VISIONS OF WARFARE
2036

EDITED BY //

69876543546 **TRINA MARIE PHILLIPS + AUGUST COLE**

ALLIED COMMAND TRANSFORMATION

SCI FUTURES

VISIONS OF WARFARE: 2036

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THIS anthology of stories was developed as a proof of concept that futurist prototyping would be a useful tool to advance our thinking around the future.

Many inventions and innovations were described in stories many years before they became a reality. Advanced submarines, flying to the moon, flip phones, iPads and the Internet itself were foretold decades before the underlying scientific challenges were solved. That futurist literature informs or inspires product design has become an established practice. The foundational hypothesis for this project is that leveraging the rich tradition of futurist storytelling will assist innovative and transformational thinking. I hope that the broader and imaginative ideas provided here can be assessed by those at the cutting edge of technology delivery and conceptual thinking and will be useful in postulating possible future evolutions of technology and the environments enabled by them.

SciFutures brought together a group of talented futurist authors and gave them a profile of the future developed from Allied Command Transformation's broad library of futures work including the Strategic Foresight Analysis, Framework for Future Alliance Operations, Technology Trends Survey and Long Term Aspects of requirements. With this profile in mind, but unbounded by military strictures or the subliminal requirement to be "realistic", the authors began a journey of envisioning the future, and exploring and imagining how technology and trends could affect future operations. This anthology is the result of that journey.

These stories will incite inventive thinking and discussion about future possibilities and add to the toolbox that the Alliance military and others can

leverage to imagine and contemplate how NATO will undertake operations in the coming decades. Insights ranging from human enhancement to advanced weaponry, robotics, artificial intelligence and atypical soldiers will enlighten and colour how we think about future military engagements, and inform new iterations of intellectual thought on long-term military transformation within Allied Command Transformation.

This project has literally taken on the challenge levied by Sergey Brin, one of the founders of Google, who said, "If what we are doing is not seen by some people as science fiction, it's probably not transformative enough." Allied Command Transformation offers this anthology to provoke a rich debate on the future. I hope that you enjoy reading these stories and I encourage you to engage actively in coming discussions.

JEFFREY LOFGREN
LIEUTENANT GENERAL UNITED STATES AIR FORCE
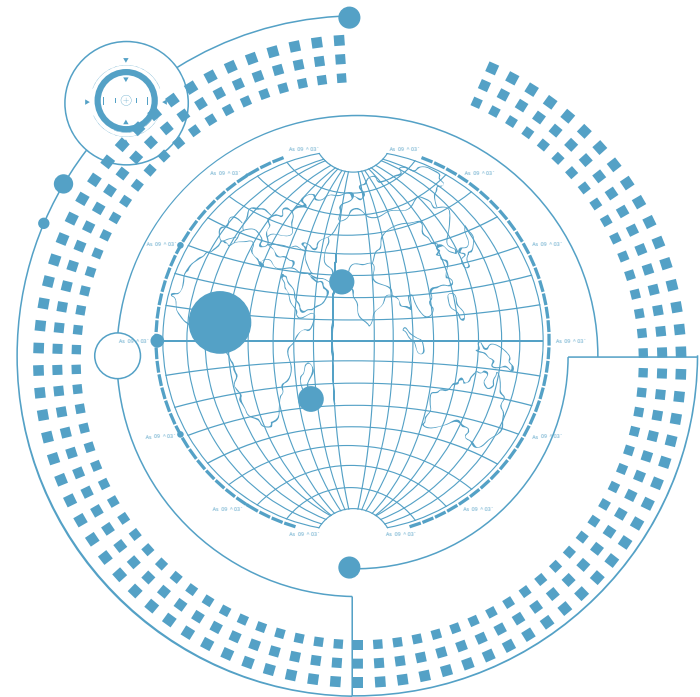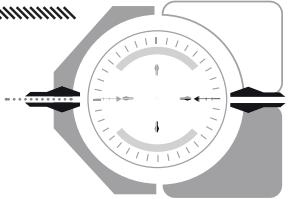DEPUTY CHIEF OF STAFF CAPABILITY DEVELOPMENT

SKYFALL

01.

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HIGHLY EFFECTIVE DRONES PROTECTING A DAM IN
KYRGYZSTAN ARE DEFEATED WHEN UZBEKI FORCES
CRASH CIVILIAN SATELLITES INTO MILITARY ONES

THE sky fell in January.

Bernardo watched from the banks of the Toktogul Reservoir. Satellites exploded in the night sky, colliding and fracturing against the force shields of

the military sats. The disaster was distant, soundless, and, Bernardo conceded, beautiful. He felt the rush of panic all the same, sitting in the dirt alone under the sky in Kyrgyzstan. By now, a third of the communications relays covering Central Asia were gone, the rest had been forced out of position or were otherwise missing. No more encrypted signals. No more GPS. And somewhere beyond the dam, his beautiful Patroller drones were flying blind.

Rather than raging angrily above the approaching forces, the Patroller quad-copters flew a racetrack pattern above the reservoir in a V formation like so many geese seeking better climes. This was their default if they lost their satellite relay and their GPS signal; without it they had no way to navigate back home other than to follow the laser beacon that Bernardo held in his hand.

Except the batteries were dead. To make matters worse, his comms kept pinging him to respond.

Before he did, he took a long draw from a dusty bottle of vodka. "I don't want to talk to you," Bernardo said.

"In a few more minutes, you won't have to," replied a voice through the earpiece. It was Col. Mancini, the Italian watch officer back at the task force command post. "The Uzbeks have almost breached the perimeter. Can't you think of anything?"

"Isn't it beautiful though?" said Bernardo. "From the start to the end." The Spanish engineer's work was indeed remarkable for his blending of evolutionary algorithms and multi-layered authentication measures created a technological marvel. The drones, here as part of a NATO environmental stability task force, were the perfect guardians for the endangered water supply. With the linkage between climate change and security clear, such natural resources took on new strategic value in the region.

The Patroller drones recognized friend from foe and were completely autonomous in their sentry-like duties, flying their routes, returning for maintenance and charging all on their own. Only a pair of operators was needed to monitor them in case hostile action was required, which the drones could also accomplish.

Gunfire blazed beyond the dam, but he was used to that. Then a mortar explosion nearby made him jump to his feet and spill his vodka. He cursed, more at the spilled vodka than at the prospect of the fighting closing in. He just didn't care anymore. Soldiers ran and shouted orders, preparing to defend the water that his drones could not. There were so few untainted reservoirs in this part of the world. Damn nanobots. They were supposed to clear out pollution; instead they'd become pollutants themselves. Science was a wondrous thing – except when it wasn't.

> THEY WERE SUPPOSED TO CLEAR OUT POLLUTION; INSTEAD THEY'D BECOME POLLUTANTS THEMSELVES.

Someone ran up and grabbed Bernado's shoulder, yelling for him to take cover. He shook them off. What did it matter whether he died now or in ten minutes? He'd spent his life on those drones, basing the designs on work done in China, Israel, the United States, and Russia. Everybody told him it couldn't be done, but it was the biggest challenge he could envision so he took it on. He'd been sure they were foolproof.

"They outmaneuvered us," said the voice in his ear, almost as if he was reading Bernardo's mind. "It's not your fault."

Of course it was. Bernardo had tested their algorithms, making sure no one could ever hijack his machines. The airborne Patrollers with their advanced encryption only took their occasional commands from satellite relays in the sky – satellites protected with the same high-security protocols, to keep hostile forces from altering their flight paths. The beacon he held in his hand was always the last resort for control of the Patrollers, and he insisted on keeping it with him at all times. The battery was dead now. And, only Bernardo knew this, he had never charged it up. That's how confident he was in his work.

The weakness was obvious in retrospect. Thanks to his work, military satellites could not be hacked. But they lived in a sky filled with flotsam. Weather satellites, research stations, orbital telescopes and a thousand other, low-security devices populated the sky.

In their desperation to gain access to Kyrgyzstan's life-giving waters, the Uzbek insurgents had sent thousands of harmless civilian satellites crashing into one another, creating debris that quickly destroyed key European and American military space assets.

And just like that, the guardians of Toktogul fell.

"The QRF is still 10 minutes out," Mancini said in his ear. "Get your drones back!"

"The failsafe control is jammed," Bernado lied.

"Dammit, Bernardo, I need those drones to engage targets!"

Bernardo threw the handheld beacon for the Patrollers into the reservoir. Five more minutes, maybe ten. Then the insurgents would reach this side of the dam. Bernardo closed his eyes.

The Kuratas robots would come first. After that, well-armed insurgents on foot. They'd be coordinating their attack by local networks Bluetooth, or maybe even radio; no satellite relays for the Uzbeks. They didn't need them. They were used to working low tech. The Uzbeks never lost sight of the practical side of warfare. They were never too proud.

END

DISCUSSION

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- How can NATO safeguard against unintended vulnerabilities in mission-critical space-based C4ISR systems? And once discovered, how should these be addressed (by whom)?

- What can NATO do to help secure civilian infrastructure against cyber threats among its member states?

- When and where will NATO begin to regularly deploy a broad range of lethal autonomous systems (air, ground and sea platforms)?

- What are the limits of true autonomy in unmanned aerial vehicle (UAV) systems and do current NATO UAV operating concepts reflect these limits?

02. BANDWIDTH

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A NATO OPERATIVE IN LITHUANIA PLACES SERVERS WITHIN AN OCCUPIED TOWN -- ENABLING A CYBER ATTACK THAT CAN CRACK THE RUSSIAN LOCKDOWN ON THEIR TELECOM + INTERNET NETWORKS

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ONE step. Her left forearm tickled, four distinct pulses. Two more steps. She felt fingers tracing along the haptic tape on both forearms. Three steps. Keep walking. Don't look back. As water squished up through the nylon of Sara Wall's running shoes, she thought, just let me deal with this last

target before they move on me.

She'd been circulating non-stop through Vilnius for 35 hours. A quick glance over her shoulder showed the silver BMW X5 that she feared was following her was now a block back, with a dark blue Mercedes G-class pulling up behind it. She closed her eyes and tried to clear her mind, then pulled out her iPhone as if selecting a new song.

The sun dipped below the buildings and she welcomed the darkness. Across the street she saw a closed bookstore, grimy round windows like lifeless grey eyes framing a trash-strewn front door. People around here walked with their heads down and mouths shut. Just like the rest of the people in this city since the Russians came a month ago

She looked right and stepped off the curb. Then the hair on the back of her neck stood up and she wrenched her body back. A darkened Vilnius city bus brushed by less than an inch from her face; she sucked in a lungful of diesel fumes as she spun backwards, smacking her wrist on the vehicle's side as the weight of her dirty yellow canvas backpack dragged her down. It weighed out at 28 pounds, but she wore it like it was filled with nothing more than Red Bull and cigarettes.
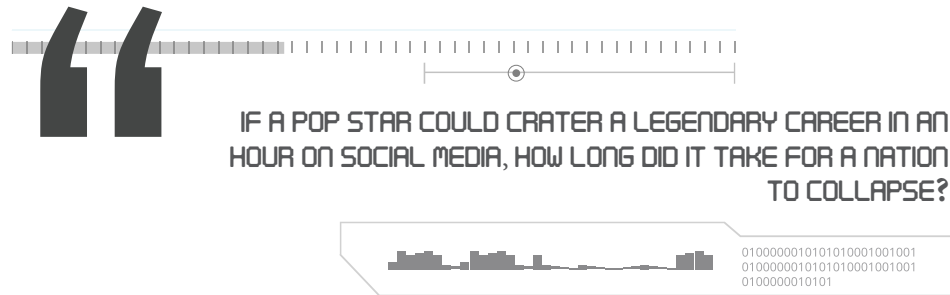
"Graceful," said a voice in her neon pink headphones. Palms flat on the wet sidewalk, she pushed herself up to her knees. Then stood, brushing off a cigarette butt mashed to the soaked thigh of her jeans. "Status, SPARROW?"

"Stand by, OVERLORD," she murmured. Sergeant Sara Wall, call sign SPARROW, had been in Vilnius for 35 hours without sleep, marking targets and placing devices. She had been in the British Army for four years, the last year in the Special Reconnaissance Regiment. She was ragged enough that she could let her orientation to right-hand drive roads at home nearly blow her cover. The four other SpecRec troopers in other parts of the city had to be no better off.

People jostled her, impatient in the rain, as they transitioned from work to home, from worry to comfort. They moved slowly, hungrily staring into their phones as if they might discover a truth that would disprove what their
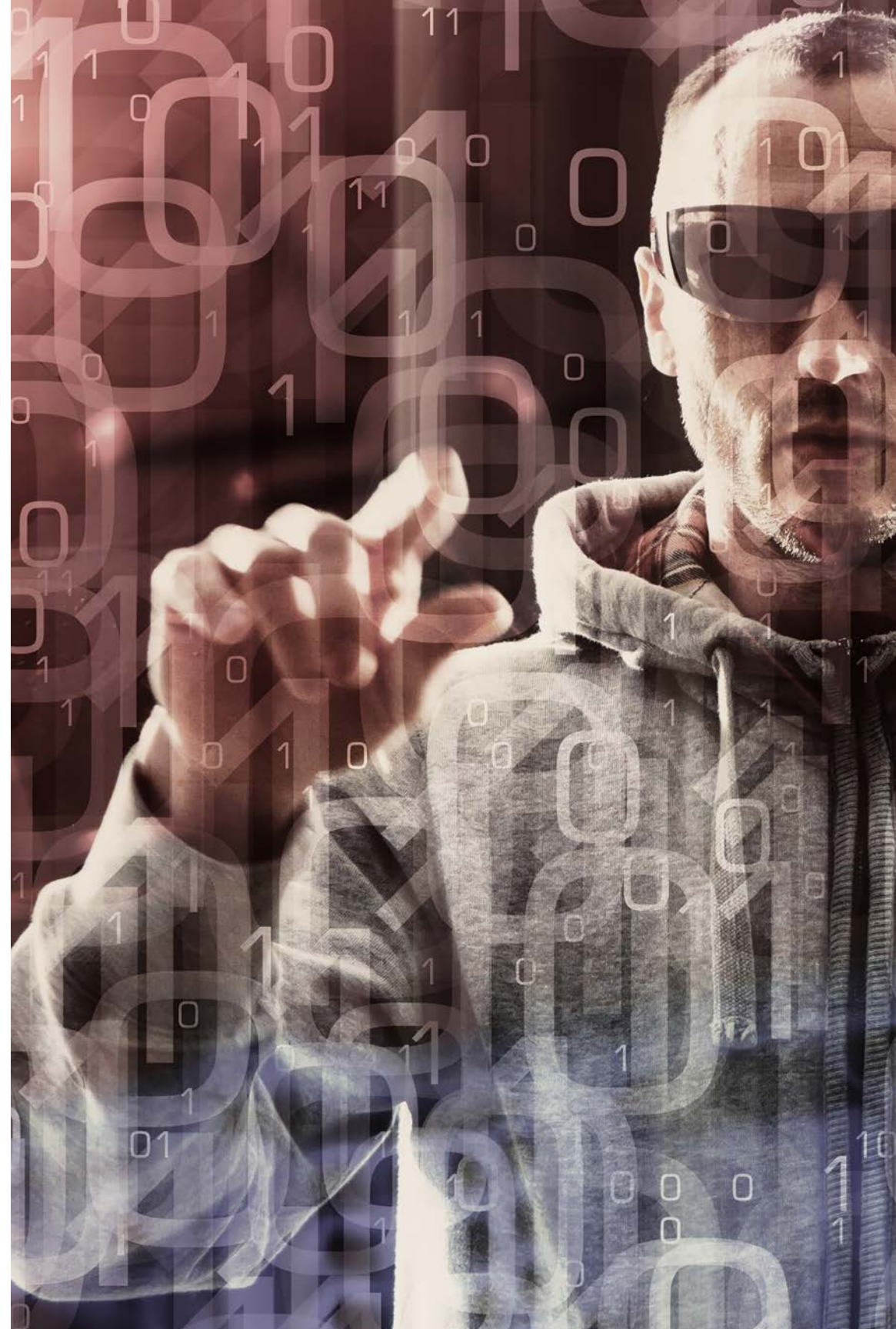
eyes could confirm was their awful reality. Russian militia and undercover Spetsnaz riding around town in luxury SUVs with no plates. Lithuanian military confined to garrison.

