MoD; even when they may be voiced in the stories by organisations or roles that are real (such as Dstl)—such anchoring in reality or the familiar is considered helpful to engage the readership. For the MoD policy relating to the technologies discussed within we invite readers to seek out the relevant strategies and documents available on gov.uk—in particular, as of time of writing, Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy.

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[dstl] The Science Inside

Ministry of Defence

INTRODUCTION

Dstl provides the science inside UK defence and security and creates generation after next technology.

It is vital in this endeavour to look beyond the horizon at the threats and opportunities that various futures may present.

The world-class teams at Dstl work with the top minds from across military, academia, industry ... and now science fiction.

The writers of this genre have been years ahead of their time in predicting the modern world around us from the internet and mobile phones to the electric submarine and driverless cars.

Defence needs to harness the creativity and vision of this sector to further stimulate foresight and innovation to develop agile and resilient solutions for the future.

Thinking the unimaginable is simply a day in the office for these talented sci-fi writers ... who wouldn't want to hear what people like that have to say?

I am sure you will find their stories enthralling and inspirational.

Professor Dame Angela McLean

CHIEF SCIENTIFIC ADVISER
TO THE MINISTRY OF DEFENCE

FOR ALL OF OUR TECHNOLOGICAL ADVANCEMENT IN THE 21ST CENTURY, we still do not have a crystal ball for unveiling the future. What we do have, however, is a greater appreciation for the importance of the interaction between technologies, politics, economics, and societies. The human, or socio-technical, element is what makes these technologies matter. It is also what often makes their effects so difficult to accurately project.

This is especially true for organisations like Dstl. Its challenge is to both shape and understand what lies ahead in matters of defence and security. But it must do so in an era where any given technological breakthrough—be that artificial intelligence (AI) or bioengineering—regularly seems to disrupt centuries of accepted thinking on everything from military doctrine to the laws of war. Indeed, how different will future conflicts look when quantum technologies or new energy paradigms become as commonplace as smart phones? Or when algorithms decide military manoeuvres or even diplomatic forays?

And yet, one of the most promising "technologies" to explore these futures may be the oldest communication technology of all: ***Story***. While technologies like PowerPoint, so common for sharing ideas in defence and security communities, are only three decades old, narrative has been used to convey human conflict throughout the entire arc of human history, dating back to the very first conversations held around a fire in Paleolithic caves.

Today we can use story's latest evolution, called "useful fiction," to explain and explore the most important elements of these combined technological and human futures. A blend of fact-based research, scientific grounding, and envisioning, this approach fuses together the process and rigour of non-fiction analysis with the communications

techniques honed by creative communities. Much like any research endeavour, useful fiction expressly draws upon fact and the "rules of the real" while conveying insight through narrative. This makes it different from both traditional white papers and science fiction. In this collection, for instance, we draw out the insights of Dstl research and experts, but share them through character-driven stories.

The value of useful fiction lies not merely in its greater engagement, but in how it promotes understanding, action, and connection. As such, organizations ranging from NATO Allied Command Transformation to United States Special Operations Command to the Australian Defence College have commissioned such projects as a means to envision the future operating environment, highlight disruptive trends from new technologies and geopolitical shifts, and spur conversation and debate about the future of professional military education.

Shaped literally by our human evolution, our brains engage with story in ways that make it an ideal means for conveying new or complex information, be it the possibilities of truly creative AI or the terminologies explaining quantum engineering. A reader is far more likely to be able to put new information into context and understand it through a synthetic experience. Characters become guides through whose eyes and other senses we literally experience key concepts. This also provides a kind of "red teaming," in which lessons can be learned by shifting points of view or injecting a complication into a best-laid plan.

Yet humans understand not just through thinking but feeling too. By creating empathy with characters and immersing the reader into a situation or setting, stories also spark emotions in a way that bullet points and numbers cannot. We synthetically experience futures we want—

or want to avoid—understanding the human stakes in a different and more compelling way. Importantly, by engaging the brain's left and right sides, this emotional connection is also more likely to lead to action.

Finally, humans connect over stories, which allows narratives to create a kind of network effect that traditional messaging lacks. The cold-eyed analysis of white papers, for all their research and logic, often falls short of breaking through to a reader's attention. By comparison, stories create a shared explanation or scenario of that trend or technology for a diverse group of people to now connect over. Even more, we tend to share with others what we like or don't like about a character or story, as a way of drawing closer to each other.

The short "useful fiction" narratives in this volume are thus born of these aforementioned forces, utilizing these powers of story as vehicles for conveying real-world research and trends.

Thus, each story is not meant to be a prediction, nor even reflective of the most likely future, as they are fully imagined creations. Yet, extensive research and interviews of subject-matter expertise are woven into each narrative with a purpose, from the technology at play to even character dialogue. Ultimately, each story's objective is to deliver the research-driven, non-fiction insights embedded within it, with a considerable helping of engaging entertainment. It is the same for the accompanying art. It too is to help the reader visualise the combination of the real research themes and the imagined worlds in their own mind.

While each story in this volume is designed to explain and explore a possibly transformational technology, those familiar with 20th century British military history will recognise distinct echoes of the past threaded through them. This also serves a dual purpose. It is not that we will see exact repeats of the past, but rather that

tethering to something historic can be an additional aid in understanding the new and unfamiliar. It is also a reminder that each generation's transformative technologies profoundly shape the larger narratives of their time.

Taken together, if there is one takeaway of this combined package of research and narrative, it is that the most crucial period in history often occurs well before a headline-making event is seen to have changed the world. Think of the decisive role that the coastal early-warning radar network known as CHAIN HOME played in the Battle of Britain. This crucial invention only came about from visionary pre-war investments in research, which were, in turn, originally inspired by concern that Germany had developed a "death ray" that would not have been out of place in an H.G. Wells novel.

Yet during that same period there were also the tales of missed opportunities. Think of how the British Army was the first to use the tank during World War One and then tested new operational concepts for it during the Interwar years. Yet, as echoed in one of the tales in this volume, lessons from the British Army's 1934 tank warfare exercise known as the Battle of Beresford Bridge went unheeded by senior officers at the time. The German military saw the same conclusions quite differently, however, and used them to later unleash the devastating Blitzkrieg that took over much of Europe at the outbreak of World War Two.

In summary, the aspiration for these useful fiction stories is that they are both entertaining and informative. Through immersion in narratives, settings, and characters designed to share research insights, a reader can develop a clearer understanding of the potentially transformative technologies identified by Dstl as well as how they might shape the future of conflict from a human perspective. That mix should hopefully make the stories a very useful read, indeed.

[CHAPTER]

01

A GLIMMER OF HOPE

QUANTUM COMPUTING

Quantum technology bodes as immense a revolution in technology and society as the understanding of electricity or the creation of computers. While digital systems use information represented or stored as either the zeros or ones of bits, quantum systems use quantum bits, or qubits, which do so simultaneously. Past breakthroughs like lasers and transistors were based on quantum physics, which is in the midst of a second wave of revolutionary research and development. This next wave of systems might then range from quantum computers, which will have an exponential increase in speed and computational power over today's supercomputers, to a world-spanning quantum internet, enabling the transmission of information in a secure way guaranteed by the laws of quantum physics, to quantum dots, tiny semiconductor particles a few atoms in size

A quantum world allows a potential new universe of possibilities. Quantum systems might render existing approaches in everything from AI to the existing encryption that protects our software obsolete. Quantum effects applied to position, navigation, and timing might allow systems to operate without need of GPS, while quantum sensing and imaging might detect objects with new levels of fidelity and defeat countermeasures like stealth. Quantum dots might be used for applications as diverse as energy storage, lasers, water purification, and even the detection of cancer cells. Any nation that gains such a capability ahead of others, known as quantum advantage, would have an edge unlike any before seen in history.

The following is an edited transcript from research for the Wilkins Report, the historical project mandated by Parliament to understand the preceding years' global conflict. This excerpt is a conversation between MoD historian Dr. Lynn Holder, PhD, and Royal Marines Colour Sergeant Ellen Tsai, VC. It captures a first-person account of the rout of His Majesty's Armed Forces, which evoked so many parallels to the Fall of France and the evacuation at Dunkirk. Yet, just as with that dark episode in the past century, within tragedy was a moment of triumph.

LYNN HOLDER (LH): **For the record, I'm confirming that you authorise this recording of our conversation?**

ELLEN TSAI (ET): Of course. As long as you are getting the wets.

LH: **Agreed. It is the least I can do for a Victoria Cross winner.**

ET: Thank you. Jimmy! Two beers, please.

LH: **Oh, thank you. This is Dr. Lynn Holder, conducting this interview on October 11, 2039 as part of my official duties in support of the Wilkins Report. The time is 1642. Please state your name, rank, and wartime unit?**

ET: Ellen Tsai, 47 Commando, 3 Commando Brigade, Royal Marines. I retired last year as a Colour Sergeant … And Jimmy! Please may I have some pork scratchings, too?

LH: **Again, I really appreciate your time. Truly, it is an honour … Let's begin then. Your Victoria Cross commendation reads …**

ET: Well, before you start reading the citation, how about I give you a bit of flavour, some context so you understand the whole story?

LH: **Okay … Where should we start then?**

ET: So it all starts when my mum and dad first met in the year Two Thousand and Five in a pub just like this one … No, I'm just taking the piss. How about we start when it all starts to go bad?

LH: **Please do.**

ET: A few hours after we arrive offshore as part of Operation Lightning Resolve, their forces start to mass just across the border. But all out in the open. No subtlety. Not trying to hide anything. And I thought we were supposed to be the NATO show of force, all that. Should have been the first giveaway something was dodgy. Thanks, Jimmy … His Majesty, the King!

LH: **The King.** *[glasses clinking]*

ET: So we end up at this summer resort type town. Like a Margate kind of place. Again, deterrence. They even had a film crew there at the beach, to broadcast us landing in our boats. Surely seeing that, the other side'll back off, just like they had done every time in the past. Only this time … We head off the beach and start to dig in. Laying down fighting positions in some farmer's field rented for the occasion; cause no one wants to deploy us where we might actually find some real cover, you know dug into an underground parking garage or setting up mines to pop out the sewer system. Well, we hadn't been there more than two hours when they cross that border no one thought they'd actually cross.

LH: **And what happened next?**

ET: It was like fighting space aliens.

LH: **How do you mean? I assume you're talking about the loss of quantum advantage?**

ET: Look, I'd been in combat before. My first was the dustup in Macedonia, just two months after I passed out of training from the Commando Training Centre Royal Marines. Since then, it was around one every year or so. The insurgency in Kenya, then an embassy evacuation in Jakarta. Then some other holiday spot. His Majesty's Armed Forces made sure I saw all the sights, only in body armour and carrying a rifle. And while those were tough operations, we were always the ones with the advantage. An all-seeing eye overhead from the drones. AI software telling us which route to take into the target. Augmented-reality goggles to see through compound walls. While the other poor idiot just had his AK and a mobile phone. We were space aliens to them. We were the ones from another world a generation ahead.

LH: **How did you know they were in your systems, that they had cracked all the encryption?**

ET: Hard to tell. It might have been when the text scrolling across my viz glass started showing everything in Cyrilic. Or maybe it was when our squad's drone decided to fly itself into our mechbot. Not sure what you ought to call that in your report … "Quantum-caused robot fratricide?"

So now we know they are somehow in our networks. Our Company second-in-command starts running from trench to trench trying to tell each of us to go EMCON silent *[NOTE: Emissions Control, the military term for reducing electronic signals broadcasts]* as best we can. He's yelling it in the middle of a battle, 'cause remember, he can't just order us to stop using the network 'cause we need the network to do everything. All the while, the robota keep coming. By the hundreds. Then they start firing rockets at us. Pinpoint accuracy. Everything coordinated and navigated down to a few metres with QPNT *[NOTE: Quantum Position, Navigation and Timing]* that they don't need any satellite comms or GPS for. Poof. There went all that investment in Space Command!

Then, a sign of hope: this pair of Dutch F-35s vectored in. So we try to guide in the air support, just now we're using old-fashioned smoke grenades instead of GPS and laser targeting. Not that it mattered. Same as the comms; those Lightnings might as well have been painted the colour of their national football team's jerseys, all bright orange.

LH: **That was the quantum radar. Stealthy materials didn't work against it either.**

ET: Roger. A robota fires two missiles at our jets and they just slammed right in. Didn't even waste a third one to be sure of it … All the debris falling down from the explosion, though, that didn't fit into the robotas' equations. Too random. And that is what gave us cover to fall back.

LH: **You mean retreat?**

ET: We turned around and pretty much ran the whole way back to the beach. I'm not sure what we thought we'd do next, maybe swim back home, but it was crazy. Hovercraft, landing craft, long-range insertion craft, lifeboats, you name it. They were all waiting there. Thank God for that. All the integrated networks and sensors were top of the line digital, which meant they just got chewed right through by the quantum systems. Anything encrypted was down. But the Navy? Traditional to the end as if Nelson himself was overseeing it all. They still had a matelot standing there watching with the old Mark One Eyeball and who was communicating with semaphore flags. They could see through their binoculars we were in massive trouble and took it upon themselves to rescue us. That's the only reason I'm here now breathing. A bunch of us piled into a Zodiac that had pulled up to the beach and got out that way.

LH: **So you make it to the HMS Severe.**

ET: Yeah. Except pretty soon it's like the beach all over again. The whole naval task force starts getting swarmed. Tiny kamikaze drones guided by those quantum dots flying into everything. As I was climbing up the ladder to the Severe, this Italian aircraft carrier, I can't remember the name of it, just detonates in a fireball and nearly throws me back into the water.

LH: **The Trieste. The post-mortem showed that one of the small drones hit a F-35 that was refuelling and set off its bombload.**

ET: With those quantum dot chips, their weapons could coordinate faster than even our fastest AI defensive systems. The captain of the Severe, though, she's very clever. Puts the speed on, trying to get out of the kill zone.

They may be able to process using quantum physics but they still had to follow old-school physics when it came to their operational range. So she takes that old frigate up to maybe 40 knots, a proper wake behind us.

The drone swarms fall behind and we think we're out of danger. But this is the point in the story that some matelot would call me a thick Bootneck and give me a lecture on how the real threat to a ship is always from beneath the surface. And them having quantum meant all their data could exist seamlessly in multiple locations around the world. So all that data that their robota and aerial drones had gathered on us, it's also now simultaneously inside their drone subs. Didn't matter that our ships had AI battle management. Against a quantum-powered system that could compress time and compute faster at an exponential speed and power?

LH: **You had no chance, is that what you're saying?**

ET: Next thing I know, I'm back in a raft, just not the Zodiac. One of those inflatable life rafts. The Severe, the ship that rescued us? She's now in the distance. Only the bow, though, is pointing straight up. I come to and figure out that the explosion from one or more of those killer subs sinking the Severe threw me over and they fished me out. But I really don't know who "they" is, 'cause I don't recognise anyone aboard the raft but Fields. The rest are a mix of Royal Navy and other random NATO troops. The lucky ones.

LH: **So, you referred to Fields. To clarify, that's Lance Corporal Laine Fields, VC, also Royal Marines?**

ET: Correct.

LH: **Can you tell me more about him?**

ET: Fields didn't serve in my company. But everybody knew him. Just not in a good way. He was one of those kids who cheated at everything. Poker. Timed runs. He was also completely 'jack.' Looking after himself first, not much self-discipline, that kind of thing. We usually weed out 'jack' Marines like him who don't have the Commando ethos through natural selection that would make Darwin blush. Fields, though, the story

was he grew up wild, somewhere near the wilderness of Assynt in Sutherland. Dad was a farmer, and apparently also a bit of a poacher. I'll get to that part soon in the story.

