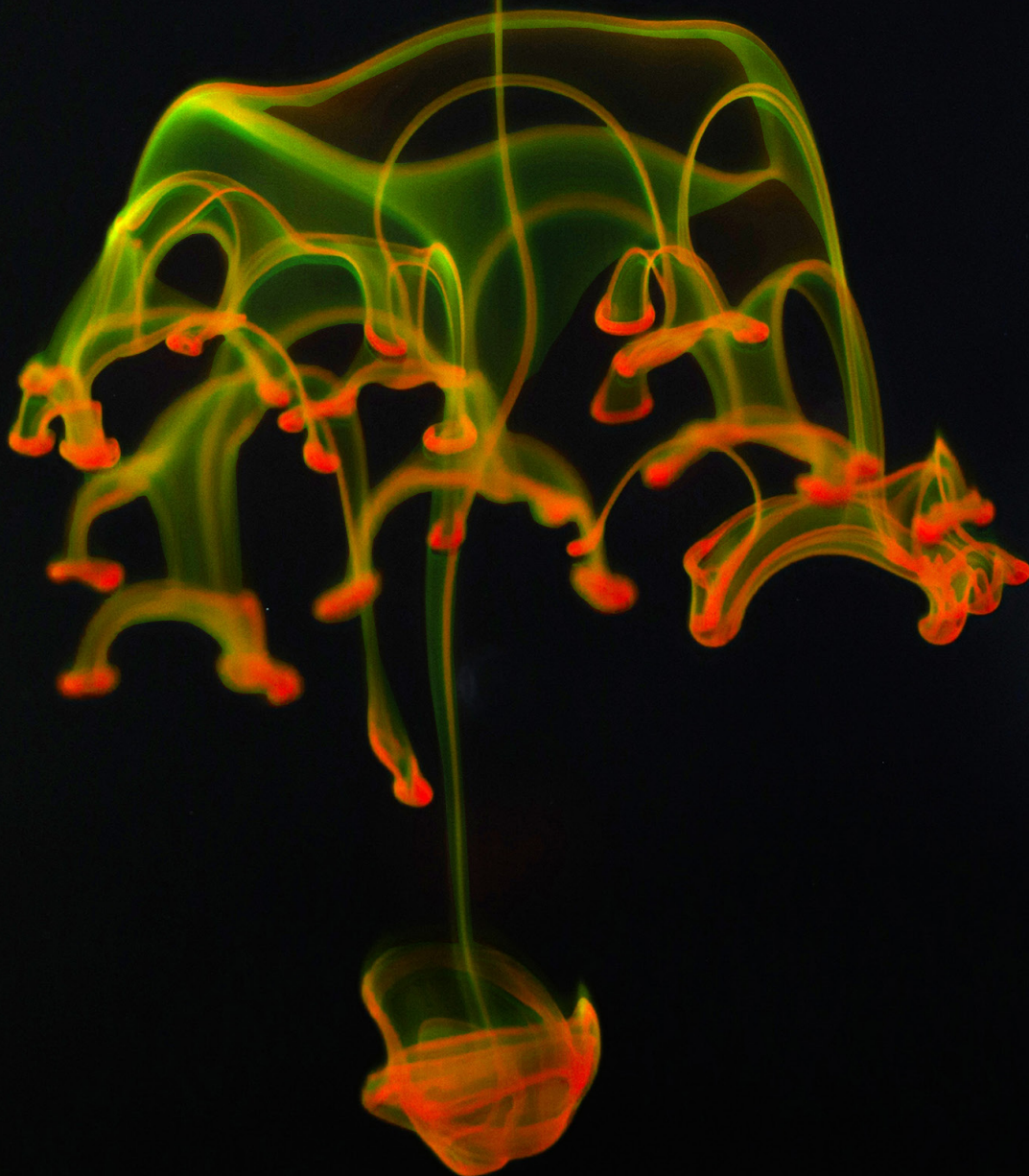


NATO'S SIXTH DOMAIN OF OPERATIONS



An essay by August Cole and Hervé Le Guyader

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Cover letter by August COLE and Hervé LE GUYADER



We have been tasked to provide expert support to the Cognitive Warfare study by helping the NATO Innovation Hub explore a narrative-driven approach to gathering different technologies, trends and dynamics. This approach allows for insights that are not often captured with traditional methods/conventional foresight.