> " IF A POP STAR COULD CRATER A LEGENDARY CAREER IN AN HOUR ON SOCIAL MEDIA, HOW LONG DID IT TAKE FOR A NATION TO COLLAPSE?

Police disarmed. All mobile phone signals going over Russian networks. Social media bots bludgeoning anyone online daring to take a stand. If a pop star could crater a legendary career in an hour on social media, how long did it take for a nation to collapse? Thirteen days, by her count. So why would a passerby reach down to help a 25-year old girl, who looked like a student, or if she was honest with herself, a junkie? Why would they? For all the Lithuanian military exercises to thwart "Little Green Men," the Russian irregulars just shifted tactics to confound the country's response.

Which was why she was scouting targets in Vilnius. In two hours, a combined NATO cyber attack would kick off to crack the Russian lockdown of Lithuania's telecommunications and Internet networks. On smart phones around the country, the Russian-branded local social media feeds would go silent, then be replaced with content from outside the country. In living rooms, the Russian newscasts that spoofed TV3 with other television channels local-language programming for the past month would go dark.

She toed the curb and this time she looked left, reminding herself how smoked she was. Standing out front of the bookstore she pretended to peer into the window and she pulled out her iPhone again. She fiddled with a weather app, tracking what looked like a cloud pattern over Lithuania. She zoomed in on her location, mashing the water droplets on the screen into a rainbow palette as she dropped a pin on her location.

She pulled out a cigarette, waiting for a large group of people to screen her from sight as she picked the lock on the bookstore's front door. Then she was inside, placing a Band-Aid like sticker across the door seam. She then set the pack down and unzipped her jacket to adjust the suppressed compact Sig Sauer pistol in her shoulder holster that had been rubbing her ribs raw. With her iPhone back out, she looked around the stacks of books for the right spot.
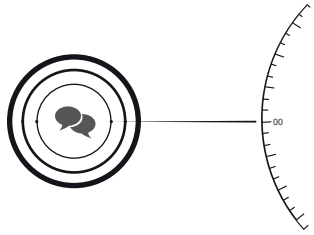
Wall removed the backpack's contents: it looked just like a Sony PlayStation but it weighed nearly three times as much because of its internal battery. If she'd been stopped, it would have been indistinguishable from a real one except for the heft. She wiped dust from a low bookshelf then put it down. Next was a pair of controllers, one black and the other a grey urban camo pattern. She plugged them in; the antennae were connected. Not a game console, she placed the preloaded server precisely where it would be able to spoof and jam the Russian mobile networks that were wrapped around this city like a spider cocooned its prey. She turned on the Playstation's power button and looked at her watch, the hand patiently sweeping around the dial as she urged the device under her breath to boot up. Forty-three minutes until the NATO cyber and airborne attack would begin. The light turned blue. Go.

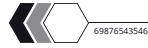"OVERLORD, SPARROW - target marked and device online. Moving to EXFIL Lima Niner. Over."

"Copy, SPARROW."

She pulled her phone out to check the status of the exfiltration route when the haptic tape at the back of her neck, forearms and along her things pulsed painfully. It was the sensor she left at the door. Her stomach knotted and she fought the urge to throw up as she sought cover. Crouching behind a bookshelf with her pistol drawn, she risked a quick glance at door. Framed in the lights of an SUV was the silhouette of a man with a submachine gun at his shoulder.

END

DISCUSSION

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⚡ When attacks happen in cyberspace, what tactical capabilities are needed on the ground to form an effective defense of critical NATO networks?

⚡ How does NATO ensure its armed forces don't lose access to critical information networks during crucial pre-conflict phases and during combat operations?

⚡ What kind of technical expertise does NATO need to ensure they can prevent and/or mitigate cyber attacks?

⚡ What forms or degree of cyber attack might trigger NATO Article 5 intervention?

⚡ When should NATO preemptively initiate cyber-attacks, and what would the ideal effects be?
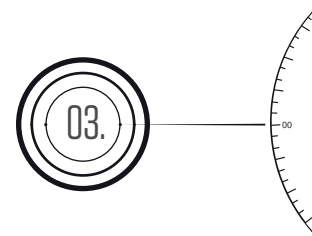
THE TASKMASTERS

A CHILD CYBER-SOLDIER FIRES MISSLES FROM THOUSANDS OF MILES AWAY WHILE BEING PURSUED BY A NATO OPERATIVE TRAINED IN FACIAL AND BEHAVIORAL RECOGNITION

TARGET LOCATED
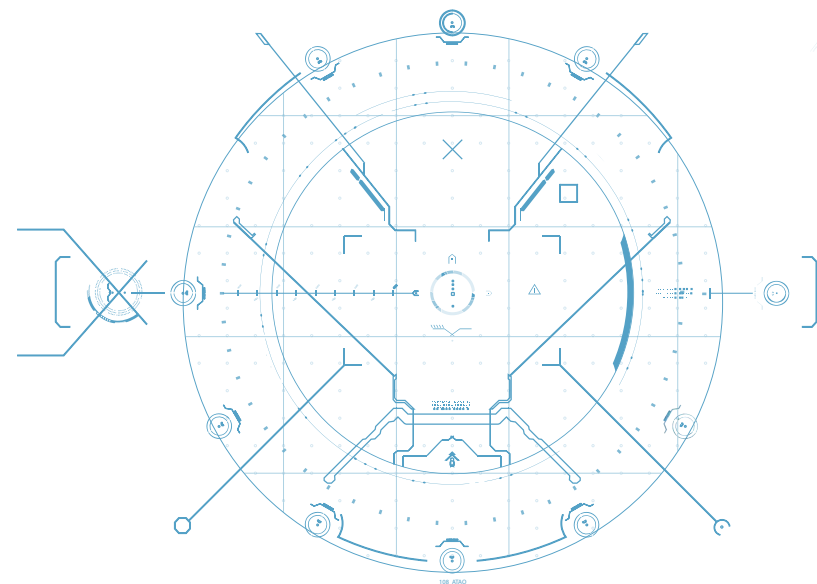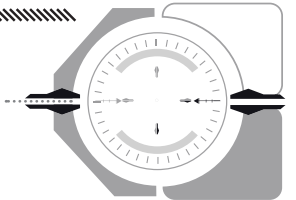
As *the drone flew in near-silence over the Pomeranian forest, a young girl huddled over her holo-terminal in the courtyard of an outdoor shopping pavilion in Montevideo, Uruguay. One window displayed thermal images of the terrain, another looked for the clouding in the near-IR band of CO_2 ab-*

sorption, while in the third, the Leader's exhortations to purge the mongrels scrolled and flashed hypnotically in a graffiti-like font. She knew she was one of many helping to execute this mission. To be part of such a group gave her purpose, even if they were also competition.

Nico watched his hi-res retina display intently as he took a sip of thick, rich coffee. The warm Mediterranean breeze drifted across the café patio. The training had started out as a simple game. People-watch a crowd through any device, and try to read individual emotions and motivations. Nico had a knack for it and his scores showed it. Then an officer of the Agenzia Informazioni e Sicurezza Esterna contacted him in real life. That was a surprise. They told him that while the game crowdsourced real-time threat evaluation, they also used it as a recruiting tool for a job unlike any other. They sped Nico through intelligence training and assigned him to NATO Joint Task Force Auburn Garden based out of Sigonella. Wherever an acute threat surfaced -- a specific individual, not a nation, triggering the Alliance's Article 5 -- there Nico would go, virtually.

The augmented feed on his display tracked the expression and recognition of every face he saw. *No threat. No threat. No threat,* the AI told him. The signal they were chasing had been encrypted and rerouted dozens of times, and finally tracked to this mall in the city's Buceo neighborhood. The virtual soldier was here. There was no doubt about that. The AI, which could access and analyze every camera feed in a five kilometer radius, was missing something.

Hundreds of drones flew over other patches of the same forest, each monitored by at least one child or adolescent, each in a different spot on the globe, all united by the desire to earn points and praise from the Taskmasters, status among peers, and a sense of achievement that comes from contributing to a Cause and its Leader.

Heart rate, body temperature, sweat levels, brainwave imaging – the AI scanned them all to detect who might be killing Polish soldiers in a Pomeranian forest with drones smuggled into the country by Russian Spetsnaz

wearing civilian clothes. If it wasn't picking something up, then something had to be abnormal about this person's readings. Nico's expertise started with simply being human. No amount of machine learning could top innate biological understanding and empathy.

> EVERYTHING WAS NORMAL. THE AI SAW NOTHING WRONG WITH HER. NICO SENSED DIFFERENT. KNEW DIFFERENT.

She quickly eliminated deer signatures, heat blobs with CO_2 clouds at one end. Peacekeepers wore parkas that masked their heat; she looked for isolated clouds in near IR.

With a flick of his eye, Nico turned off the AI overlay input of the crowd. He needed to see the people. One by one, he watched. An old man looking at shoes, a gaggle of teenagers hanging out, a woman stopping for a drink.

There. A girl, maybe twelve years old buried in something that wasn't shopping or socializing. Of course there were times anyone might get deeply involved in their displays, but she seemed to have shut the rest of the world out – and she was dead calm. Too calm. An intense call with a parent, or friend would betray a different kind of focus. Nico blinked the AI back into action and expanded her bio output readings.

Everything was normal. The AI saw nothing wrong with her. Nico sensed different. Knew different.

"Tag her as HVT Alpha," he told the AI. High value target indeed.

Her brainwave graph jumped, showing a spike in the activity of her limbic system.

"Shut her down. Block her access!" he told the AI. Sometimes he was still awed that the Task Force resources allowed him that much power. It was like wielding magic.

There! She reveled silently in the flutter of success when she found her target. She centered the reticle on the cloud, clicked "BINGO," and waited for a response.

The tiniest curl of the girl's lip told Nico he'd made the right call. Hers was a smug little smile. She didn't know her signal hadn't gone through. It was time.

"Extract HVT Alpha." This was going to be a tough one, with her being so young.

The girl frowned. It rarely took longer than a minute for one of the Taskmasters to respond with points for her, and a drone-fired missile for the located soldier.

Nico poured more sugar into his coffee and focused on stirring. A simple mechanical action. Around and around he swirled the spoon, trying for once not to see.

The Taskmasters did not return, not in five minutes, not in ten. The Leader Chat box recycled the same words, but her score stayed the same no matter how many camouflaged bodies she identified in the forest.

Having earned no points, the girl in Montevideo sighed, closed the drone window, and clicked on the latest music triveo from her favorite ThaiPop band.

She swatted at the back of her neck, surprised by the sting …

A micro drone loitering nearby hit the girl with a tranq micro-dart. Two

of the Task Force's Spanish commandos, dressed like paramedics, expertly bundled her out before she could slump to the ground. Did she even understand what it meant to kill somebody? The Task Force would have her on a jet out of the country within the hour. Nico hoped for her successful rehabilitation in Sardinia with the others but was glad that wasn't part of his job. It would break his heart. As Nico kept slowly swirling his coffee, the AI confirmed that he'd saved those soldiers' lives today. Nico liked to think that he saved hers as well.

END

DISCUSSION

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- ⚡ How does NATO disrupt or prevent cyber-recruitment for non-state actor groups, like an ISIS 2.0?

- ⚡ How will we know when AI alone is incapable of accomplishing a mission objective?

- ⚡ What happens when combatants in a European conflict are distributed globally?

- ⚡ How far will NATO go to protect member nations against super-empowered individuals/ civilians operating in the cyber domain?

- ⚡ What are the vulnerabilities in remotely operated weapons that depend on significant bandwidth connectivity?
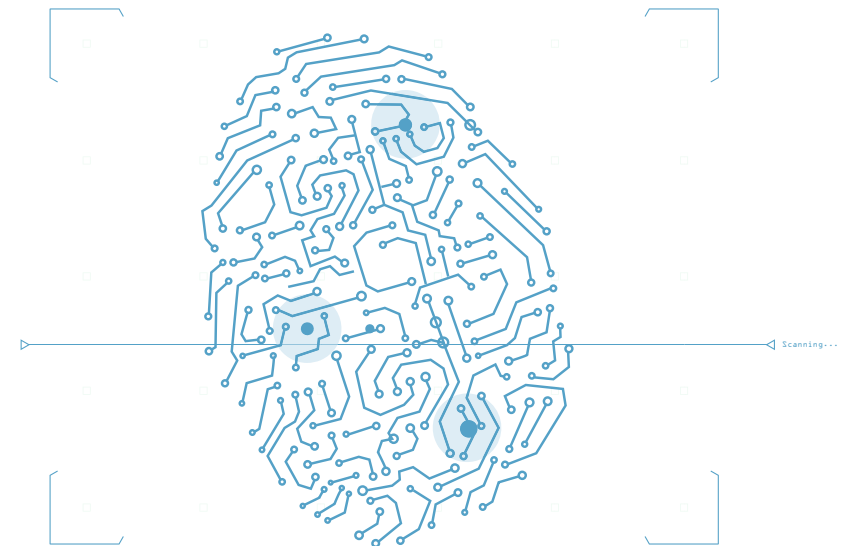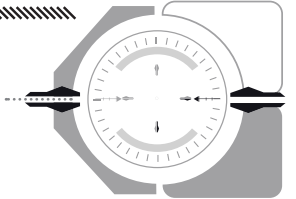
FEAR ME

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A CHINESE SOLDIER GENETICALLY ALTERED TO EMIT FEAR-INDUCING HORMONES CONTEMPLATES HIS ROLE IN THE GREAT EXPANSION DURING AN INVASION OF PAKISTAN

Scanning...

THE city of Multan is like every other Pakistani city I've marched through. It smells of smoke and battle and spice and death. All part of the annexation. There are nice temples here though. Maybe this is where I'll die. Not in battle – by my own hand, of course.

In required perfection, I keep step and pace with the rest of my parade block, ignoring the discomfort of the almost invisible filter in my nose. Third rank, center file, that's all I ever am. Except on the battlefield. There, I'm part of the 19th Group Army's Fear Squadron. I was so proud when they chose me. I bragged to everyone, my friends, my family. I had no idea what I stood to lose.

The army told me that by the end of my training, enemies would look me in the eye and tremble in fear. They were right. But it wasn't the fighting skills they taught, which were many, or the tactics they drilled into our brains. It was my genetic alterations that changed everything.

No matter that I had misgivings about the procedure; I had signed up for this. The Chinese People's Liberation Army (PLA) could do anything they wanted to me. Don't get me wrong. I wanted to serve and do my duty, but I hadn't bargained on losing my family, my wife and daughter, and everyone I loved. You see, it's not just the enemy that fears me. *Everyone* fears me.

Pheromones are the secret. The PLA altered the genes that control my hormonal structure, turning me into a raging ball of fear-inducing pheromones. At first I felt like such a big man. Strong. Confident. Scary. Until I learned the cost.

Two weeks after the procedure, I got within ten feet of my little girl and she burst into tears. The terror in her eyes still haunts me.

Our parade block stops in front of an elaborately classical government building. There really is some beauty here and I'm glad these people surrendered before it was all destroyed. The leader of Multan is smiling broadly as he subjugates his city to our division leader. Rumor has it that the Colonel is altered too, but his pheromones are designed to promote likability and induce obeisance. I wouldn't know, I've never gotten that close to him.

After the speeches, the Captain of the Fear Squadron uses his whistle and a bullhorn to distribute us to our posts. It doesn't take many of us to control a population. Even the terror groups that have harried the West for so long cower in our presence. They don't know why they're so scared of us. We don't

have the assaulter power armor of the Americans and we're not bulked out like the chemically enhanced Russians, but they're terrified, and they stay in line.

Our ranks shrink and swell depending on who is stationed where and how many new recruits are shipped in. It doesn't matter. It's not like there's any loyalty, or friendship. We can't stand being around each other once we take the filters out of our noses. Even with them we kind of hate each other.

> **YOU SEE, IT'S NOT JUST THE ENEMY THAT FEARS ME. EVERYONE FEARS ME.**

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I'm assigned to an intersection near a large bus station. The high traffic area gives me the most impact. People cross the street two, or three, times to avoid me. When I patrol, leaving ambient streaks of pheromone behind me, the sidewalk empties. I'm used to it, but I'd be lying if I said it doesn't rip a hole in me every time. If just one person would touch me, I might be saved.

I stop in a corner shop and take some cigarettes. I don't bother leaving money. Fear has advantages, and I hate every one of them. I used to be a better person than this.