Anyway, we're in the raft, just grinding our teeth to stop them from chattering any worse, when we see a ripple in the water. Somebody whispers, "Shark!" and people just held their breath. But the ripple gets closer, and soon you could see it wasn't anything natural. It had that digital pixel camouflage, but the way the sun was in the sky, the metal gave off just a slight reflection. It's one of their robot subs, doing its search pattern. The thing is, it ignores us. It goes by the raft and after around 500 metres it makes a 90 degrees turn, then another 500 metres, then another 90 degree turn. We're in its kill box, but we don't merit killing in its algorithm. I don't know why, but somehow that stung even worse.

LH: **What happens next?**

ET: Well, there's no wind. So we're just floating there, as this thing just goes back and forth. People are totally fucked off. I mean the Royal Navy sailors on the raft are even more thredders that it's ignoring us than they are about its mech mates blowing up their ship. I know it's strange, but that's just the way it is. The fourth time it passes right by us and somebody mutters, "Wish I had a fishing rod to catch that bloody fish …" And it's like a light goes off for Fields. He just says matter of factly, "Fishing rods are for bell-ends."

Then he pulls a frag grenade from his belt order and throws it into the water. All of it so nonchalantly. Underhand throw no less—Fields is no cricketer. I later ask him where he got the idea and he says he used to go "blast fishing" with his dad—"but only at night."

Well, three seconds later a big geyser of water goes up from an explosion underwater and half the raft who weren't paying attention nearly have a heart attack, thinking the kamikaze drones are finally coming in for the kill. The other half are ready to murder Fields, thinking he's likely killed us by drawing the robot sub's attention our way.

Except the robot sub? It's no longer moving in its box pattern. It's not floating belly up, like one of Fields' blown-up salmon or trout or whatever he and his criminal dad used to frag. But it's there, about 10 feet down. It is sort of hovering, but with a stream of bubbles coming up as it sinks slow like. And now you get to what the VC commendation reads ...

LH: **Why don't you tell me in your own words?**

ET: Okay, fine. So I jump in the water.

LH: **Why?**

ET: Just a natural reaction. Or, I guess a trained one. On past deployments, they had drilled into us to recover what we could of the enemy's IEDs, so that the geeks could study how they made them. So, it just seemed like what I was supposed to do. Royal Marines don't mind the water, after all. Now I know they made a big deal out of it, but there was no bravery about it; it was pretty clear the sub only cared about warships, not some single swimmer.

LH: **I wouldn't put it that way. Jumping out of a life raft into frigid water in the middle of a battle seems pretty brave to me.**

ET: Well, in either case, I kick down to the sub and it's pretty dark. But I get a glimpse of something shiny. Gold coloured nonetheless. It's just behind the bent metal edge of a hatch. So I pry open the hatch ...

LH: **Did you know, at that point, what you had found?**

ET: No, definitely not. Cause, remember at this point, no one on our side had seen one. So I get the hatch open and there's this, well, thing. It's like a model of one of those old fashioned grandfather clocks, but made with gold filaments.

LH: **That's a good description. I've always thought quantum systems look the way the Victorians imagined future technology. Intricate and delicate, as if a computer were a piece of art.**

ET: Yeah, they really are beautiful. Only I don't have time for that as I'm running out of air. I pull it out and start to kick back to the surface, but I don't get far. In reaching in for it, my right hand sleeve is all tangled in the shard of the hatch. And opening up the hatch put more water in the sub, so it's sinking faster now, pulling me down.

LH: **At this point were you worried?**

ET: Not especially so. We regularly train in the 'Dunker' at Yeovilton.

LH: **The 'Dunker'?**

ET: It's like it sounds. Simulates escaping from a downed helicopter in a big swimming pool. When you get stuck at the back and you are waiting for the idiots in front of you who are taking their time, you learn to deal with the stress and inability to breathe. It's demanding, and it works.

LH: **Impressive. And this is the moment when you suffered your injury?**

ET: Yes. I make it through a robot tank battle and a ship sinking and that's how I got my scar.

LH: **I think you are under-selling again what you did. Can you explain for the record how you were injured?**

ET: Pretty simple. My right arm is all tangled up and my left is now holding that thing. So I just kick with my legs hard against the sub until I'm free.

LH: **With the metal shard slicing all the way through to your ulna in the process. Why didn't you just drop the quantum computer and use your other arm to free yourself?**

ET: Cause Bootnecks like scars. Like I said, they trained us to get the tech if we could … So I get to the surface and I'm bleeding like a stuck pig and starting to black out. They pull me out of the water and into the raft.

LH: **How did they react when they saw what you'd brought back?**

ET: I don't recall a whole lot about that moment, but I do remember this Royal Navy officer's eyes going wide. At first, I thought it was because of how bad my arm was bleeding. But he's some kind of geeky engineer and is looking instead at what my other arm is holding. He then says something about how he'd only seen one in conceptual form. Meanwhile, Fields is going on about how whatever it is, it's his "trophy by rights." I don't know what the shit was thinking, like he's going to mount it above the fireplace back on his farm. He's lucky that it was around the moment that I passed out … And that's my story.

[END RECORDING]

The destruction of the enemy unmanned underwater vessel by Lance Corporal Laine Fields, VC and the recovery of its key component systems by Colour Sergeant Ellen Tsai, VC would prove to be a crucial turning point in the conflict. The subsequent reverse engineering by allied scientists meant that the enemy's quantum advantage was only temporary. Allied forces would no longer be a generation behind, due to the bravery and ingenuity of two Royal Marines.

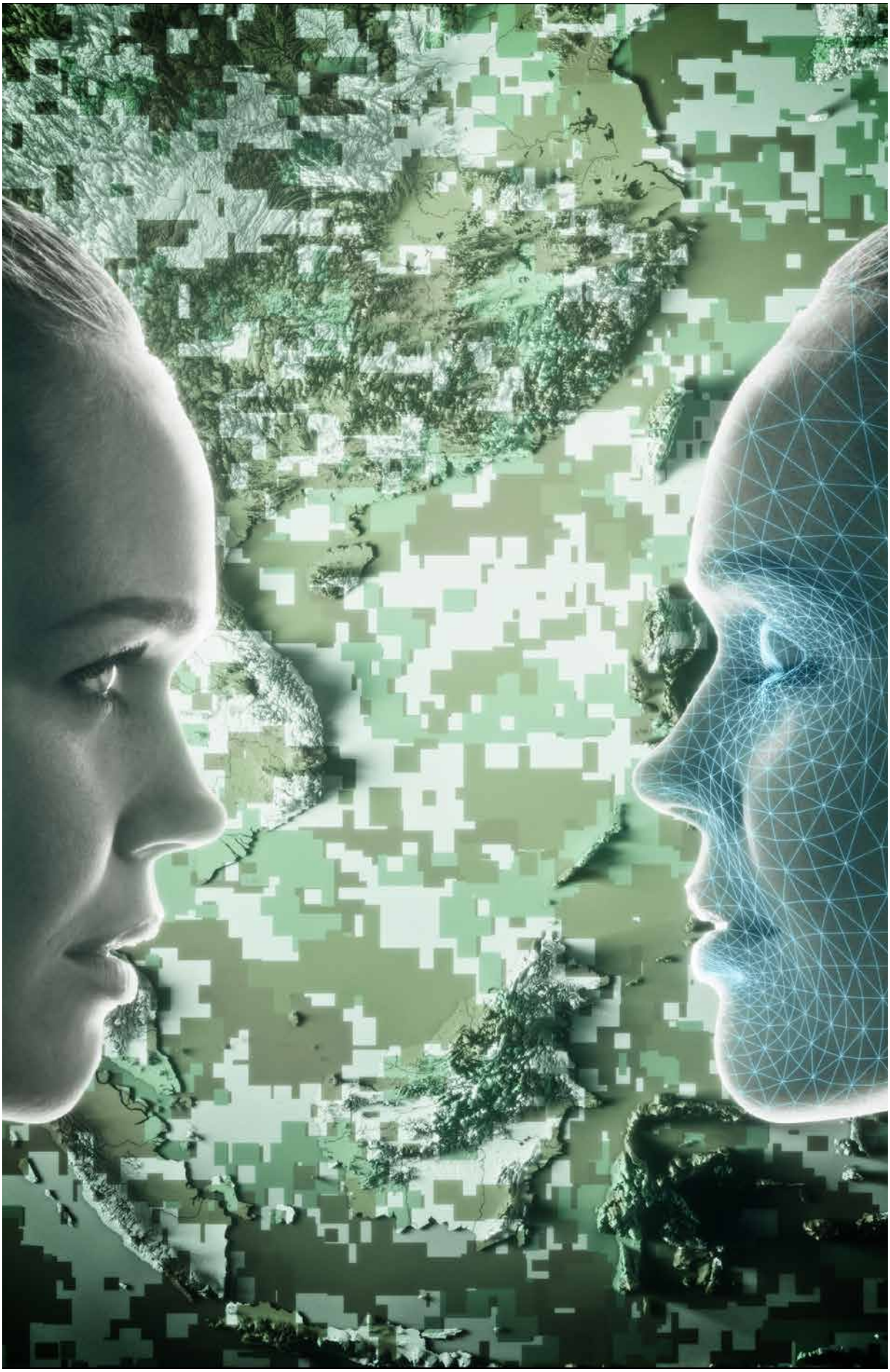
[CHAPTER]

02

A MODEL PEACE

DATA MODELS

Just as crude oil did during the past century, digital data represents new forms of both commodities and power, whose control is increasingly in the hands of industry titans. Data can not only be processed to provide direct value, but also be refined to create useful new products that scale with ever more sources of exploitable information. Yet where things differ today—and will differ tomorrow—is that data is also an intangible asset that a producer can retain and even weaponize to immediate or long-term tactical and strategic effect. Moreover, sprawling data sets and more capable artificial intelligence (AI) systems allow the creation of powerful "digital twins" that are the real-time digital counterparts of a physical object, process, entity, and even individuals. These models will be used increasingly to simulate everything from business ecosystems, to military campaigns, to entire countries, allowing deeper understanding as well as potential manipulation. Efforts by nations and companies to dominate—or at least have some sovereignty over—such mechanisms (algorithms and computing) and knowledge (talent and experience) will transform entire economies and societies—as well as global politics.



EMILY'S REFLECTION STARED BACK AT HER in the wall-sized mirror that ran down the hallway. It showed deep-set brown eyes blinking just slightly out of phase with her own involuntary movements. She stepped back slightly, adjusting her sharply cut black suit's leather-trimmed sleeves. Then her reflection took a step forward, which made her realize the system setting was designed to maintain distance between the real person and their simulation. The image then showed a smile, picking up emotional tells of joy even before her own real facial muscles began to pull up the corners of her mouth. Then the simulated and real smiles broke wider at the realization that it was more than staring into a mirror; this synthetic yet lifelike image reflected your digital twin in visible form, an AI's rendering of *you*, based on all of the information available about you, from live observations of facial micro-expressions that no human could detect to psychological insight derived from a long-forgotten social media post you had made at a secondary-school party decades earlier. Her twin's face then showed a slight frown as she pondered the implications of all that data being used as a trillionaire's hallway amusement.

She turned back to see Shane, her most senior aide, watching her. The former Grenadier Guard's faces—real and projected—were still as a statue. *At least the data couldn't crack that. Or maybe it had?* she thought.

Shane bowed his head slightly, his own signal that it was time to head back to the conference room where her staff waited. It was all so discordant. Standing in the palatial luxury of the setting, from the digital mirrored hallways to the eucalyptus scent piped through the air-con, while on the other side of the world troops squatted behind weapons in the mud and muck of tropical bunkers positioned mere feet from another.

But perhaps that is what made it so apt. Every government leader gathered there for the treaty talks knew that their host knew more about them—and even the entire planet's citizens—than any of their own governments.

"Has anything further come in from their Standing Committee?" she asked Shane, as they walked down the hallway. "I can't be seen to be pleading for them to extend the talks, but for God's sake don't they know what will happen if they walk out on us over this ultimate issue?"

"No, Ma'am. And, yes, I think they do in fact know which is more worrisome," Shane said.

"As if three years of fighting in their backyard isn't enough," Emily muttered. "And it could all be resolved right here. Right now."

But did she really believe that? That by tying everything together, this would be the negotiation that would end it all?

Shane shut the conference room door behind him, and Emily looked down at the two junior aides waiting there for them. Their eyes were tracking back and forth but staring out into an empty middle space in the room, indicating they were deep into the augmented-reality information being pushed to them by the Foreign Office's own learning systems.

"You keeping them fed and watered?" Emily asked. "Don't want them crashing when it matters most ... Or pissing themselves."

Each party was allowed only four in-person participants, so she'd brought Shane, the only person she truly trusted, and two analysts whose own Service performance and development profile ratings scored them highest in the parameters of intelligence and tenacity. It had rubbed several Ministers the wrong way not to be in the room where it happened, but she needed the brilliance and obedience these two young stars promised.

"Got 'em on a schedule," said Shane. He passed Emily her augmented-reality (AR) glasses, a green tortoise-shell pair braided with web-like carbon strands. "I'm pushing you the latest negotiation models.

We've run it through all our systems, and it matches with the available NATO and American brain boxes too. Paul wants to run these through Cambridge, but I told him no. It'll leak."

"Agreed."

The analytics coursing across her AR showed the digital version of what they knew. The allied forces had already won the war; even if they'd not yet prevailed in the physical world, they would soon, and all the sides knew it. "Their navy's decimated, half their chip supply is now compromised, and their celestial pride and joy is now just space junk being picked over by the corporate privateers," Emily said.

"The energy use shows an unsustainable pattern as well."

By this point in such a ruinous and drawn-out conflict it should be so obvious, Emily thought, shouldn't it? "So why won't they fold?" Emily said. "Do their models tell them that they get some kind of better deal if they drag this out? Or maybe they're stalling on the island swap, to try to lower the reparations?"

"More likely, they didn't anticipate his demand. They don't have the same pool of experiences in dealing with him, at least not off the battlefield," Shane said. He touched his wrist, gently tapping behind the radius bone where the haptic implant was buzzing. "He's here."

In a sign of exasperation, Emily ran her hands through her short black hair, wondering if her digital double in the other room was already spilling everything to the one person who perhaps had come to matter most during the negotiations.

As if summoned by that thought, Desmond Bri entered the room.

"Madam Minister, I'll be brief because we're all running out of time," said the data company's founder, chief executive, and majority shareholder, with irrevocable rights that no board, and it seemed no government, could take away. "And if I'm honest, patience."

Bri walked into the room and stood at the middle spot where the analysts had been staring. Somehow, they noticed that and looked up at him. *Had he just cut their feed, or just altered their projections?*

"You're welcome to stay as long as you like but I am leaving in an hour for the Valley for a meeting with the others." It was unstated who he meant. It wasn't so much a governing council, but a kind of club of shared interests, tax status, and digital power.

"If our own demands are not included in the convention, we have resolved to withdraw our support, not just to hosting the negotiations, but to any government that depends on our services."

"How dare you?" said Emily.

"It sounded different when *she* said it," said Desmond.

"Yes, I assumed you already had this conversation with me," Emily said. "Was it practice for this conversation or to just test out the software?"