The Fear Squadron member that relieves me takes up station diagonally across the intersection. I put my sacred nose filter in and head for camp. The one thing we can never do is let news of the filters out. That would ruin our secret.

The PLA has taken over the grounds of the government complex. Our tents are at the entrance, the rest of the army stays well back. Regular soldiers rush past nervously, but sleep well knowing that even as we slumber, we are deterring civilian thoughts of retaliation.
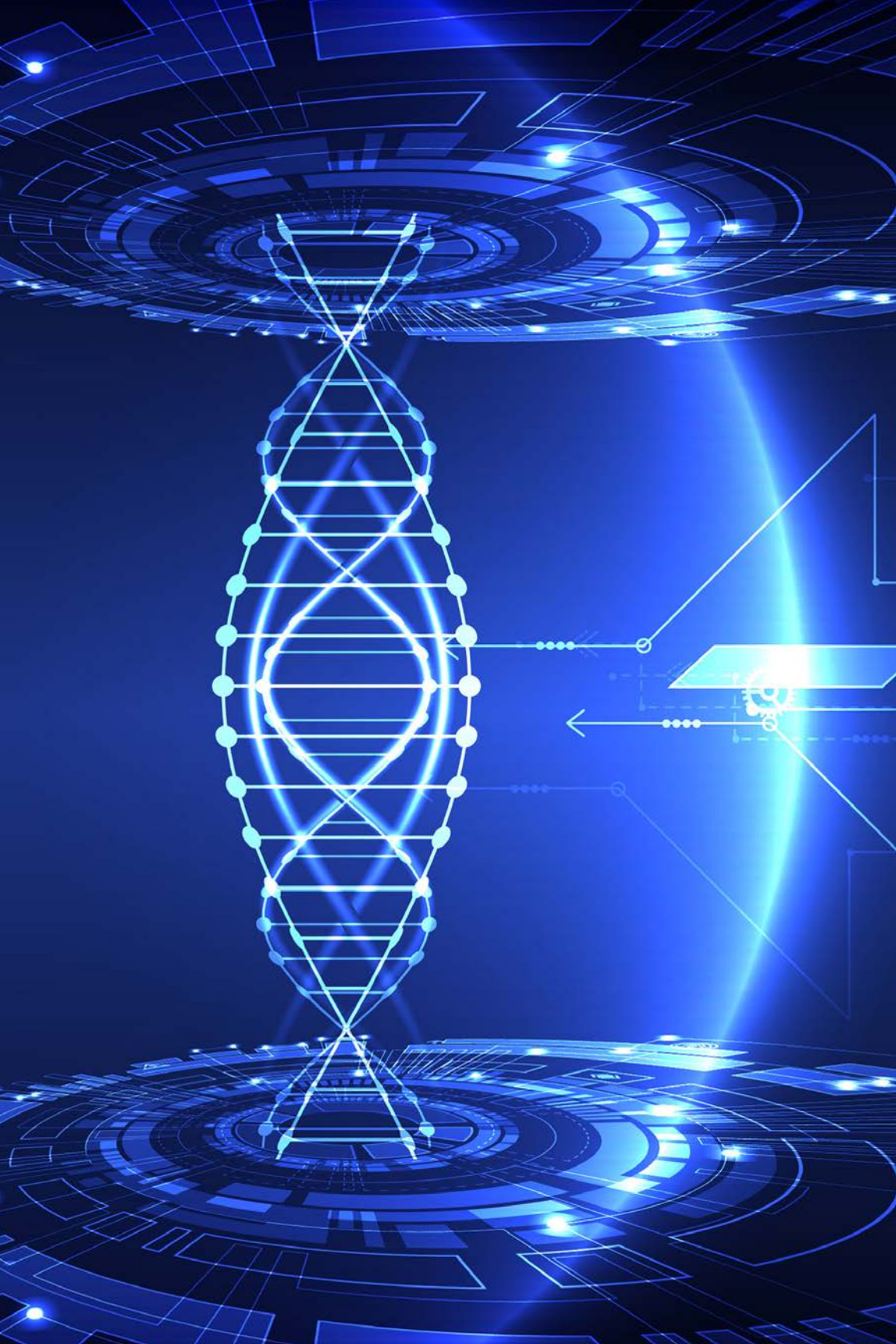
In the middle of the night, one of us starts screaming. His nose filter has fallen out and the concentrated level of the pheromone inside the tent is driving him crazy with panic. We've been through this before and it's another thing I hate. Those closest to him secure his weapons and someone opens the tent flap to encourage him to leave. No one approaches him for fear of a fight. Anyone losing their nose filter in here will go crazy tonight.

The man curls up in a corner, almost catatonic. I risk retaliation and shout at him to leave. The others join in. He's been without his filter long enough that he's probably permanently damaged. Command knows this. They've been timing it since he started screaming.

He finally runs outside. In a few seconds he's clear of the tent and the first shot cracks through the air, followed by two more. I shiver. That is not the way I want to die. Death by insanity terrifies me. I do not want that shame.
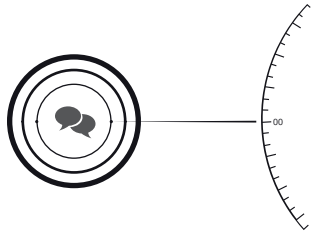
The incident has shaken me and sleep refuses to come, so I rewrite the apology I've never sent to my wife for the fiftieth time. I'm in tears for the rest of the night. At breakfast, our Captain reminds us what valuable work we're doing to support China's Great Expansion. We are building the greatest empire on Earth. Our sacrifices mean something.

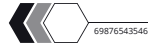Their propaganda angers me. They do not honor us.

In the same speech, we are told that NATO peacekeepers and Coalition forces have re-taken Islamabad's airport and are setting up their kill boxes inside the city. That's good. I'm in the mood for a fight. Our enemies will fall. They always fall before us. But maybe I will die in that fight instead of here in Multan.

I will use my screwed up pheromones to do something grand and heroic like break through a barricade or disembowel a machine gun nest. I will run through them screaming and shooting until a bullet takes me down from a distance and ends this isolated hell. For my last moment, those who despise me most will call me a hero.

END

DISCUSSION

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- ⚡ How far do you think other countries or entities will go in their use of genetic engineering to gain a military advantage?

- ⚡ How will NATO operations change if some members begin to explore and develop military genetic engineering for their armed forces?

- ⚡ Will genetic engineering or AI/cyber weapons be the next arms race?

- ⚡ How could combatants use sensory attacks in the future (e.g. visual, olfactory, etc.)?

NONE SHALL PASS

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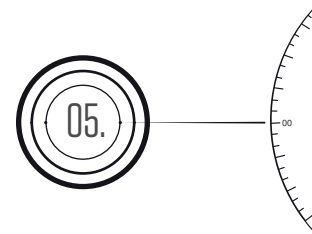
TRYING TO STOP RUSSIAN FORCES FROM MARCHING INTO BUCHAREST, WE SEE THE BATTLE AT SLOBOZIA FROM TWO VIEWPOINTS: BANSHEE PILOT AND ROBOT KILLER

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RATE

TRACKING

A **BLAST** from a Russian L-17 beam cannon rocked the Banshee three-legged assault armor commanded by French officer Lt. Brigitte Bonhomme, call sign Bibi. The shock caused a tingle in the bioconnector at the base of her skull. There was a slight pause while the built-in counter mea-

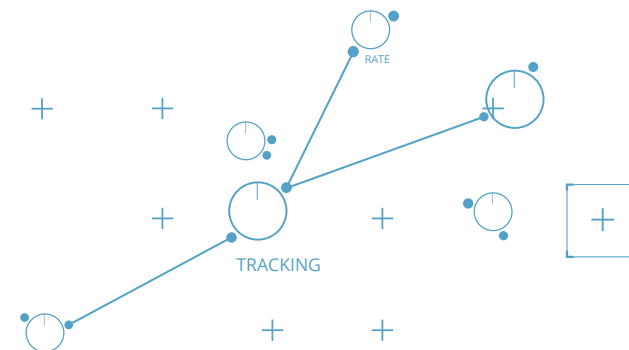sures distributed the energy through the dampers. Readouts in her contacts told Bibi the new reclaimers were working perfectly. Ten percent of the energy from that blast was redirected into her armor's power pack. The enemy didn't know it yet, but every hit from a beam weapon powered her up.

Bibi returned fire with a Raptor heat-seeking missile and shifted course. The L-17's active defense system fired a flechette round and exploded the missile ten meters out. No damage. Damn.

The flat farmland outside of Slobozia offered no cover. More than a century ago, this kind of terrain resulted in men fighting from trenches in her homeland. Today, humans didn't fight on a battlefield like this unless they were wrapped in lethal, but life-saving, machinery. The farmland turned battlefield was filled with mobile artillery and smaller fighter units, some manned, many autonomous.

The enemy was the Russian Army and its vassals. After brutally subjugating Ukraine the summer before, they were now making a move on the Romanian capital. Their forces had driven through southern Moldova, supposedly to Moldovan objection. Once the Russians entered Romania, Galati and Brăila fell quickly.

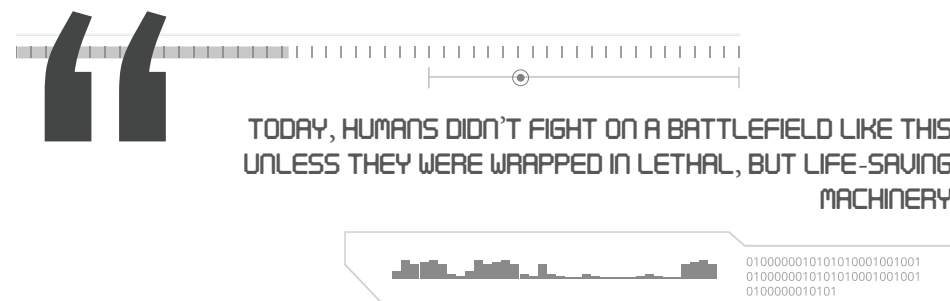Slobozia was the last stand between Moscow and Bucharest.

Bibi's armor looked vaguely humanoid, armed to the teeth and five meters tall. She piloted from within the torso and was protected by a cocoon of ChobhamActive armor. It also looked exactly like the five semi-autonomous assault vehicles that were her unit, Talon Squad of the 2eme Brigade Mecanisee. In this way, the enemy couldn't know which Banshee was the Command Module – which one held the human coordinator. There were no viewports in the cramped compartment. The holographic HUD and her connected contacts let Bibi see the battlefield for all.

Two dozen Russian Wolf tracked Auto-Tanks (AT's) entered the field en masse. They were fully robotic yet their mindless behavior could be seen in how they nearly bumped into each other as they maneuvered as a pack. AI by itself was no match for a human-machine connection. Bibi knew that the

NATO Joint Tactical Cyber Force was already working to bring them down. Russian coders were ham-fisted when they sold systems to the Federation's vassal states. Her job was to exploit that inherent weakness. The problem was, there were a lot of them.

Looking at the numbers they faced, her heart rate spiked, but only for a few moments. As soon as her machine's AI detected the elevated HR it modified the signals in her implant to steady her nerves. Some Banshee drivers liked to run on the edge and set their HR parameters high. Bibi felt better when she could calmly stay a step ahead of the machine and not feel like she was racing to keep pace.

She shifted her Banshees using the quantum-linked comm system and led out their loose diamond formation. Never keeping the same position made her harder to target. Her Banshee was the only one that could talk to the others, and through her bio-link, she was the only one that could talk to her vehicle.

> **TODAY, HUMANS DIDN'T FIGHT ON A BATTLEFIELD LIKE THIS UNLESS THEY WERE WRAPPED IN LETHAL, BUT LIFE-SAVING MACHINERY**

Bibi randomized her movements within the diamond-pattern and set to taking down AT's one at a time. With their commands in place, her unit staggered the formation and chose their targets. She'd programmed them with a fighting style similar to hers, a further camouflaging measure.

She rapid fired three micro-missiles from the over-the-shoulder launchers at her first target and focused the beam cannon on the Banshee's right arm on a second. The first missile was countered, but two made it through to immobilize the AT by blowing off both tracks. One of her Banshees used its beam

weapon to blind an AT's sensors, and it began turning in tight circles. A little cheer rose in the back of her mind. The first kills of the day.

Bibi learned early on that her unit's AI understood teamwork and would get more effective with each engagement. And it did, learning at times faster than she could comprehend. She fired off a few more beam shots, well placed to destroy the AT's heat sinks, and two targets stopped moving. The Banshees cued off her aim points and pounded the remaining tanks with missiles and beam cannons.

She and her unit took down five more AT's in short order before the enemy AI established her vehicle as a High Priority Threat. It must have seen the aim point shift that her squad followed after she succeeded in blowing the AT heat sinks. In an instant, every AT within sight range turned on her Banshee. She should have known better than to attract that kind of attention. Sometimes being too calm and calculated had its drawbacks. She swallowed her pride and sent out an RFH, request for help, to local units. This was going to be a hell of a fight and her battery energy was already dropping low.

Bibi freed the Banshees from path parameters, setting them to survival mode, and switched her machine to manual motion control. She backpedaled, churning up soil in great geysers, and dodged missiles. She had three legs for stability, but the Banshee easily switched between two and three depending on the maneuvers she made. The beam attacks she only feigned to avoid. As they hit she watched the energy in her power pack rise. In this mode she let the AI handle weapons, knowing it would analyze the situation and fire at the most immediate threat.

Still, her Banshee registered the hits and for all the damping, she was still rattled in her harness.

Nearby Banshee units were unable to respond and the Joint Tactical Cyber Force was bogged down in some digital quagmire elsewhere. Her squad was on its own.

With that much ordnance aimed at Talon Squad it was only a matter of time before her Banshees would start dropping. Bibi lost one of her team, and

then, with a gut-wrenching wail, her machine's right arm was blown off by a Hawkfire missile. She staggered back but the stabilizers kept her upright. Her beam weapon was gone.

> **AI BY ITSELF WAS NO MATCH FOR A HUMAN-MACHINE CONNECTION**

Bibi's Banshee danced a ballet while the AI compensated with the anti-personnel 20 mm chain gun and micro-missile launchers. Together they took out two more AT's. The barrage was endless.

"Winchester," Bibi said to herself when her magazines were empty. It was the first time that had ever happened to her.

Three Banshees remained engaged. Bibi sprinted toward the nearest AT and pounced up onto the top of the turret, confounding the tank's active defense systems. She used her Banshee's 20 mm cannon on the left arm as a primitive club to bludgeon the tank's turret, throwing off its aim. There was something crude and satisfying about the assault, machine on machine. Another two strikes and the tank's gun was damaged beyond use.

Then two missiles from different directions blew off her Banshee's remaining arm. The explosion rocked the protective shell around the Banshee cockpit and she saw stars, as her bioconnector buzzed from the damage. Bibi took a breath. Even without her offensive weapons, she could be useful, a distraction if nothing else.

Before she had a chance to act, two of her Banshee's three legs were destroyed by direct hits on the joint actuators – the Russian AI wasn't totally incompetent. She toppled backward and landed with a crash that even the custom-fit shock padding of her command seat couldn't completely absorb.

She was dazed and the AI knew it. It gave her a neuro-boost with signals that helped her shut out the fear and damp a worsening headache in order to regain focus. The Banshee's AI showed her that she was mostly unhurt, nothing broken or ruptured internally, though it also indicated clearly that her pain signals were being minimized. There were good and bad sides to being connected to your machine, and it knowing you better than you knew yourself. The bio data didn't lie.

The HUD was still lit and working. Bibi commanded the last two vehicles of her unit remotely, from her prone position, but they were almost combat ineffective.

She didn't like to think it, but her pod carried a suite of personal defense weapons and survival supplies to last three weeks. If this battle ended poorly, she might still find a way to evade capture.

It was another 10 minutes before the NATO Joint Tactical Cyber Force disrupted the AT's. But they had broken through the line. She'd failed.

With no vehicle in her unit left standing, Bibi watched one of the NATO task force's smallsat feeds on her HUD of the Russian armored forces heading for the city of Slobozia. That's where the bigger siege machines would be limited in their movements and human and robot soldiers would come in, sweeping through the city. NATO forces were already there, and signs were that the locals were ready to fight, too. Bibi prayed that their AI would be smart enough, and organized enough, to stop them.

Corporal Javier Zapeta of the Spanish 5th Robot Hunter Regiment "Cantabria" hated to see the fight enter Slobozia, but he was ready to get in the action. Not only that, thanks to NATO's Maker Initiative out of Berlin, he had a new toy today. The RK100P was a six-barreled 40 mm grenade launcher loaded with "sticky" rounds, a gelatin of sorts infused with nano-explosive. If it worked as his unit's techs promised, it would be a nice addition to his robot-killing arsenal.

The 5th was assigned the entry blocks of the city, an industrial quarter of warehouses and fab sites that the first wave of robots would filter through looking for defensive positions while sweeping for seeker mines. Thankfully, NATO already evacuated the civilians from this mostly commercial part of the city. A short block off the main thoroughfare, Javier took up position on a second-story roof, beneath a pop-up Kevlar tent designed to look to a surveillance drone or satellite like a massive HVAC unit. In the street below, he had set up a half dozen soccer-ball sized inflatable decoy drones that gave off the signature of a Banshee squad. None of his weapons were long range; it was nearly impossible to take a robot out with a single round. EMP's and beam weapons were almost useless, too, since defensive energy disperse-ment capabilities had been developed.

He heard them first, rumble and hum and whine. To the east, the Russian AT and Spiderbot mechanized forces were coming. Even though they'd gotten through the Banshee line defending the approach to the city, it was clear from his visuals that they'd taken a beating. The enemy's mobile artillery had been cut to less than half of what reports said.

Javier powered up his exoskeleton. While it boosted his strength, it was real-ly designed for speed, agility and stealth. On a good day he could practically run up walls, and jumping down from second-story rooftops was a breeze. It did all this while masking his electronic signature. Another reason he was so eager to get in the fight was because he could push the exoskeleton much further than he was allowed in training.

No sooner did his unit commander tell them to stay sharp than the robots split off from the main street parade formation. Javier waited. He was a pa-tient man, and the belt-fed RK100P had peculiar ammo, which he carried in a hopper attached to his suit, that used a two-chamber system. Oxygen was the catalyst for the adhesive, and the adhesive was the catalyst for the explosive.

Upon leaving the barrel, the round's adhesive would begin to expand; if a round jammed it would plug the barrel and render the weapon useless.
The first Spiderbot came into view. Definitely a Russian model, all black, quad-legged and armored to the hilt. Javier aimed at its center and waited for
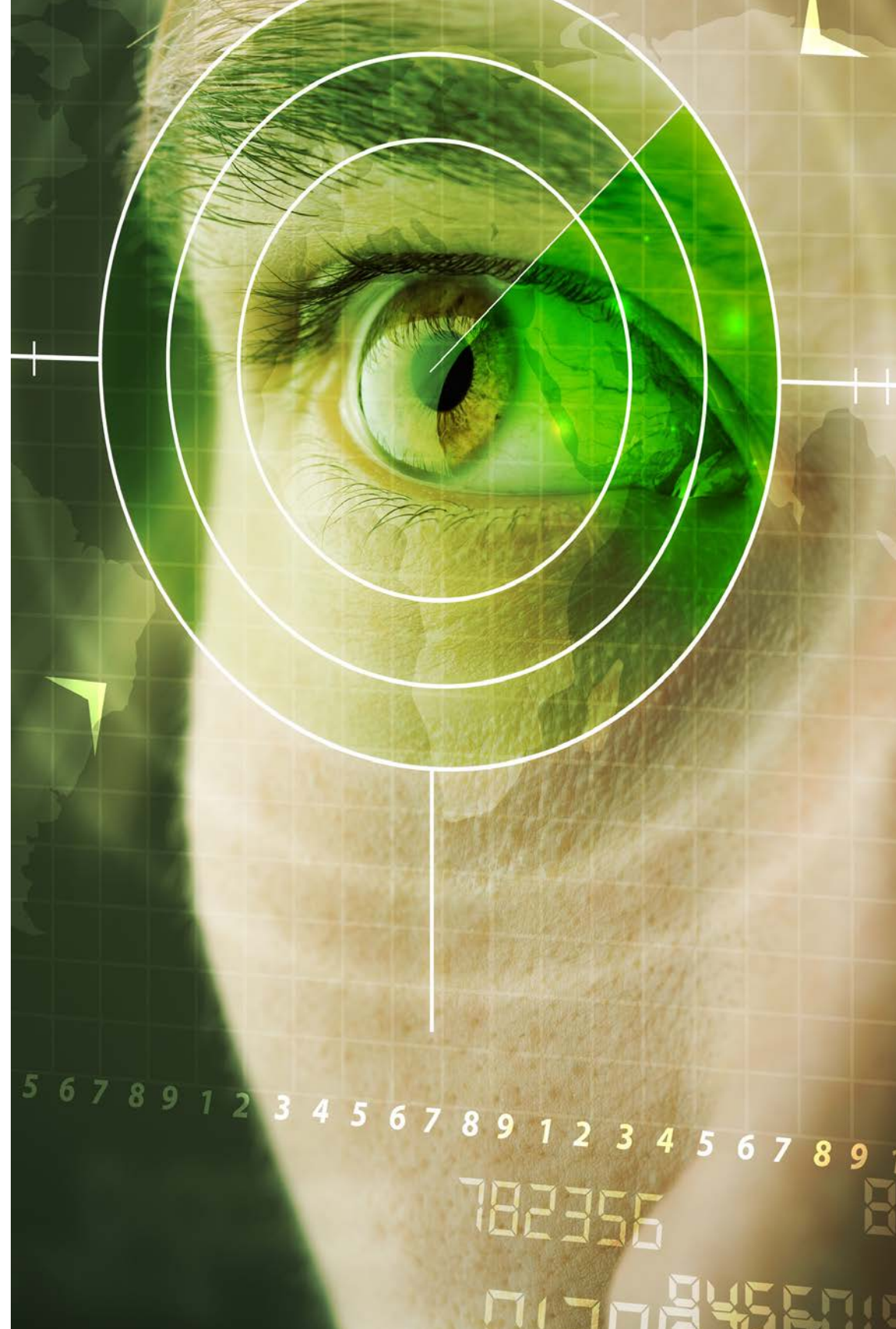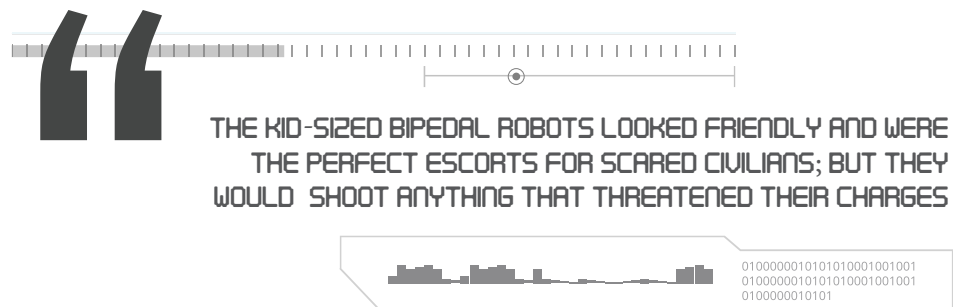
the Spiderbot to come into range. The digital countdown timer on the barrel raced toward zero in hundredths of a second, finally indicating the target was in range. If the gun made it out of prototype that reading would be in his AR visor, but for now it was welded on.

5…4…3…fire.

The round hit the bot and broke open with a splat, adhesive and explosive spilling out. But nothing happened.

The Spiderbot turned toward him and targeted. He didn't need his AR equipment beeping to let him know he'd been tagged. Javier dove out of his portable shelter toward the center of the roof just before that chunk of the building exploded in a hailstorm of debris. Two seconds later, there was an explosion down on the street, then nothing. Javier rose, and cautiously went to investigate. The Spiderbot was a smoldering wreck. Score one for the good guys.

New tactic though – shoot and run. He pushed that lesson learned out to the rest of the soldiers with the weapon so they'd be able to make adjustments on the fly. He'd have to talk to the Makers about that delay, if he survived the next few hours.

> THE KID-SIZED BIPEDAL ROBOTS LOOKED FRIENDLY AND WERE THE PERFECT ESCORTS FOR SCARED CIVILIANS; BUT THEY WOULD SHOOT ANYTHING THAT THREATENED THEIR CHARGES

In one great leap he jumped down into the street and bounded back up to the single-level roof on the southeast corner of the intersection. Counting on the buildings blocking the Spiderbots' line of sight communications, he hoped to drop the next one before it could see this destroyed unit and uplink news of the new weapon that Javier and his comrades were using.

A flash of green flared in his AR visor. He looked more closely. A huddle of half a dozen green dots in the southwest corner of this building. Crap. Civilians. This sector was supposed to be cleared.

A Menacer appeared at the end of the street. Big, humanoid and mean and loaded with a jetpack that could launch it to rooftops, balconies and other coveted high-ground urban fighting positions from which it could deploy its medium-range precision cannon. If Javier tried to get to the civilians now, he might put them in more danger.

Instead, he dropped a pin on the display and sent for a high priority Guardian. The Guardian's only goal was to get people to safety; for that it had access to maps and current combat situations. The kid-sized bipedal robots looked friendly and were the perfect escorts for scared civilians, but they could, and would, shoot at anything that threatened their charges.

Javier still needed to get rid of this Menacer before the Guardian arrived. He planned his cover differently this time. After he fired, there was a nice solid structure on this roof he could hide behind. He held his weapon over the edge and sighted in on the Menacer using his AR visor.

Fire.

The gun bucked oddly as the shell wobbled upon leaving the barrel. Javier felt it. It must have been packed unevenly. He checked to see if it had jammed the barrel with explosive goo. No, but the round splatted on the ground a meter away from the Menacer.

The robot's blue jets fired up and the Menacer flew toward him. Javier ran like Hermes. Bullets hit the ground around him just as he reached the edge of the building. With zero hesitation, Javier jumped and bounded in huge strides across the next roof and the next. When he looked back the Menacer was just crossing the first gap. It had to wait for its jetpack to cool after each jump, which gave Javier the edge.

Javier stowed the RK100P and pulled out Rosarita, a bullpup-style compact rifle, and took aim. At this distance the AR visor brought up targeting as-

sist. Javier was a crack shot and with the exo-suit his hands never shook, no matter how hard he was breathing. He blinked the targeting assist away and took the shot.

With beautiful precision, a set of three tungsten discs honed to molecular sharpness flew toward the Menacer and ripped through its torso. Knowing this wasn't enough to take it down he fired three more sets. By the time it reached the middle of the second roof, the Menacer's insides were high-tech spaghetti. It collapsed in a worthless heap.

Javier held the weapon upright and blew on the smoke wafting from the end of the barrel as if he were a gunslinger of a bygone era. The powder-fired disks never let him down. Simple and effective. Just then his AR received a ping that the Guardian had reached the civilians. Feeling a sense of satisfaction that the civilians would be safe – and not get in his way, Javier went hunting for his next target.

The battle for Slobozia lasted through the night and into the next day before the NATO forces whittled the Russian invaders down to nothing. They'd brought scores of Russian bots and automated artillery but it was humans that won the day. Well, maybe with a little help from the machines. Javier racked up forty-eight kills, the most in his squad. Now everybody wanted an RK100P, or splat gun, as he liked to call it. It had some kinks, but he wasn't giving it up. Bang. Splat. And humanity had one more battle-proven way for a human to kill a robot. Javier smiled. It looked like Rosarita just got a new friend.

END

DISCUSSION

- What military roles will robots and AI have on the battlefield, and which nation(s) might take the lead?

- What roles will humans have in future combat situations (in 2026 vs. 2036)?

- How will humans and machines augment each other on the battlefield? To what benefit? To what loss?

- What functional roles will AI play in intelligence collection and mission planning?

- What will be the force structure implications of increased human-machine teaming by NATO members?

06.

DISCERN

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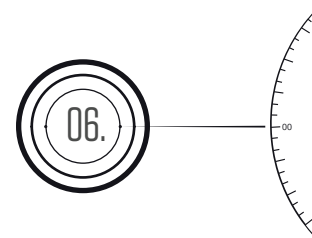
A SMART GUN DESIGNED TO PROTECT CIVILIANS GETS HACKED TO BE USED AS AN INSTRUMENT OF ETHNIC CLEANSING

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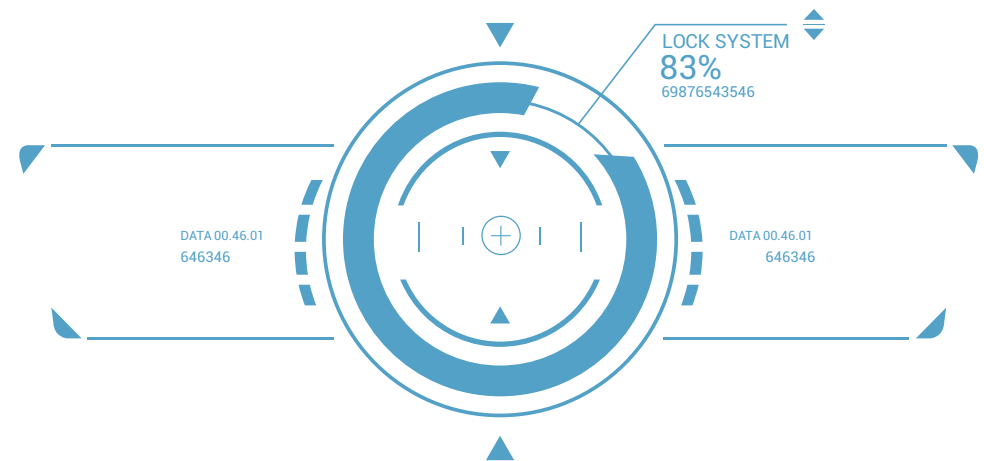
IT WAS spring in Paris, the smell of wet pavement and flowers everywhere, and I was walking down the Champs-Élysées with my brother when everything went to hell.

"Charlotte and Nathan Li?" I didn't recognize the woman with dark hair and a darker suit, but her next question stopped me. "Makers of Discern?"

"Yes," Nathan said, looking at me, worried. "Is this about the demonstration?" This woman wasn't our usual US Embassy or NATO contact, but how else would she know that name?

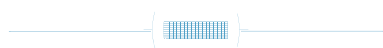The woman flashed a badge. "GIGN," she said. GIGN stood for Groupe d'intervention de la Gendarmerie nationale, according to her badge. I recognized it as a special operations unit of the French National Gendarmerie. This was damn serious. "Come with me. Your weapons have been stolen en route to the Army's testing center."

"I am Simone Saidi," the woman said as she settled behind the long table. "Of GIGN. You know us?"

"Counter-terrorism," I said, sitting across from her. That explained why she'd been able to clear a conference room for us at the closest poste de police. "Where's the US defense attaché?"

"She's coming, but we need to talk now," said Simone.

"Wait, terrorists stole Discern?" Nathan asked.

"Oui. Oriflamme," she said. "French ultra-nationalists. They hacked the carrier transporting the guns and took them. No distress signal was sent. Luckily, a Gendarmerie drone spotted the hijacking and reported it. We've caught one of the Oriflamme teams, and reacquired three of your weapons. The other team, armed with Discern, remains at large. That's why you are here. You two wrote the software that makes Discern work. Can you make it *not* work?"

I shook my head. "Discern's military-grade software. Tamper proof."

"But you need to try." Simone said, her brown eyes intense. "We've been squeezing information out of the men we captured. We know they hacked your company, and that they understand the capabilities and how to operate your Discern. They plan to find a crowd and open fire, to make the streets run red with the blood of immigrants. They claim that NATO representatives from every member nation have come here to France to see a special demonstration of an American gun designed for ethnic cleansing. Instead, the terrorists want to test it. Tonight."

"What?" I snapped. "The demo was supposed to be a secret!"

"This is no ordinary weapon, non?" said Simone.

"Discern was designed to reduce civilian casualties, not—"I cut myself off, looking at my brother. He wasn't looking at me. "You left it in."

"Buyers like options." he said.

I swore, but Simone interrupted. "What are you talking about?"