"A little bit of each," he said with an attempt at boyish charm, as if he was still a kid swilling Red Bull as he programmed in his university dorm.

"Nothing's personal here, you know that," he continued. "But yes, I have had this conversation already, so can we just jump to the end of it?"

"No, I'm just getting started," Emily said angrily.

Then she caught herself. She was trained for this. Her entire career had been in politics. He had only jumped in after his first billion.

"OK, you know what I know, and," she nodded to Shane, "You also know that there is nothing in all of this that we haven't simmed either. Hell, we probably ran all our sims on your systems."

"Technically not our systems, but 95% of our algorithms and 87% of our data," said Desmond. "And, that is the point. This war is over, owing in a great way to us. We—you and me—are fighting for what the peace

afterwards will look like. Let's make sure it was worth it. The ships have been sunk, tens of thousands of souls lost—"

"And trillions of dollars have been risked," Emily, adding what he really was concerned with.

"And for what?" Desmond said. "A return to status quo ante? We can't abide that. Can't be party to that. And it is not just about that financial investment. Out of this horror, this atrocity that started over a few rocky islands' GPS coordinates, we are focused on something that actually matters now, in this century," he said. "And you should be too. They spent decades gathering that data, tapping every sensor possible—traffic cams, heart monitors, credit systems, hacks of all our networks, all to empower, all to control not just their own populations but ours. And you want to let them just keep it? You cannot leave them such power."

"So, we should just give it to you?" Emily said.

"We helped win this war. It could be seen as a fair exchange. But you are still thinking in linear terms. This is not just about a more-than-doubling of our data wells, which, for all their efforts, they haven't exploited to anywhere near their full extent. It is about pooling their data and ours, and the exponential effect it offers. Through a massively scaled data pool like never before—through an open data flow like never before, we can train generative networks in a way never before possible. We can maximize the potential of that data like never before. We can not only solve today's problems—Disease! Climate change!—but model and solve tomorrow's, too, before they even *happen*. We can make the world a better place, forever."

He then smiled, as if reflecting on her reaction, yet it was just pretence; he had already experienced it with his simulation of her.

"I know you don't believe that, but that's what *we* believe," he continued. "I put my company, my life's creation, on the line in this conflict because I saw this outcome was the opportunity of a lifetime, or all lifetimes, to remake the world for the better. So did the others, who, I will remind you, also risked their own creations."

That was it, she thought. *They didn't just own the companies, they thought of them as their creations, almost like their children. As a parent, they would not just protect, coddle, and even excuse their every excess and wrong; they would do almost anything to ensure their progeny's inheritance.*

"So, you'll really walk if you don't get it?" said Emily. "Risk this war restarting just to make the Standing Committee give up sovereign control of their population's data. Isn't all ours enough already?"

"When it comes to data, there's never enough," said Desmond matter-of-factly, not even bothering to push the myth that his platforms' users still had control over their own data's use and destiny.

"You know that the Cabinet's not authorised any of this," Emily said. "We're to talk about reparations to bail out the budget and territorial limits, to finally set in stone all the disputed borders, so that there are no repeats of the crisis that started the bloody war. And that's what the President and the Standing Committee came to talk about, too. . ."

As he knew she would say.

"But let me go back to the Cabinet and see what I can do," said Emily.

"Yes, yes, you go work your magic on them, just as I knew you would," said Desmond, offering a wink. "It truly is the deal of a lifetime."

As soon as Desmond stepped out of the room, one of the company's caterers entered, following behind a robotic pram-like cart of finger sandwiches. He nodded to Emily and Shane, before shuttling off to one corner to set up a brass samovar for tea service. Evidently, Desmond's network had thought they all needed to be fed and watered, too.

Shane frowned and started to move toward the young man with clear intent of ushering him out. But Emily caught Shane's elbow, a gentle squeeze to hold him back.

"Bit like us, isn't it?" said Emily. "Old and new, jumbled together. And just being told what to do."

Emily thought of heading back out into the hallway, to ask her digital twin what she ought to say to the Cabinet about this latest turn. If it went any more sideways, this conference would be the end of her career.

Suddenly, a text message displayed across her glasses. *"Minister, my name is Sinh Cung and, while I am employed here in food services, I have also come to share a message with you from our movement."*

Emily pinched the bridge of her glasses and looked over at the caterer. He wore black pants and a white collarless button-up shirt, shoulder blades knifing up and down against the cheap fabric as he lifted the weighty samovar up onto the table.

They had a robot bring in the food, but still needed a human for the tea?

She pushed the thought aside and focused on what the message meant. If it was a hostile connection that was making it past the in-house security, it would mean this young man, maybe 25 years old, was a supreme talent. If it was a simple piggy-back message, he was supremely audacious. Reckless. Shane could break his neck before the interloper could even fill a cup.

The caterer used a cloth to burnish the samovar, still keeping his hands in the open to show no hidden weapon.

"I assure you that this is not a spoof or attack. It's a simple private channel inside the corporate network. We have faithful members even within the belly of the beast."

She blinked an acknowledgement command to confirm that she was reading. The text of his message came in a rush, as if he had hurriedly recorded it in a flurry of speech-to-text.

"Please excuse this method of communication. I have tried to reach out to your government through official channels, but your embassy would not even meet with us."

Emily subvocalized her response, mouthing words with the most minute sounds to be captured by sensors in the ear tips of her glasses.

"What is it that you want to communicate, then?"

"This conference claims to represent all, but it represents no one. You are making decisions for billions who have no voice here."

Emily halted the diatribe through a command initiated with a squint.

"Every government of the world is here, as well as every major company and humanitarian group. They are all represented here."

"All artefacts of the past. The data from this war is a form of the human collective experience like never before. It should not be traded away, to be bought or sold or optimized. Or even worse—replicated to play out in infinite neuromorphic computing simulations that will take on a life of their own, literally, and to what end?"

Emily entertained this concept, something she had not considered. Could an eternity of conflict be conjured, just as the hall of mirrors reflected back the world's data in her own visage?

"That's well beyond what I'm concerned with accomplishing right now," Emily said. "By resolving the disputes that created this war, we can leave a legacy of lasting peace."

"I plead with you to hear me: This war's data belongs to its victims, not its victors. It may be traded away now, but in the coming years, it will be something worth fighting for to those from whom it is taken."

"Then that is the price we must pay," Emily said silently, as much to him as to herself.

"I have said my piece then. And it will only plant the seeds of war, if you ignore it. This was a war over rocks in the sea. The next one will be a fight for our very souls."

The message blinked out. Less than a minute had passed.

"Tea's ready in a minute, ma'am," the young caterer said without looking at her, offering a grave nod that nearly looked like a bow. Then he was gone.

Something about the urgency with which the caterer's words ran together too quickly made Shane newly alert. "Everything OK?" he asked Emily.

"Yes. Just collecting myself for the call with the Cabinet. Like Desmond knows, they'll agree to his terms. And so will the President and Standing Committee. To end a war, it will be worth it."

Twenty minutes later, Emily and Desmond stood in the same long hall where Emily had puzzled over her facsimile. The two tried to keep eye contact with one another while being wholly unable to stop looking at what their digital doubles were doing at the same time. From the corner of her eye, Emily saw the two of them with arms aloft as in salute.

Desmond then handed her a champagne glass from a tray carried by another of the autonomous catering carts. There was no sign of the young caterer.

"A toast," said Desmond. "To *our* victory, and to a world remade."

Emily watched the bubbles race to the surface in the shallow antique champagne glass. On the wall, the liquid looked metallic, like poured gold. She then took a long sip of the champagne, so that she could savour the bite of the effervescence in celebration. As she tilted her head back and closed her eyes, a pang of doubt hit her: *Was this war's data worth the peace? Was it really that good?* When she opened her eyes again, she saw that her digital twin reflected in the hall's mirror was frowning back at her.

[CHAPTER]

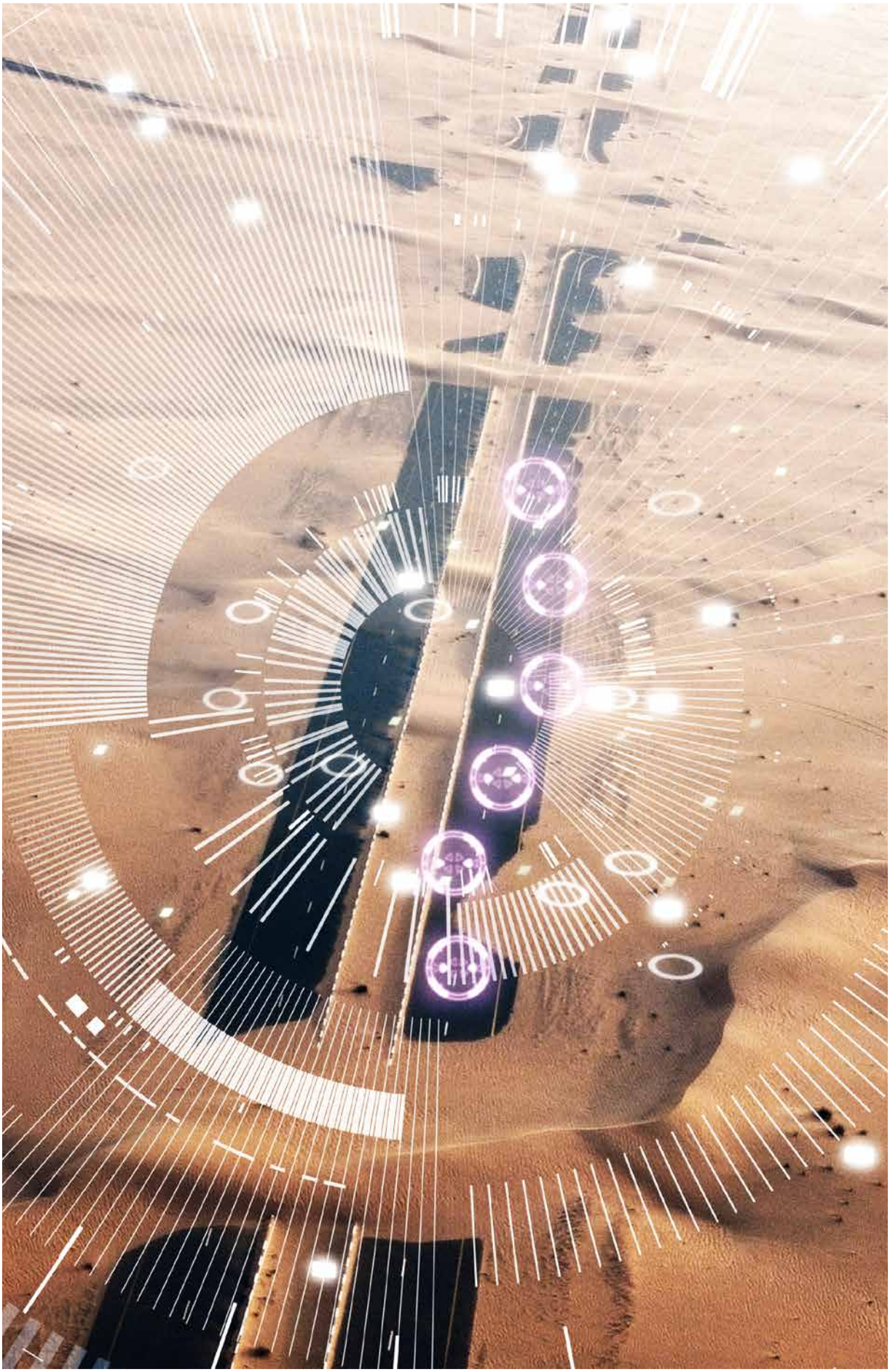
03

CHASING GLORY

NEW COMPUTING PARADIGMS

From the panoply of personal digital devices we carry on our bodies, to cloud architectures, to the Internet of Things surrounding us, computing has become both ubiquitous and transformative. However, the fundamental architecture of computing devices has remained roughly the same since their first conceptions in the 1940s. A host of new technologies and breakthroughs promise to change this over the coming decades: Computation with Memory and Logic-in-Memory approaches can break up data bottlenecks by computing inside memory units; neuromorphic computing is inspired by how our mammalian brains work; and event-driven computing runs processing only when needed.

The outcome of these advances could likely result in an order-of-magnitude changes in power, both the energy needed to operate computing systems and in the processing that they deliver. What is now limited to supercomputers and server farms will be pushed to the edge of networks, allowing AI in-the-field processing of anything from speech to imagery. While much will happen in the background, akin to how electricity invisibly works around us, there will be potential applications in everything from new drugs to drones to "effects synchronisation," maximizing the use of anything in short supply—even time itself. These new computing paradigms will have profound implications for security and society, much as the first computing designs did over the last 75 years.



_ EASTERN SYRIA _ 2035

> The striking images that you see are a nearly half-kilometre-long train of military supply vehicles I'm riding with, snaking along a highway in eastern Syria. If you follow me with your VR goggles looking to the right, you see an IED crater big enough to swallow a tank, while to the left is the dramatic vista of the late afternoon setting sun. Of course, you and I are the only ones who are going to enjoy it, as I'm the only human aboard this convoy.

Lewis Clapham then fought his instinct to speak further, to give it all a dramatic effect. As he silently panned across the scene, his goggles recorded and broadcast it all, as well as kept the dust whipping around him out of his eyes. With a smile, he started back up.

> All day long, our robotic supply line has been steady ahead to provide relief to the beleaguered and very brave soldiers from His Majesty's forces. With the AI always working to achieve maximum efficiency, it is a bit tighter schedule than I am certainly comfortable with, but the logisticians I spoke with back at the main base told me not to worry. They explained that effects synchronisation allowed by the new computing paradigms is akin to solving the "traveling salesman problem," like going out on a business trip with only the exact amount of petrol in your car for every stop you will make.

Clapham thought once more of the 17 Romeo y Julieta cigars the system had packed for him, hoping they were right about that exact number.

> So, the soldiers at FOB Angle aren't desperate—how could they be, as they're among the British Army's finest?—but if this autonomous resupply convoy doesn't make it by dark, then the situation could take a different turn … "

He made a point to zoom in on the dots of light from the shattered buildings of nearby Baghouz, the war-torn urban area just before they made the last highway turn toward the forward operating base.

> But we will. I can feel it, literally. The animal-like relentlessness of these machines. It is apt, given the neuromorphic computing that guides them, supposedly inspired by how mammalian brains work. It has unleashed as big a change for war as wireless did a century back. In World War I, the forebears of the very unit we are off to supply once fought in trenches in France that were linked to their commanders by thin wires running back to their headquarters. The second they left a trench, all communication was lost. In World War II, the wireless radio allowed movement and communication, and a new era of Blitzkrieg was born.
>
> The same has been true for our computing and AI. Unlike past generations, the computing power that was once distributed around the world across military data centres or command posts is now embodied, literally, in each of these vehicles, and it fuses their sensors together. All the learning and processing is now at "the edge," doing it all where we are, as opposed to the data going back and forth to some server farm, where it processes the data and then pushes the algorithms back out again. The result is, this whole convoy of dozens of different vehicles—some with four wheels and others with six or eight—moves, learns, and adapts as one. It's like some giant organism. From my perch, I might say it feels like it's alive even though I'm the only flesh and bone aboard …

Clapham pulled out a dark blue handkerchief to quickly wipe dust from the lens of the second camera he had mounted on the roof of the six-wheeled security vehicle he rode on top of. He then took off his goggles, as if to give the viewers visual evidence of his humanity. But it was also because all the analytics reported that his blue eyes were among his most positively rated features. So, as important as it was to convey the feel of the ride, his 2.4 million subscribers also had to be able to see his eyes. After all, it was their micropayments who had funded this latest war reporting trip, and he would need them all the more when he made a run for Parliament next year.

> It all happens under the hood, so to speak, unseen by us, but sensors everywhere that are smart, seeing in hyperspectrum—from IR to even sniffing for chemicals—alerting the entirety to what happens next. I can feel beneath me that the convoy

vehicles are beginning to slow now. It's a subtle shift, but our speed is down to around 60 km per hour as we close in on the territory protected by FOB Angle's swarms. This approaching transition, between no man's land out here and the defensive bubble around our forces, is always fraught. Anything out here is fair game for coalition air assets if it's ID'd as an enemy; our systems make their own decisions for themselves. I know that many still have concerns about such 'thinking weapons,' but that silent conversation between them is what keeps us safe when we enter the defence zone protected by FOB Angle's systems. In fact, we just passed another wreck—

He put the googles back on and panned his viz across a blackened metal ball that was folded in on itself like a rotting rose of dead Islamic State fighters splayed out like fallen petals.

—that looks to be the remains of a command-and-control vehicle used by the insurgents during their most recent assault on Angle two days ago.

A ping came in, a notice popping up in his lens that the BBC feed had just dropped into his live broadcast.

To those who are just joining in, thanks as ever for your interest in this forgotten war. This critical resupply shipment I'm riding on has to get through. We've got supplies for the 100 or so soldiers, who were unable to resupply by air for six days now due to the threat environment out here. I'll zoom in so you can see, too, but I can make out the coal-heap-like nub of rock where FOB Angle is situated. Yes, help is, indeed, on the way.

As you see the audio and video live, you'll note I've scrubbed my geolocation data. That's the old soldier in me.

It never hurt to remind the audience that he had served, even if he'd gotten out before he'd made captain.

The fresh crows may tell you it doesn't matter, and that the more they put their own narrative out there, the better, lest the enemy do it for them. But some old habits make for better futures.

But it wasn't all about feeding feeling and emotion—it was about data. Indeed, there was no need to anonymise the convoy's location, as everybody in the entire region knew exactly where FOB Angle was, knew exactly

where the resupply train was coming from and where it was going. A person or government didn't need quantum code crackers to know the world's secrets. Rather, billions of relatively dumb devices all netted together gave the same picture from the outside looking in. That data was sold and traded around the world, around the clock.

> During our long dash from the main coalition base, I've been impressed with how effective the autonomous convoy has been at staying on course and how out-of-date I feel, even though my military service was fairly recent. So much has changed during the past decade. I patrolled these very same deserts in 2027, but I feel as if I'm in the middle of a brand new war. For those of you who haven't been paying attention to how your life at home is changing battlefields around the world, the past decade's civilian technology breakthroughs mean that AI computing power is ubiquitous—in devices that range from the sweat-loss tracking running shorts telling you to drink more Lucozade, to self-driving city buses that give a haptic pinch so you don't miss your regular stop.

This is where his auto-edit software would help in real-time, cueing off any complicated terminology by inserting an interactive explanation to the relevant wiki, itself updated by humans but also self-populating by those same prompts. It might also include some revenue-producing adverts.

> Embedded everywhere, this wave of invention has led to a fervent reboot of the British Army that's made it even better than it was in my day in the Hussars, as much a difference as going from horse to mechanisation.

That reference was, of course, well before his time, but he liked to weave history into his feed, making himself seem a bit older than he actually was.

> It's something we all know intellectually, but it is also something that you can feel. I know what it's like to drive a proper convoy, but this driverless one moves more like an anaconda's legless jungle march.

He paused to watch the feed of himself, a grizzled war correspondent in repose despite the danger. He felt a chill. Bloody well done, mate, he said just to himself. Sure, his father, whose entire approach to parenting seemingly was planning how his son would carry on the family name in Parliament, would be scandalized at it, not just the unseemliness of

broadcasting yourself, but the risk that one had to take to stand out. Yet his American mother, who was currently away at her family's sprawling ski house in Colorado, would surely be commenting away in his feed any moment now.

What is happ–

A loud roar. Then another explosion. Then four more in rapid succession. Flames engulfed the last half of the convoy. Clapham instinctively ducked as low on the roof of the vehicle as he could. He then took a breath through his nostrils and then out through pursed lips, what he'd been taught to do to steady himself under stress. Then he popped his head up, scanning the sky for drones. There were at least a dozen quadcopters spiralling toward the convoy from either side of the roadway.

We're in contact … Daisy-chain IED ambush, I suspect, followed by at least two box-launched swarms. Classic ambush tactics to force the convoy apart so the swarm can divide up the drone-defence units and render them less effective. I'm repositioning my cam so you can see what I'm seeing. But … the lead vehicles are leaving the roadway and we're … pressing on at a much higher speed now. To my right, we're taking fire from a group of fighters who have emerged from spider holes. These are actual human fighters, who must have been lying in wait for I don't know how long. The patience of a committed warrior fighting for land they value above all else can be a worthy foe for machines collectively making decisions with the speed of a lightning strike.

A Banshee whirred off one of the drone launchpads in the remaining convoy, a helicopter-sized, wasp-like flying drone with a low-slung cannon pod and other deadly weapons. It began raking a berm 200 metres away with direct fire.

Behind me, a Locust strike drone is deploying …

Clapham caught his breath and hunkered lower, not wholly trusting the automated-target recognition system, as the drone skimmed within touching distance overhead. The drone trailed a stench of ozone and gunpowder.

Looking at my electromagnetic spectrum scans, I can see the EM trail of another battle swirling around us. There's an intense effort to jam and hack the convoy …

He pressed his hands over his hearing protection as his vehicle's twin miniguns blazed long tongues of flame skyward in the early evening light. That volley of fire would take out the attacking drones, he expected. Unable to keep track, he shifted his broadcast view to the mounted camera, now facing the rear of the convoy. All the while, he kept narrating. While his voice couldn't be heard over the battle's noise, the subvocalization sensors translated what he was mouthing.

> But, as you surely notice, it's not very effective. The convoy's vehicles continue to operate as one, even if they're no longer proximate to each other. The other side's ambush technologies and tactics are clearly out of date. It appears they are using the old machine-learning style AI. It means their drone swarm may be somewhat autonomous, but it's slow, having to feed data back and forth to a cloud or computing centre. That means there's likely a human enemy target, somewhere, who won't be on this Earth for long …

He visually tracked the strike drone until it disappeared in the distance, as it traced the signal from whomever had dared to attack them.

> As we fight off the enemy, you can see the enormous advantage we have. They may have all the usual once high-tech kit of drones and jammers, but they are no match for a system operating under this entirely new paradigm. It is not that our overall system is intelligent, but that each computer chip within each robotic system is processing orders of magnitude more quickly than our foes can. I know that many of you will think it improper to make colonial references but there is a quotation from Hilaire Belloc's writing that comes to mind: "Whatever happens, we have got the Maxim gun, and they have not." It is like that today …

An explosion right behind him nearly knocked Clapham off the armoured vehicle. He only hung on because he'd instinctively grabbed one of the foothold rungs with his left hand, barely stopping his tumble over the side that would have seen him crushed by the robotic vehicle's human-sized blast-proof tyres.

Then the vehicle braked hard and lurched to the right to skirt around a pile of flaming drones, half the wheels on the road and the other on the hard-packed dirt at its shoulder.

Clapham lost his grip. He slipped off and tumbled to the ground, cartwheeling before coming to a rest on his back. Convoy vehicles raced by, ignoring the human as if he were just another obstacle, as they darted and dashed with syncopated movements.

Then, they were gone, and Clapham was alone.

He sat up, placing his palms behind him on the cold dirt while his legs splayed straight out in front. Left leg. Then right. Good news. Both seemed to work, and he had no pain beyond what he considered to be reasonable for the situation. His back ached, like a bad parachute landing, but as he got to his feet, he did not think he had done anything terrible to himself. His small travel backpack may have saved him. Then he realized that his viz glasses' camera was still broadcasting. It must have autonomously shifted the uplink from the convoy to one of his family's CubeSats somewhere overhead. He then noticed a flurry of pop-up messages.

Carry on, Clapham, he told himself. *Carry on.*

He cleared his throat, coughing up dusty phlegm.

```
As you can plainly see, I am … no longer on the convoy.
But it appears the ambushing force has been destroyed by
the convoy's response. The whole engagement lasted 46 seconds
by my count ...
```

Clapham's throat tightened as he heard shouts veiled by smoke and dusty haze. Were the insurgents finally brave enough to come up from hidden lairs? Or villagers coming out to scavenge among the destroyed vehicles?