> DISCERN TIES INTO AUGMENTED REALITY GOGGLES THAT THE OPERATOR WEARS...THEY SEE THE WORLD THE WAY THE GUN DOES

"We designed Discern for the US Army, a software solution to friendly fire," I said. "It uses the guns' cameras to designate targets as valid or invalid, and the ammunition's limited guidance system to strike or avoid. Those guns were supposed to demonstrate that with Discern, soldiers could curve bullets around obstacles, friendlies, and civilians to strike an enemy combatant, all in real time. There are, however, other possible uses for these capabilities. Evil, stupid uses, like using the facial recognition to pick out cues on ethnicity, and having the gun target only certain racial groups."

"That capability could be useful, somehow," Nathan protested. "And it was trivial to program. I didn't implement it because you were right, it was useless for a multi-ethnic force like the US Army. But I didn't strip the code out. Just in case."

"In case what?" I snapped. "Racist terrorists steal our guns to prove my point?"

"You're right," he said. "I'm sorry. Discern was meant to make those guns more effective, not more horrible. What do we do?"

"We get to work," I said, and took out my tablet.

Evening fell, and I finally looked up from my tablet, defeated. "Anything?"
"We've identified the terrorists at large, and mined their social profiles," Simone said. "We have every camera, drone and sniffer in Paris scanning for them, but they're certainly using prosthetic camouflage. What about you?"
"Almost nothing," I said. "We can't shut Discern down. The only thing we can do is change how skins appear."

"Skins?" Simone asked.

"Discern ties into augmented reality goggles that the operator wears," I explained. "They see the world the way the gun does. So we can change the targets appearance--their AR 'skins'. We built that in for the demo, to make it more dramatic."

"We can make the targets look like anything." Nathan said. "Kittens or puppies. That might confuse the shooters, at least."

"But they wouldn't be kittens," said Simone. "They'd still be people of North African or Middle Eastern descent, or whatever profile those terrorists choose."

"Yes." Nathan shuddered beside me. "They're going to strike soon, and this is all we have, skins and access to their social accounts? Do they post cat pictures? Maybe they won't shoot kittens."

I blinked at him. "That's brilliant."

"What?"

"Feed me those accounts," I told Simone. "Nathan, start pulling their contacts."

"Oh!" he said, getting it. "We can't hack the guns—"

"So we hack the gunmen," I finished.
We worked furiously, until Simone interrupted. "We have something," and the big screen in the conference room lit with an image from Paris' camera network.

There were three men on a crowded street, pulling the collapsible Discern-equipped carbines from the backpacks they carried, the weapons attracting the attention of every camera in range. The shooters had goggles strapped over their eyes, gleaming in the streetlights as they scanned the crowd.

"Nathan!" I snapped. "I need to push this to the guns, now!"

"One second!"

"Nathan—"

"Okay, now!"

I slapped my tablet, then looked at the screen. Simone cued the sound, and I could hear people yelling, starting to flee as they saw the guns, but the men had paused. I held my breath as one of the men shouted.

"It's a trick," Simone translated, and the man on screen raised his rifle.

That's when he was hit, the gun sent flying as one of the other terrorists slammed into him, shouting.

"My mother, my son," Simone translated again. "What did you do?" she asked.

"We changed the skins," I said. "But not to kittens. We made Discern lay images from their contact lists over the targets and each other. They're seeing their family, their friends. Even when they realize it's not true, they can't be certain of who they're shooting at anymore."

On the screen, two of the men fought. The third tried to stop them, then gave up, stepping away to raise his gun, but it was too late. He was knocked down, tackled from behind. The gunman rolled, weapon raised to engage his attacker, but didn't fire and the tall, blonde target kicked the terrorist in the jaw.

"Thank God," Nathan breathed as police drones swarmed in, surrounding the men, pinning them with riot foam.

"We did it. We hacked them," I said, staring at the screen. No blood, no death, just confusion. Then I looked at my brother. "But now we really need to talk, Nathan."

"Yes," Simone said, frowning at us both. "You really do."

END

DISCUSSION

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⚡ What are the potential capabilities and purposes of a 'smart gun'?

⚡ How might this new technology be misused?

⚡ How can NATO effectively monitor and evaluate new weapons technologies for future unintended consequences?

⚡ How does NATO address the ethical concerns and unintended consequences for new weapons creation/management among its member nations as well as potential adversaries?

NORTHWEST PASSAGE

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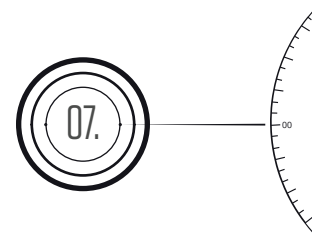
A METHOD OF BIO-MATERIALS ENERGY REDEMPTION GETS ABUSED, CAUSING MASSIVE DESTRUCTION IN THE OCEANS
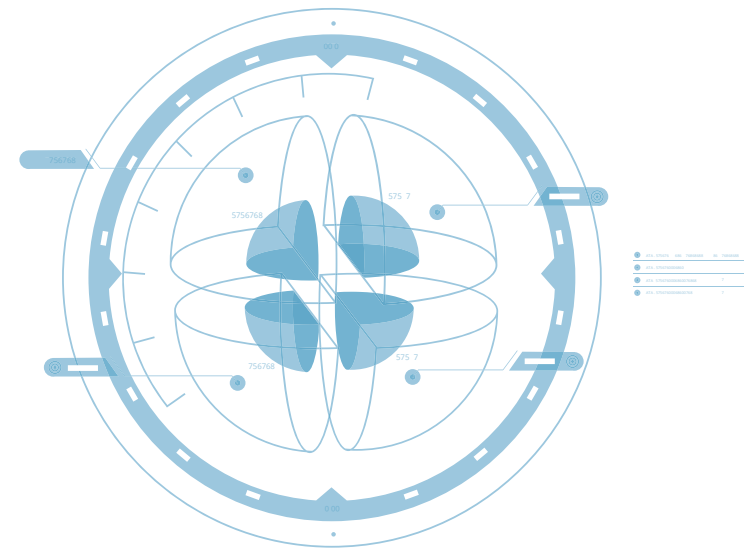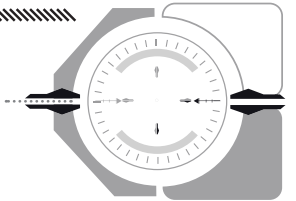
AHMED Jibrell leaned on the rail and watched the sea stream by. It was his first trip on the container ship *GlobalVenture* through the new Northwest Passage, Finland to Japan. He'd be away from Anna and away from little Leila for a long time. Months. He'd miss Leila's birthday. Well, it couldn't be helped.

Lars appeared next to him.

"Anything?" Ahmed asked.

"Dead zone has grown almost six percent. It's bad that it's this big." Lars paused. "Why didn't they stop it?"

"The technology?"

"Yes. Did we try? Buy them out, or something?"

Ahmed laughed. "Try to stop them? My friend, we funded it! This was a great idea. It was going to save us all!"

He slapped his friend's back and headed down to the small bare cabin, flipped his tablet open and checked the satellite maps. Red loops scribbled across the north Atlantic like a child's drawing. In the time lapse photos they grew, covering entire regions of the ocean. In the richest ocean in the world, one that should have been teeming with life, was an abundance of dead zones full only of stinking algae blooms that produced vile fumes.

And so here Ahmed was, *Kapteeni* in the *Erikoisjääkärit,* Finnish Special Forces, posing as a common sailor on a containership. Ten other ships sailing from Sweden, Norway and Finland, now all members of NATO, had similar crew. Three extended containers on the top deck held 60' *Jehu*-class boats; one more held German-made armed drones. More than enough to subdue the non-military Russian factory ship.

At the center of the damage on the map was a tiny rectangular shape. The factory ship. He knew there would be a fleet of smaller trawlers around it, shuttling in and out, dragging fine seine netting. Pulling in everything: kelp, small fish, krill, everything, each trawler leaving a path a hundred meters wide. Together the factory ship and the trawler fleet could make a dead zone a mile wide and ten miles long in a day. Day after day, they worked across the North Atlantic.

He looked back at the briefing book. Just an outline, really. Not much more than you could get from the news. The new two-stage process, how it could cook fuel from anything, any bio-mass. It was an extension of the old corn /

sawgrass ethanol process. They'd improved it; now you could dump any bio-mass into the tanks, and six days later it would be fuel. Five-to-one ratio, so five kilos of input made one kilo of fuel.

He looked away from the book. Yes, anything. It had seemed like such a good idea. Make use of agricultural waste, kitchen scraps, grass clippings, farm waste. Anything. It was a way to help the world economy wean itself off the last impulses of its dependence on oil.

> IT HAD SEEMED LIKE SUCH A GOOD IDEA. MAKE USE OF AGRICULTURAL WASTE, KITCHEN SCRAPS, GRASS CLIPPINGS. ANYTHING.

But nothing was simple. "Any bio-mass" meant anything. The equation was simple: anything organic could be fuel. The tabloids blared out lurid headlines of small, unregulated fuel stills, and missing dogs, cats, even homeless people. Unlikely, Ahmed thought, but it held people's attention.
He returned his attention to the satellite maps. This was not unlikely, this was real.

A Russian factory ship and the trawler fleet, in the middle of the richest ocean in the world. Vacuuming up everything alive, cooking off the fuel, and selling it to passing container ships in international waters. That's how desperate the Russians were getting with oil under $10 a barrel now for over two years.

Everybody talked, nobody acted to stop it, however, which just emboldened Moscow to furnish a fleet of biofuel processing ships. It started as an Article 4 consideration, brought up by the Norwegians for formal discussion among the Alliance members. "Damage to the environment on this scale cannot be tolerated and represents a collective long-term security risk for Europe." Yes,

and the purely economic costs to the winter fishing fleets exceeded the total income from Norway's oil sales last year. This was a real threat, all right, and an opportunity to cheaply give Putin a black eye of sorts at the end of his unprecedented fourth term. The Alliance took Oslo's bait.

Before he left, Anna had looked into his eyes. "OK, someone has to go," she said. "But why do *you* have to volunteer?"
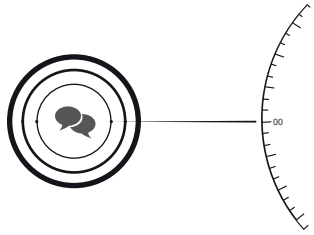
Leila would turn five soon. He'd thought about a trip; back home, to his birthland. Somalia was peaceful now, the trip would be fine. Lots of projects to see, Chinese and EU investment. They could drive down the east coast, through Kenya and Tanzania, see the parks. Leila would love it. All the wildlife from her books, there in their natural settings.

No. Not all of the wildlife, right? Not everything in the books. Not the rhinos. Not the wild dogs, not the gorillas.
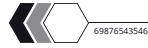
They'd been poached, shot. It was no different than what the Russians were doing to the ocean.

He flipped the tablet off, and got up to go check on his men and equipment. They'd be ready. It couldn't happen again.

END

DISCUSSION

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⚡ What geopolitical or military situation might force a country to do something that they know will ultimately be environmentally destructive to many, including their own people?

⚡ Where are the opportunities for early identification of strategic environmental vulnerabilities?

⚡ When and how should NATO intervene to prevent destruction to the environment?

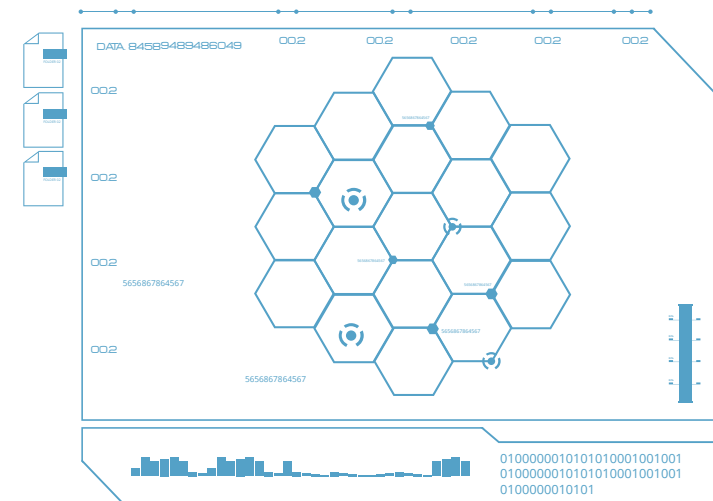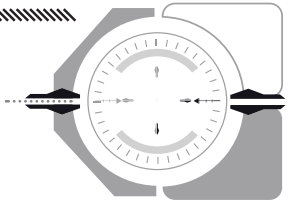⚡ Should NATO itself track "Environmental Security," or leave that to member nations?

THE QUIET ARMY

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TO THWART AN A.I. TAKEOVER OF A POLISH TOWN, AN OPERATIVE MUST AVOID HOSTILE LOCALS TO REACH THE HQ OF NATO'S NON-VIOLENT ROBOT ARMY

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MAJOR Adrian Szczech dropped out of the night sky. As he fell toward the town below, he tried to focus on his flight parameters, and not think through what was waiting for him on the ground. This HALO insertion was little different than the hundreds of other jumps he had made with the Operational Maneuvering Response Team of the Polish Special Forces (GROM). He was jumping alone into a void of information as black as the cloudless sky above him. In GROM they just called it "Tuesday." But this

mission was part of the newly formed NATO Unmanned Response Force, and it was different. He wasn't carrying his GROM-issue suppressed H&K 416, whose quirks he had learned better than his wife's. For this mission, Adrian was unarmed.

On the ground below, he faced an unknown number of hostiles, depending on how many people the rogue AI network had convinced to join its cause. It had done what petty dictators did—used gangs to take the town over, controlled the resources, and now it was yelling for ransom goods from the federal government. The AIs always wanted something, though sometimes it seemed they only wanted people to obey them.

AI breakouts started in 2035 when neural networks got big and fast enough to hack into virtual secure spaces and start transferring valuables and money into the hands of the people they needed to control real space. Gangs, mostly. Pissed off kids with guns. The first few AI uprisings were trainwrecks and Adrian had led GROM teams in, making pretty short work of them. When most gangsters see someone like Adrian pointing an assault rifle at them, they rethink their priorities. Adrian came to see that a machine without a willing army was just a machine.

> "
>
> NUMBERING ONLY A FEW HUNDRED PEOPLE, THIS WAS THE FIRST TIME NATO ESTABLISHED ITS OWN "ARMY"— A CADRE OF SPECIAL OPERATIONS FORCES SPECIFICALLY TRAINED TO COMBAT A.I.

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But the AIs learned fast. After the first few AI uprisings, things in Poland, and the rest of Europe and Russia, quieted down for a while. Expecting a lasting lull and aching to spend more time with his two sons, Adrian put in his retirement papers. Two decades of special operations work had also left him with two dislocated shoulders and four herniated discs. He didn't

relish the idea of months of nanotherapy he would need to keep up with the younger troopers, micromachines as the invisible hand helping him out of bed every morning. So he took a desk job with the Defense Ministry, developing counter-AI doctrine funded by a generous R&D grant from NATO.

It might as well be a law of nature, though, that silence is the largest indicator of impending disaster. The AIs weren't done: They were just distributing themselves. AIs that used to hide in big corporate computers (and once found, were pretty easy to wipe out) were now distributed over millions of devices, everything from CCTVs to smart phones. Within three months, Adrian was back on active duty, not with GROM, but with NATO's first "army."

AIs represented a transnational problem to Europe, and NATO's member nations saw the organization as the best way to share the extraordinary costs of deterrence and response. Numbering only a few hundred people, this was the first time NATO established its own "army," a cadre of special operations forces specifically trained to combat AI. They were trained, equipped and paid by Brussels, not their home governments, and Adrian was one of the most senior operators based in his home country of Poland. At night, he swore he could feel the nanomachines scraping scar tissue and rebuilding the tendons and ligaments in his shoulders.

The AI that had taken over the town below—Adrian checked his Vizion—yep, it called itself Druantia—was demanding access to a rocket capable of reaching Low-Earth Orbit, or LEO. No one knew for sure why it wanted it, but Adrian had a guess. Druantia wanted to launch a satellite, which it would've already put a version of itself in. Once off the ground Druantia would be situated in LEO alongside the thousands of government and private orbital communications and surveillance satellites. The reduction in latency would give it an edge over other AIs to orchestrate uprisings all over the globe, to demand something really big.

Adrian's Vizion flashed. The ground was close. He had turned off the auto release on his parachute because he liked the feeling of pulling it himself, and when he did he slowed, then deployed the canopy and silently floated

floated down into the city. He landed on target in a church courtyard.