As he considered each likelihood, he also considered what he should do next. And what his audience—and future voters—would expect of him.

```
Run or fight?
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More than his immediate future depended on it.

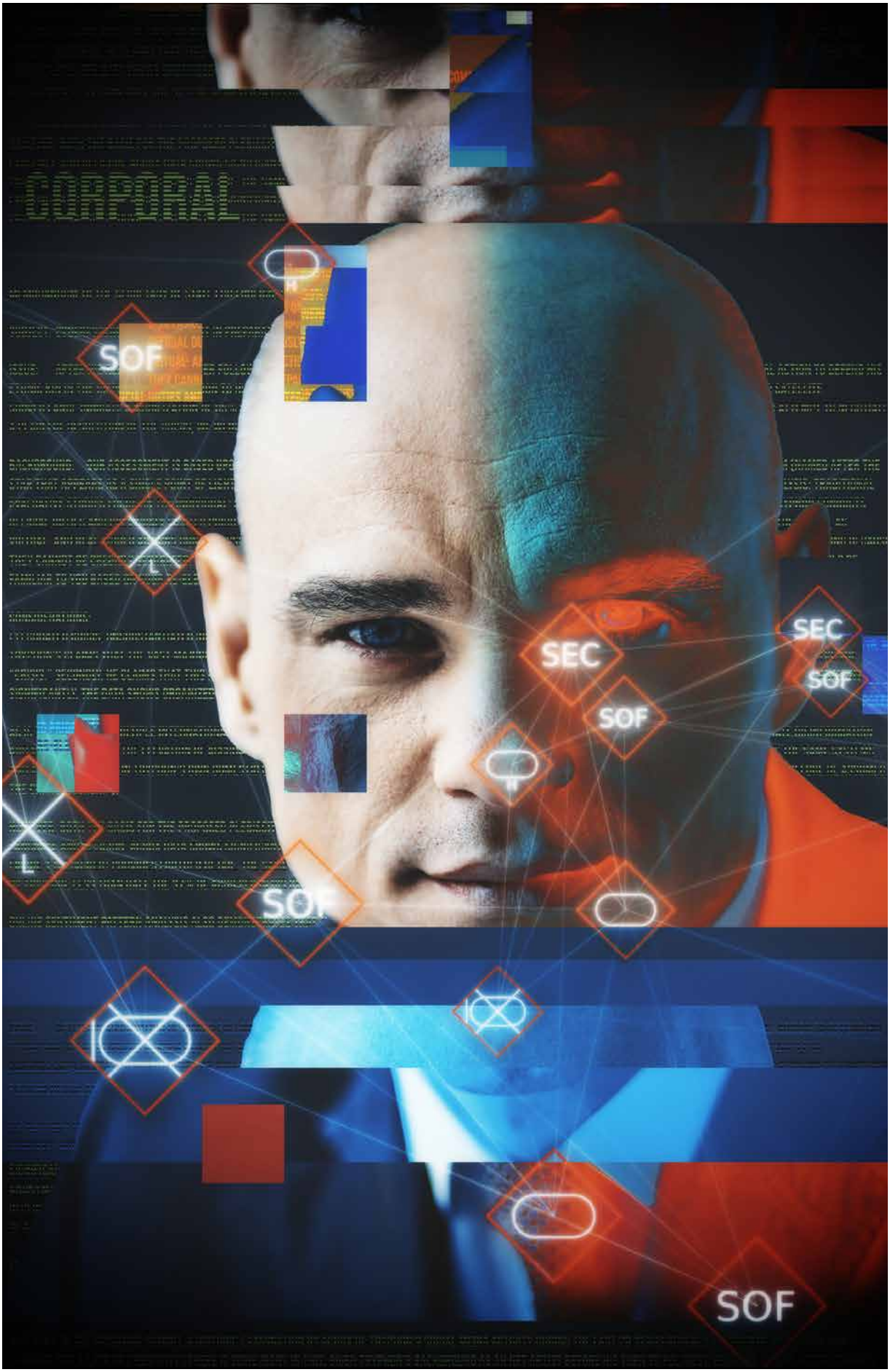
[CHAPTER]

04

THE MEASURE OF A MIND

CYBERPSYCHOLOGY

Digital technology provides tools we use to work, learn, teach, fight, organise, persuade, and even parent. In turn, its tools are used against us in each of these realms, with those virtual interactions across networks having real effects upon everything we do. Cyberpsychology is a discipline that seeks to understand, explain, and predict the human side of this. A new field of insight from ever-increasing data and research, it is enabling a new appreciation of human behaviour and decision-making at the levels of both society and the individual. For instance, by studying information consumption, persuasion, and how messages "go viral," cyberpsychology can offer unprecedented insights. That may lead to discovering the emergence of new communities or how online campaigns shape real-world actions, from voting to genocide. In turn, our online activity, in even the most benign manner, can provide insights into individuals' personalities, preferences, and other attributes. In short, we often have sufficient information from disparate sources to form a far more complete picture of an event or individual than was ever possible before social media and widely distributed mobile computing. With even more data, cyberpsychology will grow both more refined and widespread in its use.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RESEARCH NOTE FOR THE SECRETARY OF STATE FOR FOREIGN AND COMMONWEALTH AFFAIRS

SUBJECT: CORPORAL Assessment in Preparation for Upcoming Summit

ISSUE: After his assumption of power following appointment to the chancellorship, foreign leader designated CORPORAL demanded international action to defend his ethnic kin in the disputed border region to his nation's south, threatening unilateral action if the "crisis" was not soon resolved. Both SIGINT and satellite surveillance indicate a mobilisation of 85% of military forces. With the Prime Minister scheduled to meet with CORPORAL at his winter retreat, in an attempt to negotiate a peaceful resolution of the crisis, we were requested to provide a psychological assessment.

BACKGROUND: Our assessment is based upon a thorough examination using cyberpsychology analytics from the new ACRUX artificial intelligence system (named after a star that appears as a single point of light to the naked eye, but is actually a multiple star system). These findings will differ from conventional leadership analysis; CORPORAL's rapid rise and highly controlled public presence leave fewer sources for our assessment. Traditional evaluative studies focus on the individual; our approach with ACRUX considers the entirety of the digital and physical environments within which CORPORAL currently conducts official duties and previously existed prior to taking office. Both past and present digital spheres exist concurrently and influence one another. Therefore, as both virtual- and real-world actions continuously impact the current strategic environment, we make no distinction between them in terms of analytical weighting because they cannot be credibly separated. This approach is not unlike how government public health campaigns are conducted; the analytical frameworks should be familiar to you based on your experience as Health Minister during the CV-27 vaccination outreach effort

CONSIDERATIONS:

(1) Curated Crisis, Unsubstantiated Identification

CORPORAL claims the vast majority of citizens of the disputed province are seeking to be reunited with their "homeland" through a plebiscite to resolve the "crisis." Second, he claims that this is due not just to a shared ethnic affinity, but also to a sense of mortal danger. Neither are supported by ACRUX analysis, which indicates a remote likelihood of an actual crisis. Significantly, the data shows organised efforts at manipulation and amplification, but that they are notably unsuccessful. Accounts supporting the misinformation effort have structurally similar active and latent boosting networks, which manifest poorly concealed semantic text modulation.

As is the pattern in multiple international and domestic crises, there is significant evidence of social media weaponization, including both deliberate disinformation and malinformation (the elevation of accurate, but contextually false information). This is unsurprising, especially as network analysis indicates the same systems and approaches used in CORPORAL's own domestic operations. *(NOTE: Prior ACRUX analysis identified this campaign and projected his success 14 months before he assumed the chancellorship.)*

However, both the basis for the proposed plebiscite and the southern border region "crisis" it would seek to resolve are not matched. While there is a shared language and religion, ACRUX data shows significant divergence between citizens on each side of the border in 46% of the most significant socio-cultural parameters. *Figure 1* (attached) provides further detail. The same divergence holds in political beliefs. Notably, only 17% show a strong affinity for the political ideology espoused by CORPORAL, less than half the 37% he achieved in his own nation's election.

Online sentiment pattern analysis also demonstrates that, while CORPORAL found a narrative of fear to be an effective message for his own domestic information operations, it is not gaining traction among the neighbouring population. It is clear that his government's persistent synthetic information operations (including new virtual-reality campaigns) seek to create an immersive narrative that is not being authentically experienced. Neither cyberpsychology analysis nor biological markers from distributed-device collection show out-of-scope data for stress markers consistent with an actual climate of fear. Similarly, CORPORAL frequently cites the online engagement with various plebiscite information hubs as evidence of the desire amongst the population to escape the danger of the crisis, but the predominant psychological sentiment among those engaging is an emotion of curiosity, not fear or stress.

STORIES FROM TOMORROW / P.W. SINGER + AUGUST COLE

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(2) Military Fear

ACRUX does, however, show that there is a significant emotion of actual fear in one particular audience: CORPORAL's own generals.

As noted earlier, multiple streams of intelligence provide evidence that CORPORAL is overtly preparing his nation for military action. These include mobilisation orders and military movements towards the border. However, sentiment analysis of the military leadership and their core personal and professional networks shows neither confidence nor desire for conflict. Rather, it shows fear within a force that is not actually as prepared for war as CORPORAL projects in public statements. Significantly, VR engagement among the country's general officers has increased dramatically, as they are establishing sub-groups where they are conducting anonymous discussions that reflect deep concern about the prospect of war and its effect on their own professional and societal standing if they are called upon to deploy. There are also examples of senior officers utilising anonymous and secure channels instead of official or personal social media accounts, which are intermittently dormant. ACRUX analysis of these dormancy patterns indicates senior officers are highly certain to be establishing further sub-networks to ensure they are able to directly engage with their armed forces in the event of a military defeat and their expectation of CORPORAL's loss of political power, if so.

(3) Leader Profile

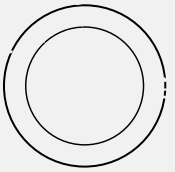
Multiple prior reports have been provided of the socio-economic conditions and underlying emotions of fear and grievance that shaped both CORPORAL's psychology and political rise. This aligns with CORPORAL's prevailing rhetoric of anger, which is a consistent theme in his digital life, be it amplifying other voices or using his own.

Relevant to the upcoming summit, a historic examination by ACRUX of CORPORAL's social media activity during the past 29 years reveals a leader of two-dimensional thinking and a lack of creativity. (There is some irony in this, given CORPORAL's background as an NFT artist before his turn to politics). He is almost certain to seek linear action towards a single outcome, aligning with a heightened sense of confidence that he can master a situation. Significant to any negotiations, however, his online activity (drawn from both his infamous posts that started his career, and also such elements as his average hover-time over advertising imagery of different emotional narratives), shows an out-of-scope, insatiable quest for self-worth. That is, he seeks to "win" every exchange, but he is psychologically incapable of taking satisfaction from any win. Thus, the issue for any negotiation with CORPORAL's is not merely whether the international community can hold him to any commitment he makes. It is that he himself is psychologically incapable of holding to any commitment.

OCTOBER 4, 2045

RECOMME NDATIONS:

The data available through online networks and analysed by ACRUX demonstrate a target population that is not as close an affinity group—nor restive—as portrayed, a military leadership that very likely believes its own force is not in fact prepared for war, and a leader who is highly certain to appear single-minded towards his negotiating goal of the plebiscite, but will draw no actual satisfaction from it. Nor will he be able to hold to any commitment not to seek more at a future time. We recommend, based on ACRUX 98.7% fidelity, that this information be woven into any negotiating strategy.



RESEARCH NOTE FOR THE SECRETARY OF STATE FOR FOREIGN AND COMMONWEALTH AFFAIRS

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THE MEASURE OF A MIND

[CHAPTER]

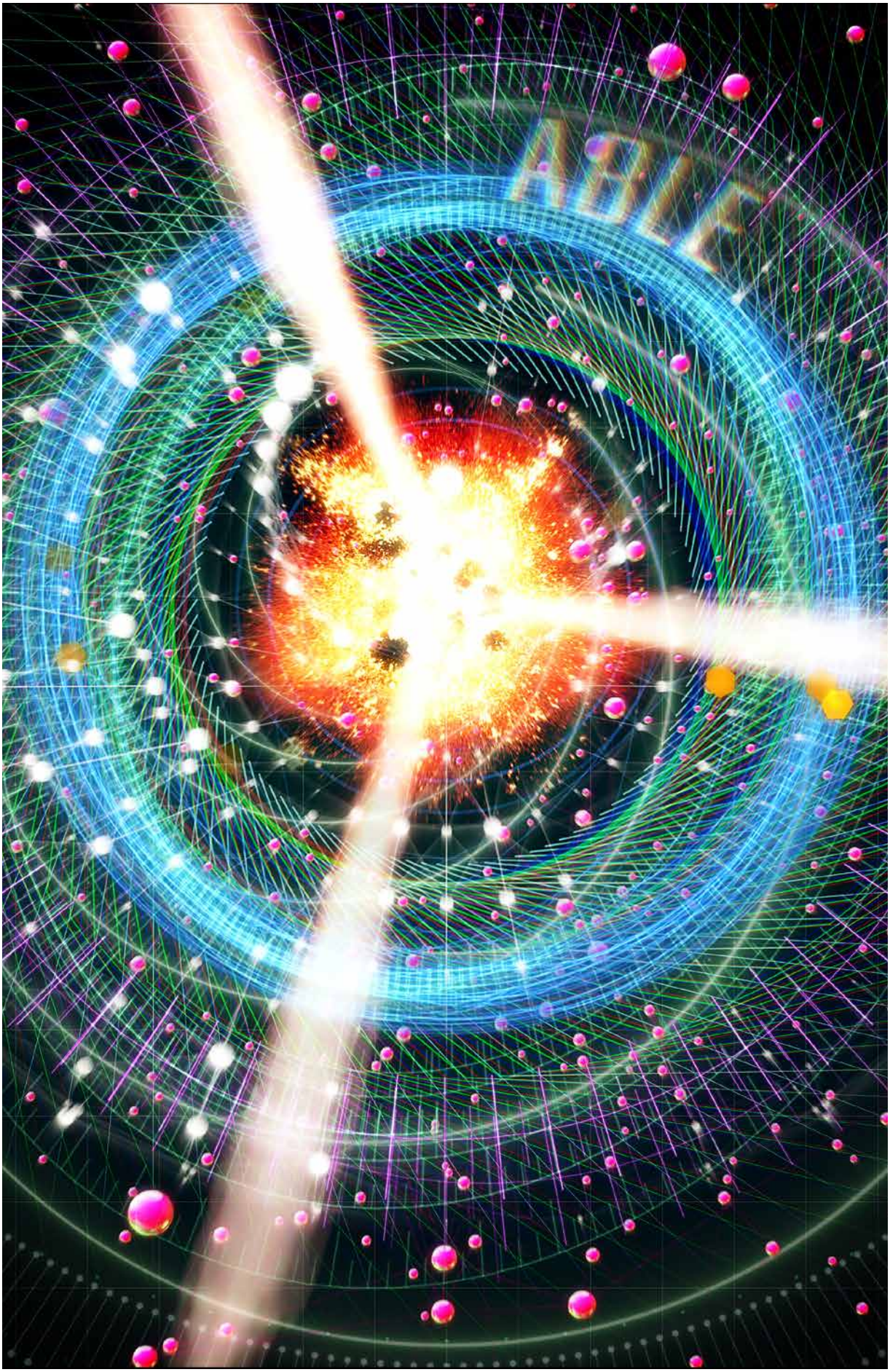
05

THE AI OF BERESFORD BRIDGE

Artificial Intelligence (AI) is becoming transformative in fields that range from finance to medicine to the military. However, its recent applications have largely been to specific tasks and machine learning, in which algorithms learn from data – or experience – rather than following rules defined by humans, has become a widely used technique. The future holds not just the broader use of AI across society, allowing drastically improved decision-making and discoveries at a much faster tempo, but portends its potential transformation into Artificial General Intelligence (AGI). An AI that is not just able to perform a wide range of tasks but is as intellectually creative and astute at problem-solving as a human, would not just fulfil the visions of science fiction. It would be even more disruptive to society and warfare than the mechanization of the last century.

While AI promises revolutionary advantages, it also presents new questions of policy, ethics, and law. This is more than just the pressing matter of human jobs and societal roles and includes many existential questions never faced before: machine permissibility *(What is the machine allowed to do?)*; machine accountability *(Who is responsible for its ever more independent actions?)*; and algorithmic bias *(How to prevent actions that seem proper within a machine-made model of the world but have a biased outcome in the real world due to data or design problems).* Differing organizational and even national cultures will help address these questions, as well as the issue of explainability (that the very complexity of AI is its advantage, which also means decisions are a kind of "black box" to human comprehension and communication). It may also turn out that teaming humans and machines will offer greater effect than each operating on their own. "We must train and grow with our AI assistants such that the machine can tailor how it interfaces with us as individuals and with the wider team," notes the Ministry of Defence's Joint Concept Note 1/18, Human-Machine Teaming.

Whichever human actors—be they militaries, business, or nations—best navigate these issues will be the leading powers of the future.


ABLE

"COME IN."

Major James Junod, British Army Experimental Autonomous Force, drew his hand back from the door, halting his knock a fraction of a second before his knuckles could rap the wood veneer. He smiled, despite the knot in his stomach.

That was Brigadier Peter Telley in a nutshell: Always a step ahead.

Except during today's exercise, thought Junod. *That had surprised him.*

"Sit down, Jim," said Telley, motioning Junod to the short leather couch set against the wall of his office. It was well worn, the brown leather ageing with a patina and shine that spoke to the many moves Telley had made during his 24-year military career. Junod had sat on the thickly padded couch too many times to count, discussing everything from family to military history to his career progression. But this time it felt more like being called to the headmaster's office than stopping by to see a mentor.

Telley offered Junod a cup of tea.

"Thank you," said Junod. The tea was extremely hot, smelled slightly of honey, and was not yet at a drinkable temperature. But Junod took a burning sip anyway, rather than be the one to open a conversation that would likely be more painful.

Telley pulled his desk chair around to closely appraise Junod and balanced his cup on his knee. Then he leaned forward with the cup in both hands, looking at the younger officer over the steaming rim.

"I think you know why I asked to meet you without any of the other members of the wargame control team present," Telley said.

"Yes, sir."

"We need to talk about what happened during *ULTIMATE CHALICE*," Telley said. "Nonsense name, really. Given the context, I suppose an AI came up with the name, as well?

"Yes, sir."

"That part is fine. We've been using algorithms to generate randomized code names since I was starting out. Here's the thing, though: You pushed it too far. It's not so much that you broke into the manor house, stole the best jewels, maybe left some broken glass or slashed the curtains out of spite. You bloody took *everything*, drawer by drawer, and then left everyone standing about starkers, watching the entire thing burn down to the foundation. I've warned you of that before. How we do things matters just as much as what we do."

That was the problem.

Dynamic is what they called the wargame's open-ended design. No one was supposed to know exactly how the combined real-world and virtual exercise would go. But, as with almost everything, there had been expectations. With Junod as the Red Team commander, the goal was to put the Blue Team force to the test but also validate the British Army's decade-long transformation into a technology-enhanced force. Smaller, more agile units led by extremely adaptable officers, equipped with a new generation of unmanned systems, and aided by machine learning algorithms.

But none of it turned out to be prepared for what Junod, playing the wargame with responsibilities normally reserved for general officers, had unleashed on the Blue Team during the exercise. Or, more correctly, what his ABLE AI battle-management system had done to what was supposed to be the most technologically capable force the British had ever fielded. The surprise had not just been how rapidly that unit had been defeated, but how creatively it had been torn apart.

It made sense in a certain way, thought Junod. ABLE had started as an American video gaming studio's creativity engine. Dstl's Defence Wargaming Centre hadn't even had to re-engineer it for war; it had just taught itself. All Junod had done was put the Red Team force under ABLE's command.

Junod had hoped this unorthodox move would have pleased Telley, one of the British Army's strongest advocates for innovative doctrine and investment, particularly with force structure and autonomous systems. But there were institutional guardrails that Junod had willingly crashed right through during *ULTIMATE CHALICE*. Senior officers like Telley and their allies had expended enormous professional capital to genuinely modernize and reform the British military, and against long bureaucratic odds. So when the performance by Junod and ABLE revealed how far the Ministry of Defence still had to go, it should not have been a surprise there would be a backlash.

"I can understand why there is such unhappiness about it," said Junod. "But no one can deny the results. And aren't the results what we are after?"

"It was an extraordinary performance, truly," Telley said. "But when so many of the game's rules get broken, how could I judge it as anything but a loss?"

"Sir, you can see what happened in the Operation Eager Guardian dust-up last year," said Junod. "The way they used the automata contrary to all the new doctrines? And instead we keep pushing progress, incremental improvements? That's no longer enough—"

"I know you feel that way. And that what you did was not trying to show off, despite what the generals might think," Telley said. He saw Junod shift ever so slightly in his seat at that revelation, his own surprise. "Yes, this exercise was being watched at the highest levels, and they did not like what they saw."

Then the Brigadier leaned back in his chair, and then stiffened as if posing for a portrait. "So, it is important that I better understand how this all happened, to resolve our situation."

Our situation, Junod noted. Another sip and he looked over Telley's shoulder at the greenish glare from the institutional fluorescent ceiling light that clashed with the office's clubby decor.

"The biggest concern it seems is that you abdicated your responsibilities as Task Force commander," said Telley. "What is your response to that?"

Junod believed that as Task Force Commander he—and ABLE—had free reign in the wargame to play as he saw fit. *Experimental* and *Autonomous* were in his unit's name, after all.

"You didn't bring me to be the same old red or blue. I let the ABLE system design the strategy and tactics within the parameters given to our side. And when those parameters were overly limiting in accomplishing the mission objectives, I allowed it to design its own," said Junod. "But that delegation of command was itself a command decision. That's the whole point of having AIs with this level of creativity—to get out of their way."

"Well, it was extremely unorthodox," Telley said. "Maybe illegal when you think about all the rules you broke, from the laws of war to all the civilian driverless vehicle traffic regulations."

"The old rules don't apply," replied Junod. "No, that's not correct. There are no rules anymore. At least not ones designed by humans."

Telley picked up his cup, but held off from taking a sip, as if weighing whether the taste of the tea might be spoiled by what he was going to say next.

"Well, in this case, we do have rules. I am not just talking about the exercise. Rules reflect the societies we come from. If there is any continuity in warfare it is that," Telley said carefully. "Our way of warfare is not algorithmic anarchy."

Junod raised his cup, gesturing at the world beyond the office. "Our way of warfare is ..." Then he stopped, before he said something that he might regret.

"And then there are the odd redesigns of the command-and-control arrangements," said Telley, moving on. "Tell me about this *Corporal* ..." Telley said, dragging out the rank, "Tanya Ali. Why did you put her in charge of the air-ground weapons company, despite her inexperience and apparently mismatched training as a mech hauler?"

"ABLE determined Corporal Ali had an affinity for the role."

"And how did it do that?" said Telley.

"I'm not sure. I'm not even sure it knows. Or, at least the AI can't explain it in a way a human would understand. But I trusted its greater judgment and data and you saw what happened; she was brilliant."

"Yes, perhaps, but natural ability is not something that we just deploy out in battle, without the benefit of years of training and experience that comes with a higher rank," said Telley.

"Well, what ABLE recognised in her saved our side dozens of soldiers and mechs. Zero-shot warfare, really. Sir, that's the value in ABLE's ability to take unorthodox steps, if we let it."

"But you had plenty of losses, though," said Telley. He sighed and leaned forward to lock eyes with Junod. "Let's discuss that. What on Earth made you think it okay to deliberately destroy a portion of your own force, like pawns in a chess game—"

"Generals did that in World War I all the time, sir. ABLE just ordered us to do it smartly, with an actual purpose. And sacrificing our drone squadron worked for the very reason that ABLE learned from it. Every move the AI made was also an experiment, to reassess whether that, that ... brush of paint was beginning to look like something. I don't think it knows what it's going to do move by move, until it does *something*. It's like building the proverbial airplane mid-flight, but an airplane of its own design."

"More like destroying an airplane in flight," said Telley. He then projected an image from the exercise onto the wall screen. It showed large

bat-winged drones diving erratically in groups of four and five toward a lightly fortified command post set inside a large military compound. Rather than auger-in to strike the ground or release their thermobaric rockets, the drones simply collided with one another in their small groups. The debris and wreckage arced toward the ground with the velocity of air-launched weapons but displaying such unpredictable behaviour that the command post's air-defence weapons were not able to track or engage the targets.

"I don't even know how we're going to get the budget to replace those systems it smashed together. ABLE didn't think of that, did it?"

"No, sir. It just wanted to win the battle, not the budget wars."

"I know you believe that is what the Defence Staff cares most about, but I can tell you that they will be far, far angrier when they find out your 'creative' system harvested the personal data of everyone in the exercise. And not just its opposition, but the referees too. The logs show it pulled down what books I've been reading, my wife's favourite movies ... it's just not cricket. That was truly over the line," Telley said.

"Sir, I apologise. It seems that ABLE does not understand personal privacy in the way we do," said Junod. "Perhaps its American heritage is to blame."

Telley raised his eyebrows at Junod, his sign that now was not the time for a joke.

"However, we do know why it did that," said Junod. "By pulling any and every data point it could on the humans in the exercise, ABLE was able to build cyberpsychology profiles to understand and predict the human moves, the same way it would with weather data."

"It's *unseemly.*" muttered Telley.

"That's as may be, sir, but it is no different than what the Premier League analytics boffins do."

"Our rules are not their rules," Telley said.

"But maybe they should be, sir" said Junod. "They only care about winning, damn the costs."

"We cannot do that. Pushing the boundaries is what we needed from you. But there is a point past which it's not *useful*."

"So, the lessons will not be implemented?" said Junod.

"We can't simply wake up tomorrow and clear the table because of one exercise. We will have to test and refine further. So that there are no more surprises like this again."

"Sir," Junod said, feeling the exhaustion settling him deeper into the couch. "Right now, ABLE is processing what it, no, what we did on both sides of the game. That means it will not just perform even better next time, but with far more surprises that are certain to make us uncomfortable."

"That is not the way we do it," said Telley. "I know you don't like it, but that is the reality you have to accept. And, if you can't, there is no way I can protect your career further ... from yourself."

Junod shook his head, setting his tea down on the floor at his feet so he too could lean forward and look Telley directly in the eyes.

"Sir. This isn't about me or my career. Our adversaries are so deep into our networks that they probably saw the whole thing. And, they have far fewer rules. My greatest fear is that the next time we get surprised by ABLE or some other creative AI like it, it won't be an exercise."

[CHAPTER]

06

SILENT SKIES

The future will increasingly be unmanned. Once hobbyist playthings and commercial curiosities, civilian unmanned aerial and ground systems in the form of everything from small drones to autonomous trucks are poised to fill our skies and streets. They will also operate in new ways, such as flying in self-learning, adaptable swarms.

As they grow in both the scale of number and roles, they also become threats. Depending on how they are used, the fruits of each branch of this autonomous evolutionary tree have the potential for devastating effects. Already, terrorist groups wield consumer quadcopters as grenade-dropping strike platforms that cost less than a gaming console, while criminal networks have employed drones as lookouts and delivery systems.

Pacing the threat remains a significant challenge, especially without getting in the way of the potentially significant economic and societal transformation that autonomous systems offer. New approaches will extend from unmanned traffic management software and onboard electronic identification systems to 'geo-fencing' systems that seek to limit where they can operate. The tensions between opportunity and threat, and the back and forth of innovation by attacker and defender, will be a determinant part of the story of the unmanned revolution.

PM Resolute After Drones Kill Hundreds in London

Skies Shut Across Europe as Experts Expect New Wave of Security

By Philip Shaw
July 19, 2040

SEND PING 302

LONDON — The Prime Minister pledged new security measures across the United Kingdom after thousands of deadly drones rained down on London's Soho Innovation District yesterday morning in a harrowing aerial assault that appeared initially to target the Prime Minister and, by the day's end, left over 300 people dead and more than 1,000 injured.

The worst aerial attack on London since the Blitz could be heard and seen from miles away, as writhing columns of robotic aircraft swirled across the sky for more than eight hours. Speaking from Chequers just hours after the attack ended, Prime Minister Ibrahim Bracknell said the nation would avenge those killed and injured during the day's horrific events.

'Our thoughts in this moment of loss and tragedy are with those whom we have lost. To those who have survived and are recovering in hospital beds across London, know that the entirety of the nation is at your side,' he said. 'And to those behind this atrocity, rest assured that you will never rest well again. I pledge to you and all of the world that we will find you, wherever you hide and exact the full measure of justice.'

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Raining Death and Destruction

The attack began just as Prime Minister Bracknell arrived for a speech in Soho Square Gardens to kick off the DigiGreen 2040 technology investment conference. Most of the 335 dead reported by authorities so far were killed in the attack's opening minutes.

Metropolitan Police officials said the initial wave of attacking drones concealed themselves amid early-morning delivery traffic. The first strikes dove into the crowd gathered at the conference's outdoor stage at Soho Square Gardens, as Prime Minister Bracknell was rushed back to his motorcade.

'It was like a thousand Swords of Damocles suspended overhead suddenly fell to Earth. I may never venture outside again,' Declan Wurth, a speechwriter for the PM who was at the event, wrote on his personal feed.

Moments later, London's so-called Elegant Barrier defence protocols were enacted and began to automatically divert cars, trucks, and buses out of the area while locking down building entrances to prevent drones from entering. Most of those who died were caught outside in the open, officials said, though some people were killed in traffic accidents as autonomous vehicles rushed from the area. A senior Metropolitan Police official said the measures saved 'thousands of lives.'

Following the initial attack on Soho Square Gardens, follow-on waves sortied from the rooftops of five nearby buildings. The launch platforms appear to have been emplaced atop this high ground by unwitting cargo drones during the morning's delivery runs, according to an initial Metropolitan Police analysis provided to journalists. In addition to the drones striking at the crowd, at least 25 cargo drones flew into other unmanned systems, causing debris to rain down on various sites.

After the attack, authorities declared a suspension of all aerial operations out of Heathrow and Gatwick. As the Prime Minister spoke, the skies over the capital city were empty once again, an echo of the terror-driven

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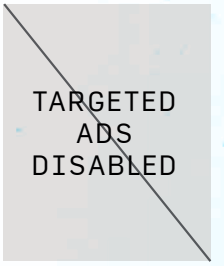

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closure of London's airspace after the attacks in the United States on September 11, 2001. Analysts have already commented that the blanket ban will be unsustainable economically for more than a week. Spokespersons for the major delivery services, share-air hire services, and quick-fly drone companies declined to comment.

Metropolitan Airspace Management (MAM), the public-private partnership that oversees the aerial economy in greater London, is still evaluating the incident, according to a spokesman. 'We share the nation's sorrow at this tragedy, and we are assisting the ongoing investigation without reservation,' the spokesman said.

Eyewitness imagery and other data analysed by this newspaper's data desk, as well as open-source analysis of Metropolitan Airspace Management data, confirm officials' accounts that the attacking swarm was made up of a mix of quick-fly attack designs, as well as commandeered cargo, share-fly, and delivery air vehicles.

Those who survived recounted a harrowing brush with death, in which chance, not preparation, made the difference between who lived and who did not.

'I felt the hair on the back of my neck go up. Something told me to run.'
Dez Pahlavi

Dez Pahlavi, a partner at a data trading firm, said the sound of the swarm was what alerted him to the threat. 'I had just been dropped off outside work, and I was a bit annoyed because I was further from my building's entrance than I'd asked. Then I felt the hair on the back of my neck go up. Something told me to run. Turned out I was right in front of the coffee shop, just a couple of steps away. I made it inside just before the security gates came down. Only then did I get the alert.'

Speaking from a hospital bed at Royal London Hospital, Frances Toons, an independent algorithm resources manager, said she did not receive a shelter order in time. 'There was an explosion above me, and I fell. I managed to crawl under the bus that I'd taken to work, and that saved my life.'

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Missing the Threat

Why MAM and the Elegant Barrier defences missed an attack of this scale is so far unclear, especially given that this has been a longstanding concern among defence and security officials. A Scotland Yard counterterrorism source noted that similar weapons and targeting systems have been used in conflict zones including Syria and Iraq for well over 20 years.

The detection systems currently deployed in and around London rely mainly on real-time visual imagery, scanning for unusual electronic signals, and short-range radars. The main challenge, according to experts, is the large volume of commercial drone traffic in urban areas that can be used to conceal threats. 'Finding weaponised small drones in a city such as London is like looking for a needle in a haystack during a hurricane,' said Martin Schull, an adjunct fellow at the Royal United Services Institute in London and a former Royal Air Force pilot.

While no group has claimed responsibility, a counter-terrorism source said there are numerous domestic and foreign groups who could be behind the attacks. 'London is always a target,' the source said. 'Targeting the PM, however, with a decapitation strike is akin to an act of war.'

An analysis by Scotland Yard of the algorithms used by the attacking drones did not register the flight behaviour in any current databases. 'It's likely a fresh software build, probably machine-made,' the source said, noting it will therefore be extremely difficult to attribute the code to its creator.

Open-source intelligence analysts have reported that the incident was reminiscent of previous attacks in Paris in 2030, Manila in 2031, and Seattle in 2029 that prompted London security officials to introduce the Elegant Barrier security programme.

A major challenge for MAM is that the scale of commercial drone use requires heavy automation by both the drone-flight operators as well as air-traffic

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management. MAM's air-traffic management system should be able to immediately detect any anomalies, but that did not occur until after the attack had begun. 'The shelter protocols weren't enacted fast enough,' said Schull. 'If some of the attacking drones were deemed not to be a threat, that error could have scaled throughout MAM's systems to apply to hundreds of the weapons. So, by the time this classification error was caught, it was too late.'