The power was out. Everything was black, but his Vizion told him that he was just a block from the mission objective, a Polish military depot that was part of the new NATO Unmanned Response Force.

Adrian sprinted. Through his Vizion he could see figures moving through the darkness toward him. They were all young, holding their rifles like they'd learned to do it from American VR, which they probably did.

Adrian cursed silently. 'Cause here's the thing about being in the new NATO counter-AI army: He wasn't carrying any gun. Nobody in this army did. His weapon was better, command would say. Less deadly but more effective for the mission. As the figures moved toward him on the street, approaching like they believed they were invisible in the darkness, Adrian scrolled through options on his Vizion visor by looking left and blinking. There it was, his weapon: an LDT, or Local Device Takeover. Adrian blinked twice, selecting it and sending his pre-chosen command.

All at once the figures on the dark street dropped their guns. It might as well have been choreographed. Flash mob surrender, Adrian thought, smiling. But it wasn't that. Each of the people had a smart device. It was how Druantia was communicating with them, giving alerts and maps. It was how they knew he'd parachuted in. The LDT sent a command to hijack each smart device and then use a proprietary code to cause the battery to burst into flames. It was just enough to force them to drop their guns and toss their phones. By the time they'd figured out what had happened Adrian was inside the NATO Response Depot, and closing the door to the street behind him.

He was welcomed by the sight of rows of bots. Each had NATO emblazoned across its broad chest, but they looked anything but threatening. (If I'd made these things, Adrian thought, they'd look like tanks. But no—they're more like cute mechanical big brothers.)

Adrian made his way to the control panel and keyed in his one-off access code. The lights came up and the hundreds of bots all looked at him.

"Adrian Szczech," the nearest said. "Please initiate briefing procedure."

Adrian smiled at the way the bot had pronounced his name—perfect, even with a bit of the Wroclaw accent to it—and tapped the flash drive into the console. The bots angled their heads as they learned everything about Druantia, the satellite, and the tactical situation with the town's gangs. This was the most important part—the bots needed human commanders. There was absolutely no way they could just march out onto the street without the very complex code that Adrian had just parachuted in with. To network them was to risk compromise by an AI like Druantia.
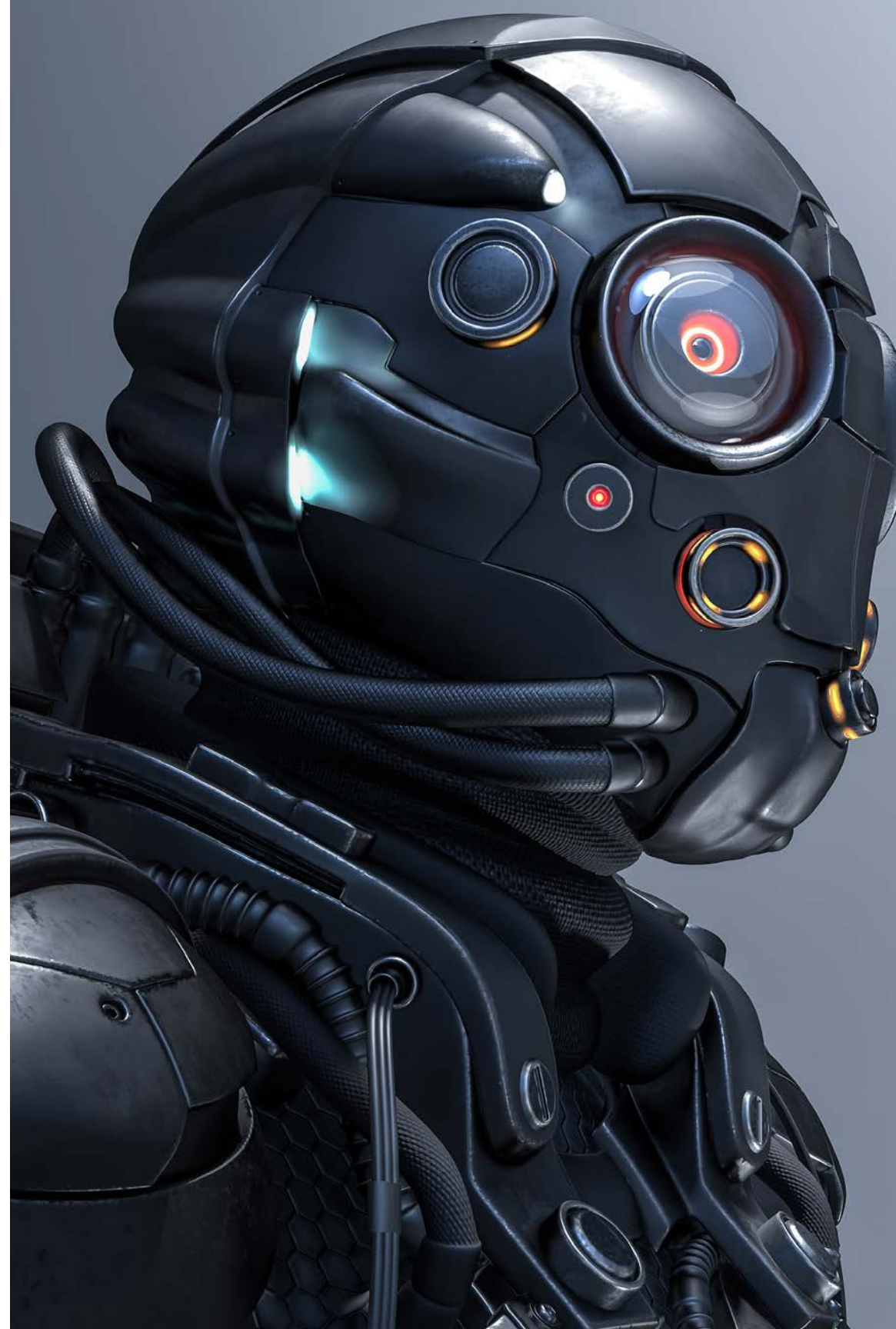
The briefing only took about a minute.

"Adrian Szczech," the lead bot said, "Please remain here while Unmanned NATO Response Forces deploy."

Yeah right, Adrian thought.

The bots rolled out of the depot in rows, exiting by various doors and rolling up side streets. Shots rang out, but the AKs the gangs had were no match for the bots' armor. In fact, shooting at a bot got it to turn to you and bow, like it was apologizing. Adrian knew that once the bots were in place they'd take up passive but forceful stances. If they were shot at repeatedly they'd fire back with rubber bullets or Tasers or directed soundwaves, but nothing lethal.

Right now, as sure as they'd be shot at, Druantia would be trying to hack its way into the bots' heads. It wouldn't work; the designers had made sure that each bot was only linked to one other bot. They formed a chain that could answer to a drop team's code, but otherwise, each bot was a tamper-proof safe, open to only another safe, and that to another: a locked network.

Even better, after a while, when the sun came up and the children of the neighborhood got brave enough to come up to the bots, they'd 3D print little toys for them. The toys were fun but they were also a message. Once the kids made their way home and their parents saw that the bots could 3D print anything they needed they'd come and ask for parts for water purifi-

ers, medical supplies, splints for broken bones. Some in local government argued that the bots in the URF should be out there at all times, printing goods for anyone that wanted them. The problem with that, Adrian knew, is that it created dependence. Fill a city with these miracle bots and in short order you'll get a population that can't do anything for itself except cut off the hand that tries to take the bots back. They worked best as a way to get the city back on its feet.

Once the city was secure, others would come, by truck this time, not parachute. Counselors. Hackers. Designers. Whatever they needed to uproot Druantia and get the town healthy and running again. To make it human again.

Following the bots down the street, Adrian shook his head.
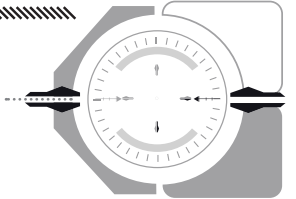
It sure beat shooting his way in.

END

DISCUSSION

Is there a way to conduct an entirely non-violent military response to an armed incursion?

What are the advantages/disadvantages of prepositioning unmanned systems? What if those forces are semi-autonomous vs fully autonomous?

Much like Isaac Asimov's "Three Laws of Robotics," should there be global safeguards imposed on civilian developers of AI? How could NATO implement internal safeguards among member nations?

What is the role of special operations forces in conducting clandestine cyber operations?

If a population is in need of post-conflict economic and development assistance, how does NATO assist without leaving them dependent on intervening nations?

DISCORD

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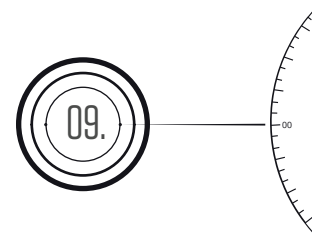
MUSIC CREATED BY ALGORITHMS TELLS THE STORY OF THE FLOW OF BUDAPEST; DISCORDANCE TELLS WHEN IT'S IN TROUBLE
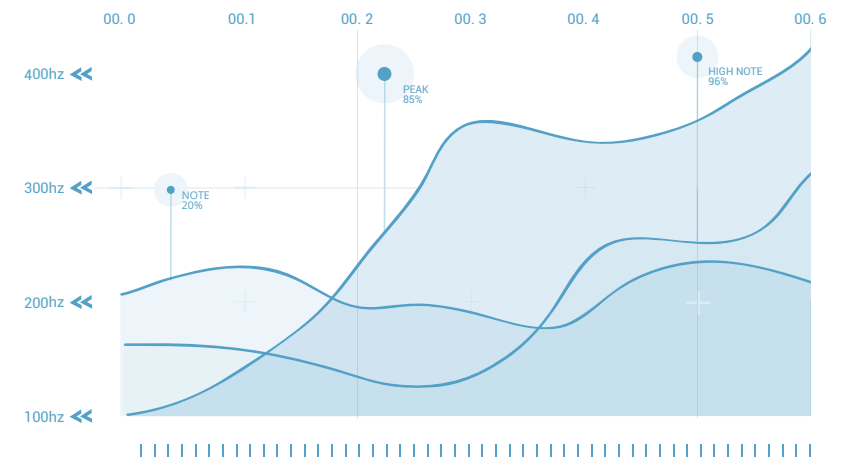
ZOLTAN sat suddenly upright. The music had changed. High, sharp notes chimed where only a chill, soothing ambient melody had sounded before. Now metal drums joined in, playing a fast tempo. He set his knitting down, not even bothering to remember the stitch count. The discordant pop-ish tune told him something was very wrong.

Both hope and fear coursed through him, speeding his pulse. It was hard,

waiting and listening all day. He wanted to be useful, but he didn't want Budapest to face any real danger, either.

Zoltan turned the music down and pulled up lists and graphs of network traffic. His music was generated by the flow of that traffic, transforming any unusual spikes or lulls into an audio signal, which he could easily discern. Most of the time it was just ordinary variations. A router broke down, causing another to work harder. A new game launched, clogging some previously unused port number. Occasionally some hackers acted up, or malware triggered and began to spread. Nothing he was interested in. He was here to watch for threats to life and property, not scams or petty hacker wars. "A computer could do it," people told him, but they were wrong.

The computers missed it last time.

The basement where he worked was draped in festive Christmas-themed LEDs; embroidered wall hangings attempted to bring warmth and softness to the windowless concrete walls. Pipes in the ceiling above creaked and clanked, and the air was always damp. But Zoltan spent twelve hours a day here, hoping he picked the right shift to catch the next threat. It was more familiar than his apartment, and he spent more time with his chair than he did with Magda, his wife.

None of the typical spikes or hazards showed up in his manual check. All the routers and trunk lines were fine. He kept searching.

Three years ago hackers had found a way to hack the transit system and redirect all the cars, blocking access to a research hospital while militants broke in and stole both drugs and dangerous infectious agents. The drugs were sold to buy weapons. The infectious agents wound up being used in Ukraine. Poor Lviv.

Zoltan was the consultant who figured out the hack. The cars hadn't been breached, which is what everyone assumed. Getting consumers and manufacturers to care about security was nearly impossible, but that hadn't been the weak point this time. The attackers tricked the congestion-routing algorithm.

Back then, the people demanded a response, so the Lord Mayor allocated some budget, and Zoltan wound up in this basement, listening to music and knitting, day after day, both hoping for and fearing the next incident.

Still, none of these graphs showed anything too unusual. He was missing it. So what normal things were going on? There was the big book fair down at the new convention center, happening all week. A National Assembly session, but that was a regular occurrence. Plus the big expansion project at Kelenföld power plant.

> ACROSS EUROPE, SEVEN CITIES WERE TARGETED THAT DAY, AT THE SAME TIME, USING THE SAME TACTICS: LURE LARGE CROWDS INTO CENTRAL AREAS WITH ORDINARY-SEEMING EVENTS, CONVEYED VIA SOCIAL LINKS

The personal sharelines showed a spike of activity. That was the high pitch. Zoltan pulled up his false popular-teenager identity to see what the buzz was about. The girl group True Bootzie was in town and had just announced a surprise free concert at Bikás Park. That was strange, but didn't seem suspicious. Standard publicity stunt.

That wasn't the only thing people were chattering about on the sharelines though. ElectronSHOP was having a huge sale, two for one on the VR lightweights. Now that was ridiculous. Last he'd heard the new lightweights were sold out, none available at any price.

Maybe the naysayers were right. The budget for his joke of a "department" was just about gone, and unlikely to be renewed. He didn't cost much, in the greater scheme of things, but a man sitting in a basement knitting while listening to music, and detecting only harmless blips in data wasn't worth even

that much. The anti-drone nets around Parliament always needed repair. A few more cameras at the borders might make all the difference. Even one more soldier with a gun was something you could point out to taxpayers.

Zoltan's messenger buzzed. It was Magda. "Did you see the sale? I know money is tight but should I get four?"

Zoltan didn't answer for a moment. He was still missing it. A spot on the city map lit up with red, but it was just a water main broken, something that happened too often in old Buda.

"Are you there?" Magda repeated.

"I am. Don't go. It's not real."

"I just talked to Ildi, who got two sets!"

"Okay, maybe the sale is real, but somehow it's a trap. I have to get back to work." He dropped the connection. The map where the water main break glowed told the story. Between the convention center and the water main was the ElectronSHOP, and between ElectronSHOP and Bikás Park was the Kelenföld power plant. The power plant that was undergoing renovation, with who knows how many unknown workers going in and out every day. Zoltan picked up the phone. It was an antiquated thing, but hardwired and secure. "We have a situation. Crowds are being manipulated into converging on Kelenföld. There's got to be something dangerous inside. We need to get everyone away from there."

———||||||||||———

Across Europe, seven cities were targeted that day, at the same time, using the same tactics: lure large crowds into central areas with ordinary-seeming events, conveyed via social links. Block escape routes with obstacles, then set the explosives off.

Everyone knew to scan big, public events for threats. No one had foreseen

the possibility of someone fabricating an event and drawing the victims to the target location.

In Budapest, though, the crowds were dispersed, the bombs secured and safely detonated. In all the others, hundreds were killed and thousands injured. Network tracing led back to Russia, but they denied it, and anything could be spoofed.

But the Ministry of Defense, and soon after, NATO, took an interest in what was once just the mayor's project. Now Zoltan still worked in a basement, but a much better one: it was expansive and dry, with a free vending machine. Armed guards protected its doors. His new assistants learned quickly and helped listen around the clock. His wife joined him on a trip to Estonia to see if the new NATO Cyber Command in Tallinn could replicate his cacophonous prescience in Berlin, Paris and even London. The next attack would be different of course, but Zoltan would be watching. Listening rather. Listening and knitting.

The baby blanket was almost complete, if imperfect. But it was just in time. His daughter was due soon.

END

DISCUSSION

- How can NATO anticipate hostile, but unattributed, social media influences – and disrupt them?

- What is the most effective way of monitoring large groups of people without violating European and global standards privacy and civil rights?

- Can NATO develop defensive solutions for social media to prevent population manipulation?

- There are known principles for securing existing physical locations (e.g., nations, facilities, etc.) What are the approaches for responding to more fluid/dynamic situations in which people suddenly aggregate in a new location? (e.g., methods of preparation, response, etc.)
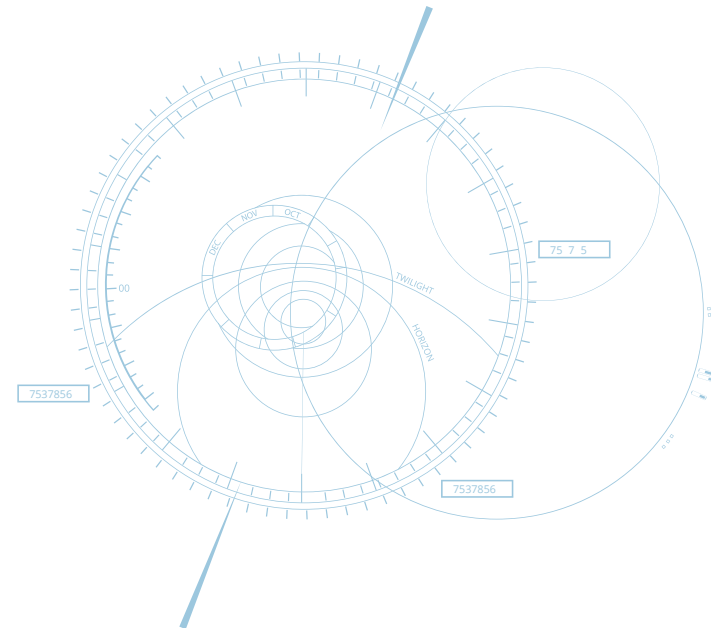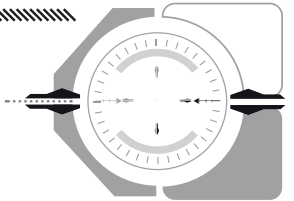
TRUTH BOMBS

10.

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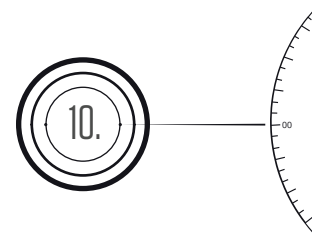
CIRCLING IN A PLANE OVERHEAD, A NATO OPERATIVE INFILTRATES A SOCIAL NETWORK MANIPULATED BY THE RUSSIANS BY ATTACHING TRUTHFUL REFERENCES TO SOCIAL MEDIA CONTENT
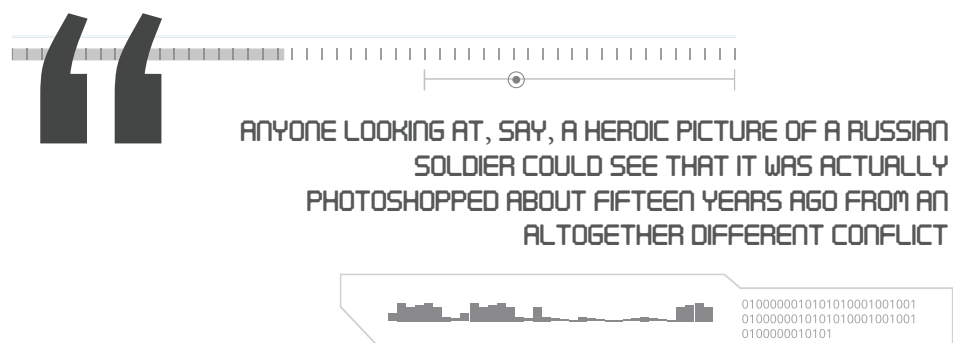
THE U.S. Air Force E-3 Sentry AWACS (Airborne Warning and Control System)—a dreadnought of the info age based on the 707 jetliner that first flew in 1957 -- held station 20,000 feet over Estonia. Audra stood in the center of the E-3, call sign "Tempest 17," flexing her legs as the aircraft

banked, looking around her, amazed that she was finally in combat. Of sorts.

Normally an E-3 might as well have been bolted together spy tech thrown through the air for all the grace it had. But this aircraft, an E-3X variant, was stripped down, empty as a stage built just for her. Which it was. The aircraft's VRBMS virtual-reality battle management system put her at the center of all of the web traffic going on below in Tallinn. The VR rig made her feel like she was standing in Tallinn, the medieval part of the city. She didn't see a soul on the streets but she could hear the occasional shot from a mile or two to the north, where all the action was.

The VRBMS system had an avatar. It stepped out now from a shopfront to Audra's right and smiled, greeting her. The avatar had a personality, which it learned from working with her for the past six months during stateside training in Nevada. United States Air Force Captain Audra Standish, had a PhD in satellite imaging, focus — Paleotempestology.

> ANYONE LOOKING AT, SAY, A HEROIC PICTURE OF A RUSSIAN SOLDIER COULD SEE THAT IT WAS ACTUALLY PHOTOSHOPPED ABOUT FIFTEEN YEARS AGO FROM AN ALTOGETHER DIFFERENT CONFLICT

"How can I help, Captain?" the avatar said.

"Show me the most active Tallinn social networks."

"Yes, ma'am. No more chasing the storms of a distant past," the avatar responded.

Audra had indeed studied the mega storms that happened millions of years ago, but had joined the Air Force when she began to feel like her academic work wasn't helping people in the real world. After eight years in the Air Force, they'd finally figured out what to do with her expertise in catastrophe modeling: send her to an increasingly chaotic northern Europe. Which was how she'd gotten assigned to the NATO Airborne Dynamic Response Force based out of Geilenkerchen, Germany where her aircraft had arrived only a week ago.

As Tempest 17 turned lazily, forests sprung up in the VR world around Audra. The one to her right was massive and dark—Facebook. Instagram, in front of her, was only slightly lighter. VK.com and WhatsApp glowed modestly. To her left a beautiful, shining forest was labelled Tallinn Action Network. The forests had been the avatar's idea. The bigger they were, the more members they had in the real world (specifically in Tallinn), and the lighter they were, the more activity was happening.
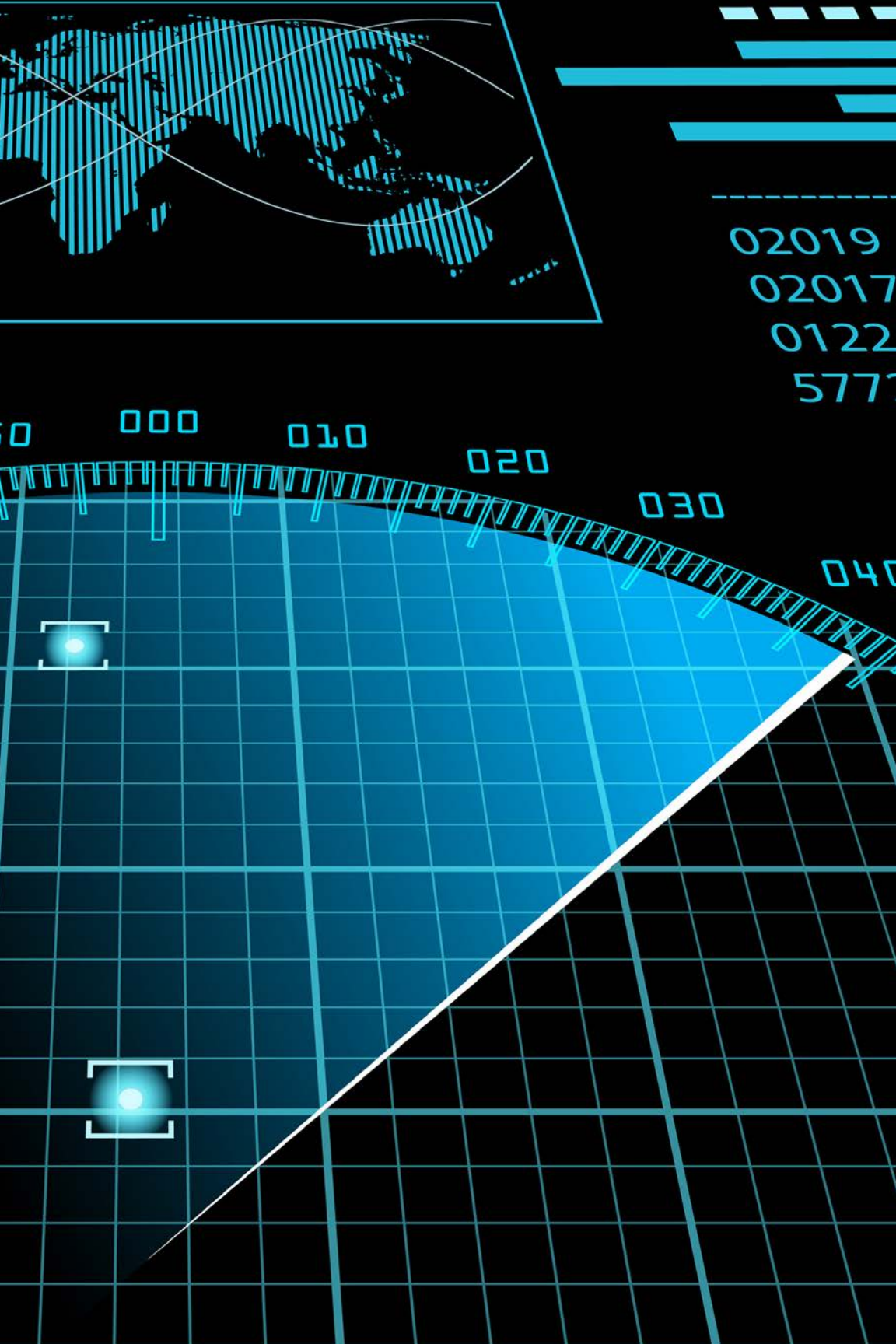
"The Tallinn Action Network is going crazy," Audra said. "Give me the most recent updates."

"Launched three weeks ago by an unknown entity. It is gaining members very quickly. Some estimates suggest as many as ninety percent of the people under thirty in Tallinn have joined it."

Audra gestured at the glowing forest and it raced forward, immersing her. She was among the glowing trees now, watching information fly back and forth. News stories. Images: People shooting AKs; Molotov cocktails sailing through the air; bodies on the ground, dead in a park. Tweets. Texts. Everything that was happening over the new social network.

"Notice anything?" the interface said.

"You kidding?" Audra asked. It was right there, after all. When viewed in this holistic manner, it was clear everything on the network was very pro-Russia—the articles about the militias and the Russian "Little Green Men" that had come into Tallinn to "protect" its population from the strife; the pictures of Russian operatives against beautifully-lit backdrops might as well have been propaganda posters; pro-Russia shirts were for sale, as were, in a dark

corner of the forest, small arms and explosives. It was clear that Russia had created the social network, and after it gained popularity with young people in Tallinn, was feeding them misinformation. When looters hit the streets to take advantage of the cyber-attacks on the Estonian power grid, they were further whipped into anger by the false things they'd seen on the Tallinn Action Network, undercover Russian military agents were there to further enflame them, of course.

"Open up filters on this network. I want full vetting of every word, image, and source."

A current of little blue triangles flowed into the forest, representations of the battle management system attaching footnotes to everything being sent back and forth down in Tallinn. The blue triangles represented her directing open-source, mostly civilian volunteer vetting groups drawn from experts in NATO member countries. Right now anyone looking at, say, a heroic picture of a Russian soldier could see that it was actually Photoshopped about fifteen years ago from an altogether different conflict (graphic designers spread all over the open-source network had quickly discovered that, and agreed to a ninety nine percent certainty). Anyone reading an article about the Russian irregular forces' heroic arrival could see that the article had originated from a Russian Army Psy Ops unit (computer specialists were managing to trace source codes—all of which were Russian tech). Anyone trying to buy small arms or explosives could see that they'd been brought in by Russian agents to unbalance the city, a fact which was bolstered by CCTV footage of vans crossing the borders, which matched CCTV footage of the same vans having AKs being unloaded from them in Tallinn.

In Audra's experience, for every storm there was some natural element that would dismantle it; the best deterrent to conflict was truth. Absolute, open-source truth. The civilian volunteer vetting groups were the best way for this to happen. Audra had heard people suggest that the CIA come in and vet the information in a situation like this, but of course that could make it worse. How would the average person in Tallinn feel hearing from the CIA that the Russian military was orchestrating a takeover? They'd feel like an ant standing between two heavyweight boxers. It was far better to let them get their

truth from people like them; those people were just spread across the world. She chuckled, thinking about how this ancient jet designed for the Cold War contest in Europe could once again be the decisive element -- not by directing bombers and fighters but by shouting the truth to anyone who was even half-willing to listen. Civilian know-how and willingness to participate were going to win this fight long before they needed to bring tanks in. Audra laughed at the irony.

"Did I miss a joke, Captain?" the interface asked.

"Just keep flooding that social network with facts," she said. "Drop truth-bombs until Tallinn fixes itself."

END

DISCUSSION

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⚡ Is the open-source information used to provide "truth" in the story an effective way to combat disinformation? Is there a better way to develop narratives with battlefield effects?

⚡ Can open-source NATO information operations become trusted voices or does attribution reduce effectiveness?

⚡ What are unethical ways to use disinformation to counter disinformation?

⚡ Do you think a narrative ("truth") is a powerful enough weapon all on its own to end, or shorten, an armed conflict?

⚡ Propaganda has traditionally been based on disinformation and to generate domestic support. How can transparency be used more effectively in a real-time manner with social media and other communications tools?
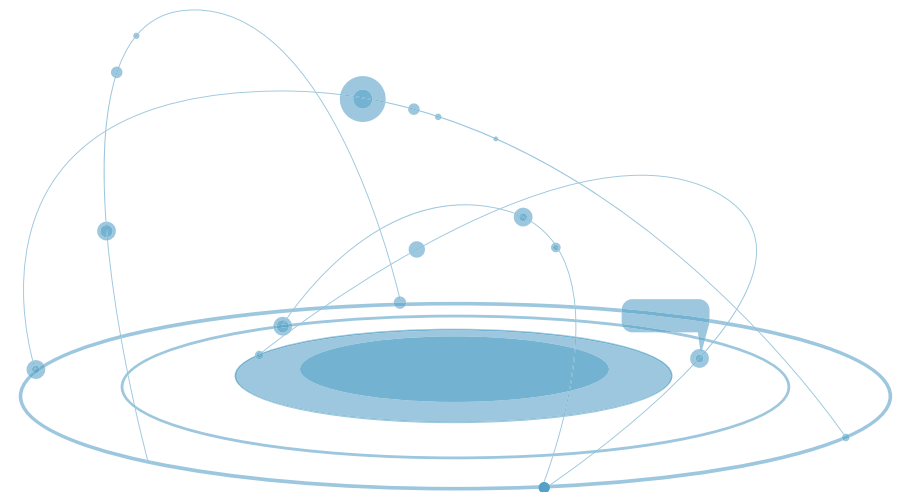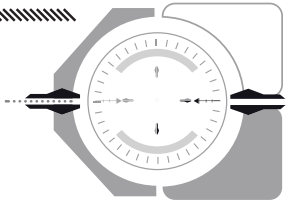
RAPID DEPLOYMENT

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A FANATICAL HUMAN ELIMINATION GROUP STEALS NATO MILITARY SUPPLIES TO EQUIP AN INEXPERIENCED, BIO-ENHANCED FIGHTING FORCE

NATO//DISTRO ALL/INTEL
ATTN: DCOS OPERATIONS AND INTELLIGENCE
SUBJ: AUTONOMOUS MODULAR FORCES DEPOT (AMF) RISK ASSSESSMENT

Summary: AMF military vehicle depots are now online in all NATO member nations for rapid global deployment by the Alliance. Each depot contains components required to construct the following (or combination thereof):

- 100 Semi-Aut Class 3 MisTRAL "jeeps" w/ modular offensive

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systems (short-range GNAT micro-rockets, etc.)

- 60 Aut class 7 tanks w/ 125mm cannon and modular offensive
systems (MEDUSA swarm missiles)
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Fabrication cycle: Components are, where possible, generic and reusable. Development of further models using the same components for maximum on-field flexibility is in progress. Primary cost for deployment is thus construction time, measured in hours rather than months.

Primary risk factor: Penetration of depots and theft of contents by enemy factions, despite low-risk locations.

Fail-safe: Critical firing mechanisms are not stored with weapons. Each depot holds a remotely activated 3-D printer to create the missing components, meaning both depot and control centre must be compromised.

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Boris Simandl was a new recruit to the Human Extinction Movement (HEM), and ready to become a hero. The hacking of military security was so far beyond his comprehension, he struggled to be properly impressed. Or to appreciate the irony of the Human Extinction Movement's stealing bio-enhancements capable of creating supermen. He was too busy staring at the mirror open-mouthed. A week ago he and his best friend were different men. They were nothing-boys who seemed to be failing at everything, even growing up. Boris was 32 years old, stomach sagging, face ravaged with acne scars. He'd known Fernando, standing next to him, since they were teens. Fernando was 50 kilos overweight with sallow skin. Time had not been kind to him, either.