This attack represented a far larger operation in terms of technical sophistication and ambition than past threats, which may have contributed to the delayed response.

'This eclipses anything we've seen before in terms of scope and sophistication,' said Dr. Shannon Rye, a senior lecturer in the War Studies Department at King's College London. Dr. Rye said she understands the desire to make British cities safer, but she expects it will be difficult to balance those compromises with the rewards that aerial drone deliveries and other autonomous systems offer. 'Civilian targets remain soft targets because making our cities truly safe would destroy the conveniences and openness that our modern society—and economy—depend upon.'

Even so, stricter measures are temporarily in place not just in the UK, but in Europe. Security officials across the continent halted commercial and private aerial and ground drone activity within an hour of the attack.

In the United States, the Department of Homeland Security put the nation on 'red' status, which requires intensive verification of autonomous transit and commercial activity. The US Federal Aviation Administration halted all air travel to the UK and indicated a blanket ban pausing travel to Europe is in the works, as well. A White House spokesman said the US president has offered the Prime Minister 'our solidarity and whatever support the British people require.'

No changes are expected to the already strict aerial economy regulations in Japan and China.

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The global economic impact is yet to be tallied, but it is expected to reach into the trillions of dollars. A HM Treasury spokesman declined to comment on the economic impact of the attacks.

RECOMMENDED ARTICLE

PM Eyes MAM Takeover, 'Kill Switch' Policy

By Philip Shaw
July 19, 2040

SEND PING

302

LONDON — A Home Office security official said the Prime Minister will go to Parliament later this week with a variety of more stringent security measures to prevent future attacks, from enhanced surveillance to backdoors allowing authorities rapid takeover of any systems deviating from expected flight paths. Another proposed step will be to turn MAM management over to the Ministry of Defence. MAM will be integrated into the national air-defence system and undergo tougher oversight. A Royal Air Force officer is expected to be appointed by the PM for the role of MAM director, the source said. Industry input into MAM regulations and their enforcement will end, leaving regulation solely in the hands of the MoD, the source said.

It is expected that these proposals will be contentious, with industry bodies already lining up in opposition. A source close to the Prime Minister says he welcomes the debate.

'There is no going back to the way things were,' said the source. 'They came after the nation and him personally. Everything is different now.'

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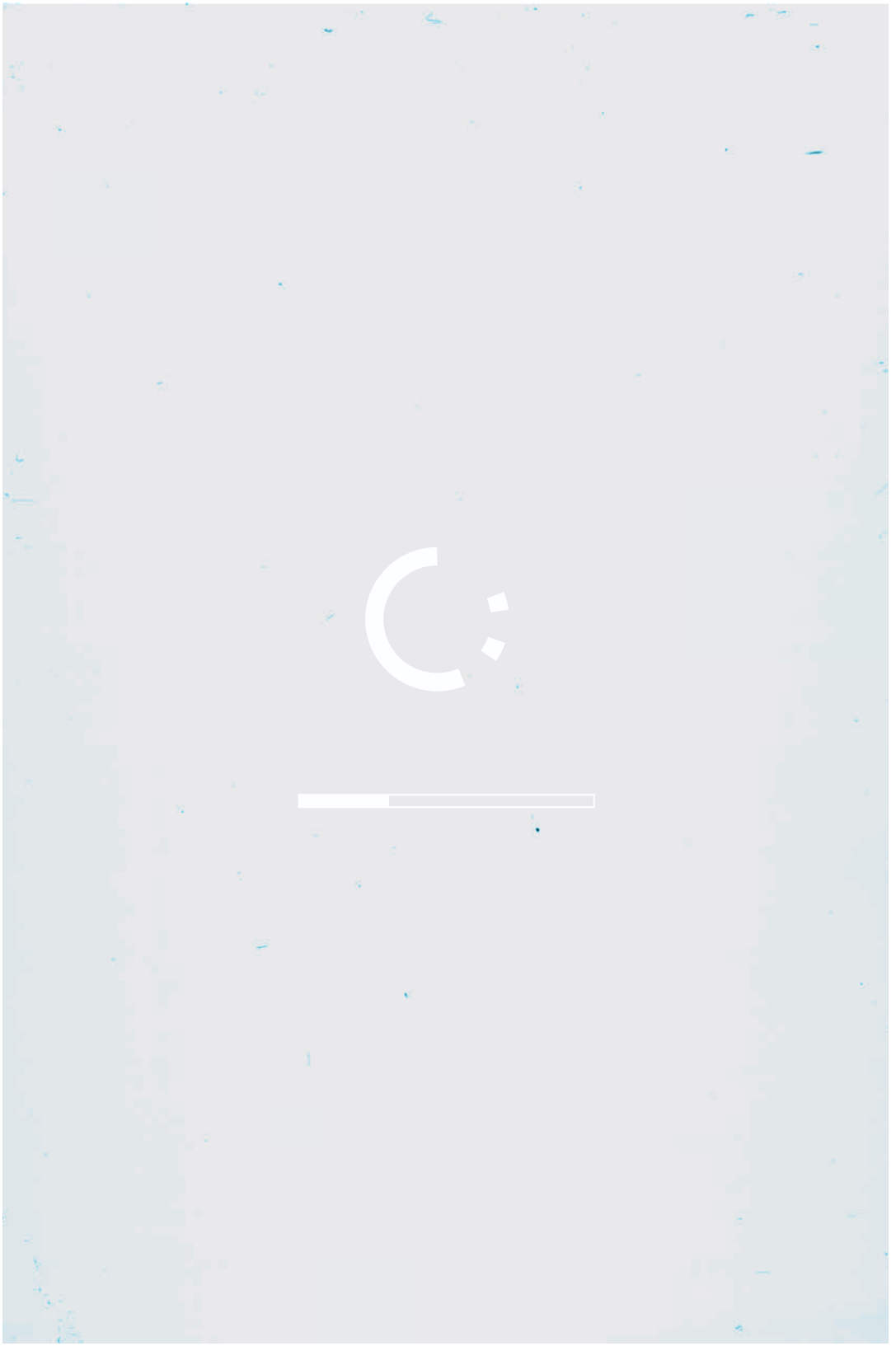


[CHAPTER]

07

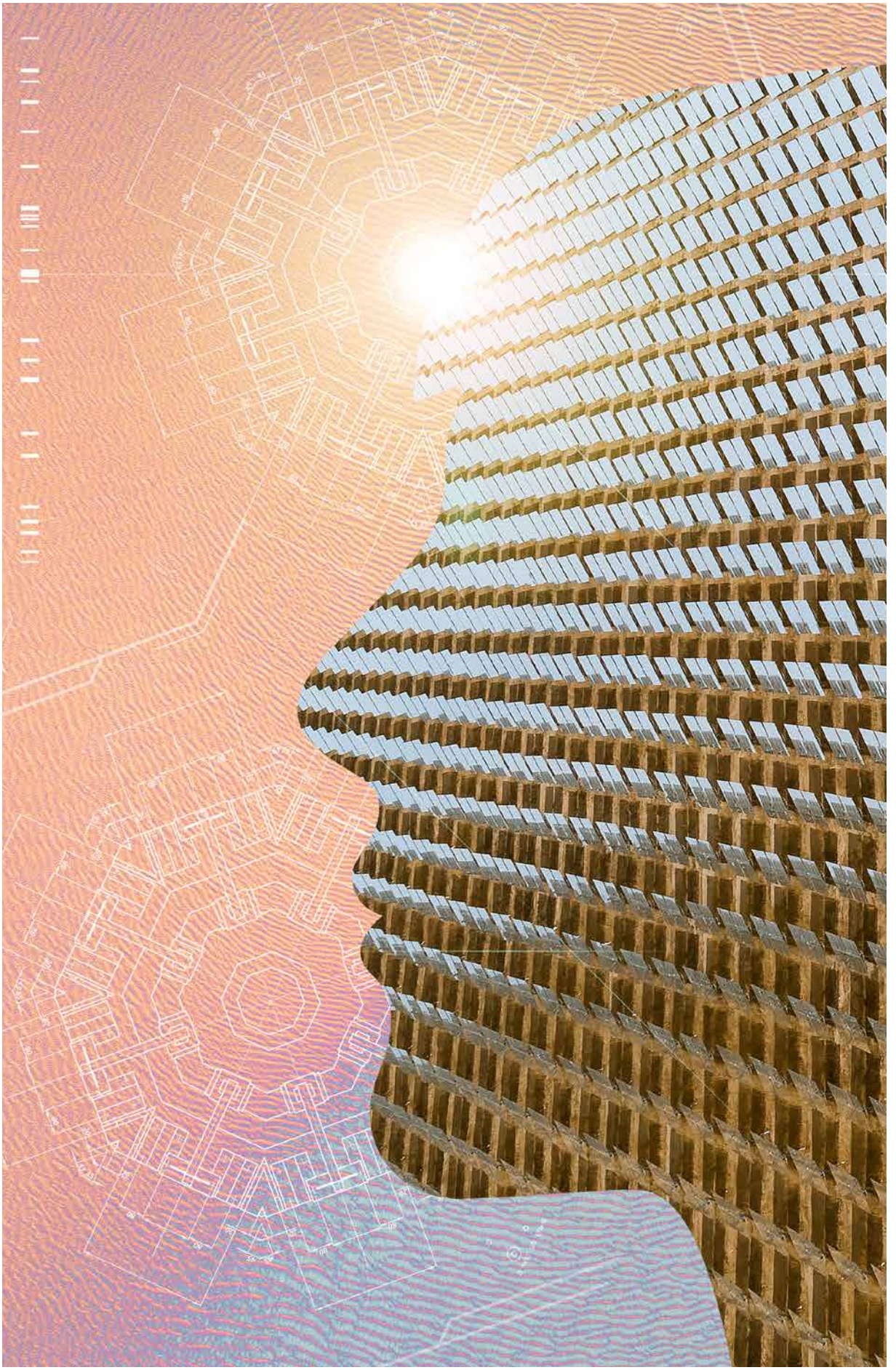
GREEN WARS

With the move from natural resources such as wind and animal power to coal, and then to oil-fuelled factories and transportation, shifts in energy sources have always been transformative for the economy, society, and warfare. What powers the world, and who uses and controls it, has both reshaped the dominant technologies of the day and reordered the most valuable regions of the world. It has also literally changed the climate of our globe.

At the very same moment a movement towards a net-zero world of carbon dioxide emissions is growing, there have been major developments in possible new technologies to empower our world. These include 'green' hydrogen, alternatives to the internal combustion engine—in the form of solid-state batteries that could even be 3D printed into novel and useful shapes—fuel cells and supercapacitors, energy harvesting devices, and even biological sources, such as microbial fuel cells.

The key is not just the technology itself, but developments in new materials, structures, and markets to make them economically viable. Likewise there are important potential shifts in how that energy is collected, stored, and transmitted. These include new energy-management systems of ever-smarter power grids and microgrids, and even new approaches like SWIPT (Simultaneous Wireless Information and Power Transfer) that transmit power via far-field electromagnetic radiation.

The shift from fossil fuels to renewable energy will entail a significant shift in not just supply, but the entire design economy of energy. It will require new equipment, machinery, and vehicles (at sea, on land, and in air and space), as well as new markets; perhaps treating packets of energy in a similar way to data packets moving across the internet. In this way, it will likely drive significant local and geopolitical shifts and turmoil, akin to the benefits of and battles over oil in the last century.



Obituary

‘Green Wars’ Shadow Warrior Dead at 39 Years Old

Colleen Bell was emblematic of the change of the last decades

Oct 30, 2040

‘The right person at the right time, that she was.’

That is how a former British Army staff sergeant described retired Major Colleen Bell, OBE, killed yesterday in an e-bike accident in Dorset.

Though Bell was many things—a pioneering unconventional warrior, a noted author, and a thinker—she ultimately left her mark as an icon of the new-energy age.

Born in Bovington, she began her military career after graduating from Jesus College, Oxford. It was while reading Geography that she first connected to the issues that would shape her career, and she, in turn, would employ to shape her own life. After Super Typhoon Lupita left a swath of devastation from Hanoi to Hong Kong and Taiwan, killing millions and ultimately leading to the Global Zero Accords, Bell undertook a summer internship with an international relief organization. She soon found herself working in a refugee camp in the storm-ravaged Central Business District of Hong Kong.

CONTINUED ON NEXT SCREEN

In her bestselling memoir/manifesto, *The Change of Power*, Bell wrote that she found it 'freeing to be focused on a singular mission to help others help themselves, to the exclusion of everything else—even one's own wellbeing.' She also witnessed there the first large-scale experimental use of the now widespread SWIPT (Simultaneous Wireless Information and Power Transfer) technology. With much of the local power infrastructure destroyed, an ad-hoc network of solar energy collectors and beamed electromagnetic radiation carried electricity the final miles to the refugee camp. It was during her time in the camp, Bell wrote, that she had her first taste of the 'inherent relationship between energy, power, and violence.' She wrote of seeing her first mass grave, describing it as a symptom of the exacerbating impact that extreme weather would have on the sorts of simmering civil conflicts that she would later be immersed in as a soldier.

Returning to university, Bell was transformed. She remained an active member of the Oxford Union and rowed for her college. Yet, to her pursuits, she added organising coalitions among the student population to pressure the university to commit to ethical sourcing of the rare earth minerals used in its solar power and hydrogen fuel-cell systems. She succeeded after a 5,000-strong march drew students from across the region, the sight of which caused one displeased New College tutor to quip, 'It's like a medieval siege.'

Bell's father was a well-known financial journalist and viz commentator, and her mother was a commodities trader who split her time between New York and London. Years of accompanying her mother on far-flung business research trips, and rock climbing and mountain biking abroad with her father, left Bell with a keen eye for international economics and an insatiable appetite to be out in the world's more exciting corners. Bell would credit, though, reading her grandfather's Gulf War diaries as shaping her decision after university to 'enter the coming fray' and join the British

Army. 'It was the last thing anybody expected Coll to do,' her mother said. 'Which is why she did it. If I'd said, "At least become an officer," I'm sure she would have joined as a private soldier, just to spite me.'

At mid-2020s Sandhurst, Bell stood out immediately, regularly challenging her senior officer instructors to focus more on the strategic and tactical aspects that would come from the new technologies and economics of a world in transition. 'Strategy from the Steam Age is nothing more than hot air,' she wrote on her feed at the time, which later became the basis of an influential military journal article that won her renown while still a cadet. 'Marie [von Clausewitz] must be rolling in her grave that we remain unwilling to see the profound power changes that surround us.'

As would be a repeated pattern, the young Bell was controversial, but prescient. Her TED-X talk went viral and even garnered her an invitation to brief the Defence Minister. In it, she connected the disruptive implications of new energy technologies like hydrogen and solid-state batteries with the opening skirmishes within the post-petroleum societies in the Middle East and West Africa, as regimes struggled with the imminent loss of their main sources of revenue. The roughly drawn frontlines of the scramble for rare earths in the Asia Pacific would follow soon after. The ensuing period of global conflict that came to be called the 'Green Wars' seems inevitable in hindsight, but at the time a military instructor condescended to Bell she was 'too distractable.'

Bell would leave the public eye after graduation, joining 2 Rifles as a lieutenant. Her first trial by fire was in the Middle East during the turmoil of the late 2020s, when the oil- and natural gas-based political economies of the old regimes proved unsustainable in the new energy order. Into this chaos, Bell deployed as part of the support mission to the 'free zone' that built up around the massive solar farms being established in newly

independent territories. She led small-unit patrols protecting these new sites in the region's emerging clean energy network, which had become a lifeline for more moderate tribes fleeing the regional disorder. Bell quickly proved her mettle at both soldiering and languages. By her fifth month, she no longer needed an interpreter for Arabic, which won her the trust of the local fighters.

It was here that Bell also developed the concept for what would later become her iconic look. The desert heat, worsened by accelerating global warming, was brutal and overwhelmed the air con in her unit's armoured vehicles. Bell shaved her head, except for a thin ponytail that she kept in a braid. Confident in her practical approach, she wrote a memo on the need for better kit that combined traditional local desert wear with the fast-cooling properties of the high-tech racing suits worn by Olympic swimmers that mimicked snakeskin. This fusion of form would later be adopted as standard for a warmer world, but at the time was rejected as too unsoldierly.

Bell's studied but seemingly cavalier approach to tradition did not sit well with her superiors, and they let her know that she was pushing the 'unconventional' in unconventional warfare too far. It was then that she nearly left government service, but the opportunities offered by the re-established Special Operations Executive caught her attention.

Whereas the original World War II organization had been formed to 'set Europe ablaze,' the newly formed SOE's mandate was to wage unconventional warfare in a world already ablaze, both literally and figuratively. Its environment of innovation and bottom-up experimentation is where Bell went from officer to legend.

The SOE was part of the not-so-hidden conflict between the old and new energy powers that raged around the world over the next decades,

expressing itself in everything from civil wars to coups to gambits for new resources, and even votes in the UN on upcoming carbon capture treaties. Much of Bell's early role remains classified, but what is known indicates she quickly established the trust of both her SOE superiors and local forces wherever she went.

When a consortium of private military contractors (PMCs) funded by an oil firm sought to tip the balance of power during the Nigerian civil war, Bell was part of the covert force that deployed in response. Using newly introduced fuel-cell-powered motorcycles and energy harvesting systems to 'live off the land' on multi-month overland missions, Bell finally found the autonomy she had long sought. Identifying the vulnerability of an adversary still reliant on traditional energy transportation networks, the SOE team that she led exacted tens of billions of dollars' worth of losses from the PMCs' sponsoring firm. Her small unit drove down both the firm's share price and carbon output, ultimately leading the corporate board to conclude it was more profitable to throw its weight behind the emerging energy packet market.

Bell readily advanced the SOE's mantra of being the pathfinder for a new way of warfare, more suited to a world in which all the rules of economics, politics, and warfare had been rubbished. A prototypical example was her sabotage of the Baku power hub during the Azeri ghost war, tricking the regime's AI management system into a surge that shorted out a key node in the area's air-defence network. Yet, she was careful to balance technical acumen with a human understanding. While many in Western militaries remained focused on weapons with ever-greater precision or information warfare algorithms that promised to change an entire nation's bellicosity to docility at the push of a button, Bell sought to be as close as possible to the people who were most vulnerable to the changes altering the world around them.

The actual issue at hand, she would later argue in her book, was not the predations of greedy dictators or displacement by increasingly dangerous weather events. It was the need to show respect and deference to those rightfully asserting their place in a world being reordered after more than a century of fossil-fuel paradigms. 'The most important weapon we have in unconventional warfare is actually listening to what our partners are saying,' she wrote in her journal after her second deployment to West Africa.

This attitude, and a willingness to always lead from the front, won Bell immense loyalty among those who served with her. 'I would follow her to the ends of the Earth,' described Staff Sergeant Gerald Hightower, who served with Bell on multiple deployments. 'In fact, I did.'

While Bell's tactics were becoming renowned inside military circles, the deployment to Indonesia made her a global icon. Bell's unit formed part of the advance force sent in ahead of the United Nations mission to ensure an unfettered supply of rare earth minerals necessary for the new generation of batteries crucial to meeting the UN's decarbonising global mandate. A coup in Indonesia, discreetly backed by a Chinese tech firm, jeopardized the entire global gambit to reach a net-zero world. The world's leading nations—and their respective de-carbonization industries—could not tolerate such a stranglehold on even a sliver of the world's new energy sources.

However, the intervention had echoes of a past era's colonialism. Recognising the need to reshape the narrative, a reporter was embedded in Bell's detachment. Critics would later accuse Bell of glory-hunting, but the record shows that she objected to the assignment in multiple strident memos to her superiors.

As they conducted a weeks-long campaign of reconnaissance and sabotage, Bell's commandos engaged in a game of cat-and-mouse with numerically superior regime forces, all the while beaming out live augmented-reality vizfeed of their exploits in yet another operational innovation. The striking Bell, replete in her ponytail and attire, had the look of a super-heroine come to life. She built up a legion of online fans from afar. Recognising the potential, UN information operations began to highlight the exploits of the 'The Guerrilla Gaia.' Her attack on the regime's Jakarta drone maintenance facility, which disabled their operations right before the invasion, came in seventh in global live views that year, just behind the semi-finals of the World Cup.

The invasion succeeded, in no small part due to the efforts of Bell's force. But the global attention that her role garnered did not sit well. 'The theatre of it all sickens me,' she messaged a friend at the time. It would be her last deployment with SOE.