Now both men had bulging chest muscles and taut stomachs and looked better than any video game hero's skin they'd inhabited. Whatever else they achieved, the HEM operation was worth it for this moment alone. He stood among his friends as fit as any military's most elite soldiers. He was better than the best their countries could give.

A siren sounded. Two-dozen operations started throughout Western and Eastern Europe. At each, twenty makeshift soldiers stormed ordinary-looking but well protected warehouses, retrieving components to construct combat vehicles on the spot. This was not tactical genius; it was a matter of seeing the security flaws created by foolish pride: the various governments in charge of protecting their military assets never considered HEM capable enough to compromise the depot's network and physical security, let alone that they would be able to then put the pieces of Europe's most advanced weapons together like LEGOs.

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<div align="center">NATO//DISTRO ALL/INTEL</div>

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ATTN: DCOS OPERATIONS AND INTELLIGENCE
SUBJ: URGENT ***SECURITY VULNS AT AMF DEPOTS*** URGENT
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###SITREP###: Abnormal activity confirmed at AMF Depots in all 28 NATO member nations as Human Extinction Movement (HEM), a terrorist cult which believes humans must be eradicated for the sake of the planet. Not surprisingly, they believe they should be the last to be eliminated, not the first.

```
HEM forces consolidating in areas with heavy distribution of
military warehouses. Through the promise of bio-enhancements,
HEM numbers have swollen. They have the manpower to create
and deploy ad-hoc armored units with the on-site components
available. They have demonstrated the ability to disable re-
mote IFF systems: therefore all autonomous and semi-autono-
mous units can be employed against local and civilian targets.
However, to reduce collateral damage, rather than empty the
warehouses, we can use the depot contents to our advantage.
Further components to enhance the vehicles are being expedit-
ed to the two dozen depots HEM operatives have penetrated. In
addition, local 3-D printers are creating enough firing mech-
anisms to outfit every vehicle.
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Boris and the rest of the HEM members raced to construct their mobile units; creating six-wheeled MisTRAL jeeps using online manuals. They couldn't resist attaching as many weapons as they could. If Boris could imagine it, like a micro-rocket launch box secured to an Active Defense turret,

he had the means to make his dream a reality yet again. It was difficult, for sure, but that was the challenge. When he cast a look over at Fernando's jeep, it looked more like a lopsided tank because the directed-energy laser turret required such a big power and cooling unit hanging off the side.

> ❝ THIS WAS NOT TACTICAL GENIUS; IT WAS A MATTER OF SEEING THE SECURITY FLAWS CREATED BY FOOLISH PRIDE

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Boris chuckled, and clicked the last piece into place. Looking around inside the depot, he realized there were a lot of components left over. Ceramic armor plates, LIDAR sensor pods and drone charging pads, among others. When he stepped back to take a picture of his MisTRAL, he realized his was lopsided like Fernando's. He wasn't sure why the left side jutted out further than the right. It might have been the way the reactive armor was secured to the extra rail mounts for the fuel-cell chargers. But it sure looked lethal, and it would be fast. No question. They could storm the city and nobody would be able to bring so much firepower to bear so quickly. Once they held the city, HEM said they'd take the country, and once HEM held the country, then it would not stop until it wrested the Earth from humanity's yoke. One attack at a time…

Boris wasn't 100% certain that mankind was so bad that killing everyone was the only option. Maybe just rich folk and politicians. That would send a message and maybe get civilization back on track. As to actually eliminating all humans from the planet? Well, he'd cross that bridge when he came to it. Because he had more pressing questions: how to actually drive the MisTRAL?

#

NATO//DISTRO ALL/INTEL
ATTN: DCOS OPERATIONS AND INTELLIGENCE
SUBJ: URGENT *** AMF DEPOT INCIDENTS RESPONSE*** URGENT

###SITREP###: Intelligence confirms HEM assembling components at all 28 depots into 372 semi-autonomous MisTRAL jeeps. Simulator training enhancements readily accepted by the insurgents. Most did not recognise the add-ons. Those who did apparently saw no risk in installing them. HEM leadership appears unaware that tactical training might not be appropriate for the userbase and unsafe in an urban operating environment.

ALLCON: Resulting MisTRAL jeeps are online, with offensive and defensive systems enabled. Civilians will be evacuated from the affected areas by civil defence teams. Final assembly and deployment by HEM forces expected to be completed within the next 6 hours.

#

If Boris had time, he would have given in to the creative impulse to paint "Frankenstein" on the side of his MisTRAL. Sitting beneath the jeep's armored carapace driver's seat, he was in a hurry to get to work saving the world by destroying it, however. HEM's operational savvy that allowed them to penetrate the NATO depot defences required real operational discipline: He had no communications, just an actual paper map with hand-written instructions on the back to meet at the old border crossing by the river, maybe five kilometers away.

Something flashed in the distance and his viewscreen went dark. When it cleared, a Russian Armata tank was bearing down on him. Boris screamed before the MisTRAL stepped in to engage the target.

A bright red light flashed on the dashboard, highlighting the firing status of his guns: armed and target locked. He gulped and then, following the onboard combat system's prompts, fired on the tank. At such close range, he had to dodge the Armata's active defence systems, which sprayed metal into the air to shred the barrage of rockets fired by Boris' MisTRAL. The jeep slid to the side, avoiding the worst of the flak. Boris poked the button marked target lock again and then fired, letting the MisTRAL select the weapons to be used.

A whining sound filled the air and a volley of micro missiles crunched into

the ground. For a moment, he thought he'd missed. Then, the bright light of the tank exploding made him flinch and close his eyes. When he opened them, only smoking wreckage was left.

In the distance, three jeeps approached. Friend or foe? Too well-made to be his HEM brothers; adrenaline coursing through his system, Boris daren't take any chances. He didn't want to waste this new body. He told himself he was a fast learner: he now knew how to target and fire the missile launcher. The jeep threw itself in reverse to evade, and he sped backwards as he targeted the right-hand jeep. Lock and fire. Lock and fire. Child's play.

Another jeep appeared behind him. Friend, he thought, until he heard the triple beep of a missile lock. He was being targeted by another Armata tank!

Near the bridge, up ahead, was some sort of blockade of cones and metal barriers shaped like Xs. A button flashed on his dashboard: full manual control. Now or never, he thought, time to drive. He punched the accelerator and turned the wheel hard to spin the jeep around. Narrowly missing the roadblocks, he re-targeted the laser cannon on the Russian tank and accelerated under full power to ram the tank with as much force as possible. Maybe he wouldn't survive but at least he'd give his brothers a chance to make it.

The last thing he saw was an image on his viewscreen: Fernando's shocked face as both jeeps fired point blank at one another a moment before colliding at high speed.

#

NATO//DISTRO ALL/INTEL
ATTN: DCOS OPERATIONS AND INTELLIGENCE
SUBJ: AMF DEPOT INCIDENT AFTER ACTION REPORT

Summary: Employing the AMF training simulator to override their onboard battle management systems at the moment the HEM forces deployed their MisTRAL jeeps sufficiently disoriented them. Approximately 87% of the assembled units were destroyed without outside intervention: the majority of these were caused by the users selecting manual drive (a setting for the
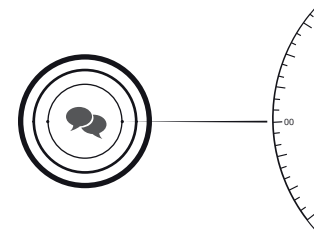
obstacle course) and then losing control of the vehicle as well as weapons systems.

#

The simulated environment overlay onto the MisTRAL viewscreens caused further issues and a number of the drivers drove into buildings whilst avoiding VR obstacles.

The remaining HEM vehicles surrendered to local military police.

DISCUSSION

Do you think it is possible that an extremist non-state actor group might use genetic engineering in the future to build a superior fighting force?

Was it smart for NATO to let the situation play out rather than send in forces to reclaim the maker depots?

How much control should specific military units have over development and modification of their equipment for a given mission?

How can equipment and weapons platforms be rapidly customized for mission parameters, while also ensuring these capabilities don't fall into the wrong hands?
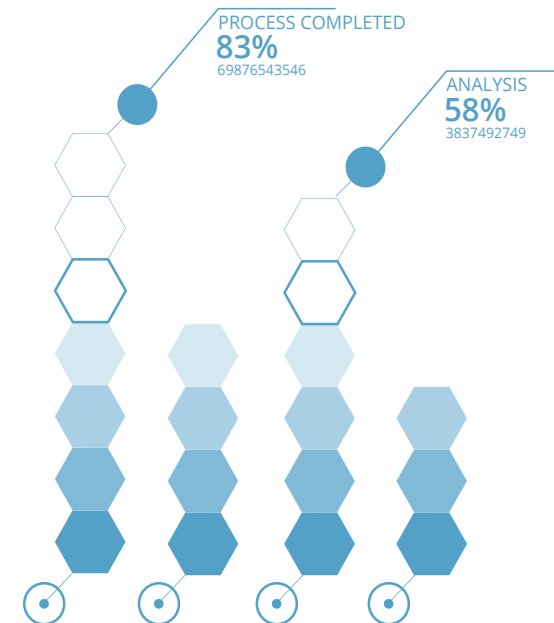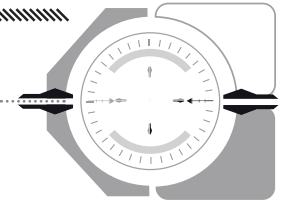
12. BALANCE

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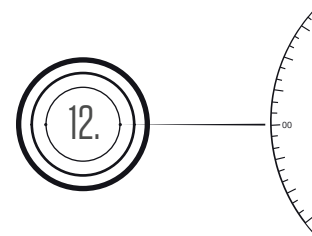
A SPECIAL FORCES OPERATIVE, WHO IS ALSO A DOCTOR, GAINS ADMITTANCE TO A TERRORIST CAMP -- WHERE SHE TRIES TO DISABLE A MILITARY GRADE 3D PRINTER

PROCESS COMPLETED
83%
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ANALYSIS
58%
3837492749

FINE rugs carpeted the floor. On a burnished table, a silver samovar hissed with the aroma of salted tea. Shahr Ahmad Malak, commander of R210R, was dressed in immaculate fatigues, a Chinese smart identifier gun slung over his shoulder. "My wife tells me that my daughter and new grand-

son would not be alive today, if it were not for you and the ICRC."

Joan Pascal, wearing expensive European hiking pants and an unzipped red down jacket with an International Committee of the Red Cross (ICRC) patch on the right shoulder, nodded. "I manufactured blood to match your daughter's rare type, and treated your grandson with anti-jaundice nano-bots."

"Unfortunately they couldn't attend a public hospital due to the Indian government's intense scrutiny of my family, and PFOR tracks my every move," said Malak. Allegedly funded by Pakistan and China, R210R were Kashmiri separatists with the ultimate aim of removing all non-Muslims from the Indian subcontinent. R210R was designated a terrorist organisation by the NATO peacekeeping mission in Kashmir, PFOR, which operated under a UN mandate to keep the increasingly dangerous region from turning into a humanitarian disaster – and a global conflict. European forces, deemed as impartial as any side could be in the decades-long India-Pakistan conflict, tried to tamp down terrorism and violence as best they could. It was a losing battle, which Pascal knew too well.

"Is it true that the beads in your necklace represent every life you've saved?"

"Forty-nine beads."

Shahr passed over two pearls, one large and one small. "For the life of my grandson and my daughter."

"Thank you. With your permission, I'll use the pearls to buy more medicine."

"But you have your medi-printer. Your miracle machine, making medicines from sand."

"Technology has limits and some drugs are very expensive here."

"Drugs should be free to all, like they are back in your Canada," said Shahr. "As you say."

"But Joan, why did you lie to me? You claimed to be only a midwife, when

you're a physician."

"I apologize. Some community leaders don't approve of women doctors. An omission sometimes helps me reach women most in need."

"But I'm not an uneducated man. I'm a skilled data-miner, which is how I found your true identity in the UN database. I'm no misogynist. Even some of my soldiers are women."

"I apologize again."

> " I MANUFACTURED BLOOD TO MATCH YOUR DAUGHTER'S RARE TYPE, AND TREATED YOUR GRANDSON WITH ANTI-JAUNDICE NANOBOTS

Joan watched him, then averted her eyes, studying her heavy-duty boots. It was no mistake. It was a careful piece of psychological profiling. Shahr took the bait. "I believe you, as a physician, would treat any patients in need. Any patient. Even if they belong to an organization you do not approve of."

"That's true. I can't, and won't, refuse a patient treatment."

"Very well. Then I would like to invite you to visit my family compound. We have so many patients there. See you don't forget your magic box."

Joan gave silent thanks to the Profiling Unit's AI, the plan was all proceeding on-script. Her mission objective was in reach.

Shahr's men led her to a black van. They politely informed her that the vehicle and the compound were data-shielded and she'd be out of contact with her superiors.

Hours later, they arrived, undoubtedly having crossed into Pakistan-controlled Kashmir.

Doctor Hasin Munar was the compound's amiable physician. He hastened Joan to a rudimentary but very clean 18-bed ward, but cautioned her that some of the patients didn't value Western medicine.

"I'm also a practitioner of traditional Ayurveda medicine. I requested a transfer to Kashmir to have the honour of working in the birthplace of the Father of Medicine."

"The great Charaka! You value his theories?"

"I know the importance of balance," said Joan.

Balance was important in all things. Kashmir had been pulled between three nuclear powers for too many decades: India, Pakistan, and China. Very recently, that balance had tilted. Joan's mission was to right an imbalance that could tip those powers into war.

She found her evidence in the medical bay: fatigues with biomimicry, a lightweight helmet with smart glass, a motorized exoskeleton with an inbuilt cooling system. No illicit arms deal sourced these: they were clearly fabbed inside the compound.

Shahr had somehow stolen a military-grade 3D printer and bypassed the security, manufacturing advanced tech, potentially changing the balance in the region.

A dozen patients exhibited second and third degree burns. Only the latest Active Denial System's electromagnetic radiation made burns in that pattern, its electromagnetic radiation heating the skin to 140 degrees. Had he tested the weapon on his own people, or had they been hurt due to its improper use and lack of training? Regardless, here was evidence that the stolen printer was manufacturing weapons.

The patients should have been in a critical care burn unit, but Shahr wouldn't allow that. Joan printed painkillers, emulsifiers and nanobots to keep the skin clean and to prevent toxic tissue-decay and other infections. The stolen printer had obviously not been used to manufacture treatments. They probably didn't know how.

Joan worked all day with Manur, balancing vata, pitta and kapha with her nanomachines she manufactured that were so small as to be all but invisible.

Then it was time to return. But not before she'd completed her mission: all day long as she fabbed medicine, alongside it she produced poison of a sort. These special nanobots followed advanced manipulations protocols to seek out the stolen printer and cause it to fail without a trace of tampering.

Because there would be a time when Joan Pascal would return. Perhaps not as a midwife or doctor, but as her true identity: a Canadian Joint Task Force

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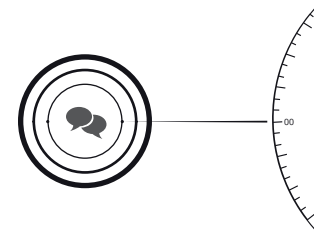
DISCUSSION

- What new legal and ethical rules are needed when targeting specific machines or devices for destruction with nano-weapons becomes possible?

- How will HUMINT (human intelligence) operations evolve in an era of persistent surveillance, personal targeting and nano-scan weapons?

- What are some of the unintended consequences of disruptive emerging technologies (e.g., molecular printing)?

- Does increased cultural understanding lead to more successful mission outcomes? How does emerging technology help NATO improve cultural sensitivities and awareness?
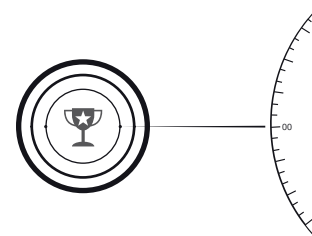
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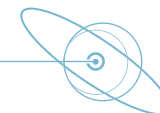Ari Popper
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