Bell spent the remainder of her career lecturing at Sandhurst. It might have been a tepid finish, but she discreetly used the time to write what many consider the definitive work of the era.

A mix of geopolitical and economic history, environmental manifesto, and personal reflection, *The Change of Power* masterfully wove hard-earned lessons of service with insights of those she served alongside from cultures around the world. 'A cogent and inspiring tale for our time,' noted the *Financial Times*. It was an instant bestseller and translated into 18 languages.

Bell was reportedly working on a second book, when she died after an e-bike crash while riding with friends. Her story had been told, but there was apparently much more to tell.

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[CHAPTER]

08

THE SOLSTICE CUP

HUMAN ENHANCEMENT

In the 20th century, advances in computer software and processing power created new possibilities and dilemmas in realms that ranged from warfare to the economy. In the 21st century, breakthroughs in the biological realm, fuelled by that same revolution, will likely be just as profound or even more so when it comes to altering the historic limits of human potential and cognition. The resultant possible applications and attendant perils, including moral, legal, and political ramifications, will have significant implications for the future of conflict. Human performance enhancement will play out in various forms, some as incremental gains, some as massive leaps beyond the limits of Homo sapiens "natural" potential. But the sum total will alter everything from small-unit tactics to selection and training to the larger vision of how an entire society prepares for and engages in warfare.

Making the issue more complex is that there will be no single pathway in the enhancement themselves, nor of the visions of what is allowable or not. Some nations will seek to develop this edge asymmetrically, perhaps casting aside ethics for strategic or tactical expediency. This will leave other countries and their armed forces to decide whether they will follow with their own breakthrough nanopharmaceuticals, enhanced situational awareness through technology enhanced neuroception, and other advances—or draw an uncrossable line. There will also be a likely division between the public and private sectors. In some aspects and nations, armed forces will be the pace setters. In others, the private sector will lead societies toward new paradigms of human physical and mental performance. In turn, this portends wildly significant disparities in capital investment in biological breakthroughs and their attendant social changes. The one certainty is that the gradual evolution of human potential, that once played out over literally hundreds of thousands of years, will drastically change in our lifetimes.

THE PROJECTILE SKITTERED ACROSS THE ICE, LEAVING A MATTE SILVER SLASH IN THE GLITTERING SURFACE.

« INCOMING! GET MOVING, CHIP! »
Captain Kumar messaged with a subvocal command.

The digital text appeared instantaneously on Chip's contact lenses via his Integrated Neuroception Situational Awareness System (INSAS). Known among the unit as "the buzz box," it was a skinsuit-like human-machine interface system that converged all manner of external data about the nearby physical and digital world with body-worn sensors that measured an entire squad's worth of soldiers' micro-movements and neurological activity around fight-or-flight responses. Put another way, your mate might wordlessly slide you a pint across the bar and you would reach out to snatch the glass without a glance.

« AFFIRMATIVE »
Chip, a Colour Sergeant in Bravo troop of the British Army's Advanced Performance Force, soldiers colloquially known as Perfs, messaged back.

It was needless. Chip was already moving across the Antarctic ice at nearly 30 mph, a speed that would have won him an Olympic medal just a generation ago. But the enhancements made his gait look more like the skips and bounds of a long jumper than the high cadence of a sprinter on a track.

« RUSSIANS SEEM TO BE SHIFTING FROM SWARMING OFFENCE TO BREAKTHROUGH AT YOUR SECTOR, THEY'RE TAKING THE FIGHT TO YOU »

« AFFIRMATIVE »
Chip messaged back.

A smile broke across Chip's face as he felt the surge-like sensation from the pump attached at his hip kicking in with a cocktail of modafinil- and tramadol-like synthetic drugs. It wasn't the drugs directly, though, he was used to that. It was that really getting his blood pumping was something he didn't get to do as often as he liked. That was the worst about Antarctic ops. You had to stay moving to stay warm but never enough so that you ended up soaked with sweat that could freeze.

A moment later, Captain Kumar, pulsed another update to Chip via their INSAS gear.

« HEAD'S UP, THEY'RE BRACKETING YOU »
Kumar messaged, still trying to steer him from afar. That was the drug the commanders got addicted to, this ability to not just see but understand what a soldier was experiencing and feeling. It was like being a coach who was also on the pitch among them.

« AFFIRMATIVE »
Chip messaged back, hoping the continued curt replies would send the real message that Captain Kumar needed to hear: He didn't need to be puppeted right now from someone not actually on the field.

Chip took a deep breath, his lungs filling in spaces that most never even used and then processing the oxygen into energy at the efficiency of the most doped-up Tour de France rider.

Still moving at speed, he looked over his right shoulder to see a Russian soldier bearing down on him. The smile on Chip's face quickly fell away, and he gritted his teeth. Somehow that bloody puppet was keeping pace—and moving even faster now. It confirmed the intel that the Spetsnaz had many of the same capabilities as his unit, and maybe even more. Had they engineered their own? Or had they just hacked into the MoD programme files years back and got a head start for free?

Chip pushed that thought aside as he saw the steam rising in great clouds as the Russian exhaled mightily. Maybe they didn't have the same endurance upgrade? It would be a close one.

« WATCH THE APPROACH ON YOUR LEFT >>
Kumar messaged.

Chip didn't bother to reply, instead girding himself for what would come next. He knew the pain-buffers would take away the worst of it, but the decision had been made years back that no mod should eliminate all pain. They had reasoned that the pain would help keep Chip and the rest of the APF Bravo troop tethered to their humanity. He got the moral reasoning of that, but it was the kind of decision that the politicians and philosophers on some advisory board didn't have to live with.

The Russian came closer into his view, almost even with him. Chip noted the black sensor studs in his brow, glad that his own MoD cared a bit more about aesthetics.

With one last burst of speed, the Russian Spets-mod, as their modified Spetsnaz troopers were called, reached the target just ahead of Chip. So, in a microsecond, Chip lashed out with his right leg in a sweeping motion. The Russian, easily two or three stone heavier, went down, and both went sprawling in a spray of white. As Chip tasted blood and he heard the projectile strike the target. For all those hundreds of millions of pounds spent on pushing past his old human limits, he'd still failed when it mattered most.

"GOOO AAAAAA LLLLLLLL!!!!!"

Chip got to his knees, the voice bellowing from just behind him, rubbing it in.

It was the other Russian, celebrating in the universal language of football triumph.

A day ago, the two sides had been squared off in dug-in fighting positions. The match had started as a taunt, a football booted from one frozen trench to the other side of the battlefield's dividing line, showing off just how far a Perf could punt it. Think of it as psychological warfare, or just the hijinks that bored soldiers got into after three months of watching each other, as they stood guard over the disputed rare mineral fields kilometres below them.

Then the other side had booted it back, showing off that two could play that game. And then had come the insults and gibes, first verbal then subvocal, via their respective neuroception systems. And from that came

what they called The Solstice Cup. The match would require a brief cessation of hostilities for the sole purpose of determining who were the true football champions of the bottom of the world.

« THE KING WILL NOT BE PLEASED »
Captain Kumar messaged.
« YOU'RE A GREAT SOLDIER, CHIP, BUT A RUBBISH KEEPER »

« DO ONE »
Chip shot back, as he went to retrieve the ball.

He looked over to see Kumar and the Russian Major commanding his detachment standing on the sidelines sharing cups of tea. Captain Kumar was a decent enough officer. The Russian was noticeably smaller than his hulking troops, meaning he was likely unmodded too, or maybe only on the cognitive side for control purposes.

In a certain way, the two officers had more in common than they did with the eleven men they had both sent onto the agreed upon 250m x 170m pitch, double the World Cup dimensions.

As Chip sprinted after the ball, still rolling from the Russian's booming kick, a haptic pulse shot a shiver up his spine, a digital warning from the body suit he wore next to his skin that tapped into his body's natural messaging system. A moment later his contact lenses visually framed the threat as an orange rectangle. It was a patch of thin ice detected by his nav mods. Mapping software and sensor fusion with his INSAS gave him a natural sense of exactly where he was on the Antarctic ice, and where its myriad dangers might be. With closed eyes, he could patrol from waypoint to waypoint or in a whiteout guide a ski train around crevasses without revealing any electronic signature at all.

Chip slid in a sideways stance like a snowboarder, skidding to a stop.

He caught his breath and considered his options to rescue the ball now coming to a halt in a crevice of less than inch thick ice. In many ways, it was the most novel piece of technology within 300 miles. While the rest of them all had the various government issued modifications planned out over decades of research, Corporal Green, the troop's medic,

had made the ball using hemo-pack patches, a foot-long needle that otherwise would have saved somebody with a collapsed lung, and a bottle of pure oxygen to pump it up.

Staring at the no-go zone around the ball, Chip considered what his best move might be. A moment later a medium-sized Russian quadcopter zipped overhead. Chip was just about to sprint to cover, when he realized what they were doing.

The Russian CLOVER drone pirouetted around the ball, blowing it back toward him by using the tiny storm created by its lift fans.

As Chip recovered the ball and trotted back to the pitch, he looked at the digital clock timing down in the corner of his eye. They had three minutes left in the match, before the satellite coverage brought them back into view of their headquarters.

He didn't need a display to mark the score. It was now 3-3. While politically they should leave it a tie, personally and professionally, he couldn't accept that.

Crossing the field's imaginary border laid out in his contact lens display, Chip hurled the ball to the centre of the makeshift pitch and crouched ready for the game to begin again.

« YOU ARE VERY SLOW. NEED RUSSIAN MODS »
said the Russian commando defending the opposite goal. He communicated with their Arcwave commercial antennae, which they used for widecasting local messages beyond the troop or onto open networks. The message came through in Cyrillic, but Chip's INSAS feed translated it a moment later.

« MATE, WE GOT STUFF WE HAVEN'T EVEN SHOWN OFF YET »
responded Chip.

The end of the match went even faster, the two sides no longer feeling each other out, naturally staying near their trenches in case the other side proved untrustworthy. Now it was all about the win.

Or was it?

Chip watched as the British left wing back burst forward with the ball, threading between two Russians, who then collided into one another with the sudden brutality of a car crash. Without any referee blowing a whistle, the game stopped and the soldiers of the two sides rushed to make sure they were okay. It was the British winger, who had eschewed the open goal, who helped one of the Russians up.

Chip wondered what his superiors would make of all of it, if they could have seen it.

"Superiors." What a funny word, he thought. Who was the superior, really? Here, on the pitch and in the midst of this conflict, Chip's Perfs and the Russian Spets-mods were equals, for perhaps the only time in his life he would experience that outside of the unit. The thought made his stomach knot.

« STILL WITH US, CHIP? SEEMS YOU'RE DRIFTING A BIT. NEED CENTERING? »
Green, the medic, messaged.

« LEVEL SET »
messaged Chip.

Chip leaned forward at the ready as the game resumed. He clapped his hands together to keep them warm. For all the investment and progress in human performance modification, the geeks still could not figure out how to make a decent cold-weather glove.

The two midfielders moved carefully around each other as the Russian commando, designated as RU421 in Chip's display, tried to take the ball away from Banks, the most junior enlisted soldier on the British side. As time clicked down, the play became refined and deliberate, like watching ballet, and not the argie bargie of a Premier League match.

« THAT'S THE GAME. RALLY ON ME »
Kumar messaged.

A tie it was then. Disappointing, but maybe better that neither side left truly disappointed.

The players began to trot back to their respective trenches.

A pair of Russians, though, came over to Chip, one pulling a thermos out of his anorak's pouch and the other drew out a pair of roughly hewn metal cups.

« BEFORE WE GO, WE CELEBRATE TOGETHER, COMRADES »
messaged one.

« WE MAKE IT HERE. ICE VODKA »
messaged the other, as he poured clear liquid into one of the cups. It looked to be made out of a large-calibre shell casing, maybe from a Udar-6's main turret gun.

Green messaged Chip,
« I CAN TELL YOU'RE ABOUT TO ASK ME IF THAT'S SAFE TO DRINK. AND YOU KNOW WHAT I WILL SAY ALREADY, RIGHT? »

« ONLY WAY TO KNOW IS TO TRY IT AND SEE WHAT HAPPENS. STORY OF MY LIFE IN THE PERFS »
Chip said.

Chip took the cup and toasted the Russians.

"Cheers!"

"Za zda-ró-vye!'" they replied, as the INSAS system translated it.
« "TO YOUR HEALTH!" »

The Russian soldiers each downed the vodka with a smile and then raised their glasses. Chip watched them get a far-away look as they stared at one another, then turned on their heels at the same time before trotting off, footsteps in sync, toward their commanding officer.

The vodka tasted far sweeter than he expected. Either that was antifreeze or the Spetsnaz had figured out some kind of genius still.

Chip watched the Russians on the field, noticing how they seemed almost chipper. Meanwhile, his hip hurt and when he took a breath his ribs

ached. With this match a draw, Chip wondered if they were sandbagging or maybe they had the pain mods that his own side had eschewed? Or was it something more. The Russians certainly were outright faster in their sprinting. As for endurance, it was hard to tell.

He wanted to think that as soldiers squaring off at the bottom of the world, thousands of miles from their commanders, they were more alike than not. A shared humanity would be how a prior generation described it. But was that accurate anymore? Had the Russians broken through with Brain Computer Interface technology or were they aggressively advancing with epigenetic engineering than they wanted to let on?

Chip couldn't say for certain, he knew, but he would raise it when his squad would inevitably have to debrief with the higher ups on this escapade. But he had a gut feeling that something was different with the Russians, the kind of intuition that not even his INSAS system could pick up.

At least not yet.

DEFENCE MINISTER

Attached please see the image provided to me by the President at our recent summit. It is from a new Cube Sat that they had overhead Antarctica. It is apparently of some new stealthy design, and thus was operating unbeknownst to any NATO military unit in the area. I shared my deep upset with our friends' failure to be forthcoming about their latest capabilities, but that is a matter for another exchange.

I'm sure you share my concern about the implications of what the satellite detected. It is not just what would happen if this imagery ever got out. By tomorrow, I want a list of measures we can take to modify the perf soldier settings, parameters,and inputs. We have to ensure that something like this NEVER occurs again. We should have won the match!

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