By leveraging the Fictional Intelligence (FICINT) concept, our objective was to raise the awareness at the Command level of Cognitive Warfare and of the operationalization of emerging and disruptive technologies and/or strategies by NATO members, adversaries and non-state groups.

This study is also meant to help determine whether the Command should recommend declaring the Human Mind as the 6th domain of operations.

To do so, we were expected to deliver an essay of, maximum, 10,000 words describing a fictional yet realistic NATO operational scenario at the end of this decade. We both felt that the most effective way to achieve this ambitious goal was to adopt a narrative approach where three distinct chapters would together form a coherent picture, hopefully fulfilling NATO's expectations. As is fitting an exploration of the Human Domain, these narratives are character driven so that the reader may better understand the strategic, operational, political and social implications of this paradigm from the point of view of those who will be experiencing these transformative moments.

Thus, our essay is built upon the following structure:

1 | Tallinn chat and walk.

Taking place on September 21, 2028 in Tallinn, Estonia, this chapter describes a discussion held between SACT and the chief scientist of the UKHX lab at ENS (France) right before the kick-off of the first edition of the NATO Academia Forum (NAF).

2 | *In Silico.*

NATO must grapple with its most daunting strategic threat since the Cold War when the COLD ARROW LIVEX NATO exercise held in Svalbard, Norway on June 7, 2029 goes awry.

3 | The speech that never was.

Deeply influenced by the “chat and walk” discussion held a few months earlier in Tallinn, this is the speech that SACT had prepared for the June 14th-15th, 2029, NATO London Summit. Prepared, but not delivered, because of what happened just a week before at COLD ARROW, a turn of events that illustrated only too well the urgent necessity to add a sixth domain to NATO’s domains of operations.

Marblehead, MA, USA, September 15th, 2020



August COLE

Bordeaux, France, 15 Septembre 2020



Hervé LE GUYADER

1. Tallinn chat and walk

Danish King's Garden/ Tallinn, Estonia / 21 September 2028 / 1930 Local Time

21 SEP 2028, 7:30PM

TALLINN, ESTONIA



Credits : Marc Leydecker

"Jean-Bernard, it's great to see you again. This sure brings back good memories, but did we really have to meet here?" said General H.P Weaver, NATO's French Supreme Allied Commander Transformation (SACT). "My security officer, Jim, said he's not comfortable with the location. Plus, it looks like these three statues of monks make him nervous."

"But it's only four minutes' walk to Tallinna Raekoda", said Dr. Jean-Bernard Béthany, chief scientist at the UKHX Ecole Normale Supérieure de Paris laboratory and a longtime confidant of Weaver.

"But you're not the one giving the evening keynote for the NAF event in half an hour", said Weaver. He looked at his watch, a vintage Jaeger Le Coultre K881 his father, Roger Weaver, Paris based US journalist at the International Herald Tribune had given him before passing. "25 minutes, actually."

Weaver's abrupt reply brushed away any reminiscing about their shared time as flat mates in Paris to focus on this discreet conversation. This was indeed a moment to pay close attention to Béthany, who was the driving force behind this inaugural NATO Academia Forum (NAF), where multidisciplinary academic research was to be recognized by NATO as a main contributing partner, as industry had been since 2013, with the NATO Industry Forum (NIF)¹.

*"OK, I'll keep this short, but probably not sweet. Besides, as much as I'm elated to see this event materialize, its best success indicator would be to quickly evolve into something new! We don't need NIF's, we don't need NAF's, what we need are NIAF's -- that is events where industry and academia stand next to each other to grapple with today's threats. The silo approach to address issues that **really** matter is a sure recipe for failure and, believe me, you don't have time for that. We can't keep on ignoring these (Jean-Bernard did one of these finger quote gestures he was famous, and often mocked, for) 'TRL valleys of death' that are developing."*

Weaver nodded in agreement as he fell into step walking alongside his old friend.

*"By all means, J.B., go ahead, be as blunt as you wish, but tell me something I don't know! I sure don't need yet another lecture about hybrid wars... Tallinn has been home for our Cooperative Cyber Defense Centre of Excellence since 2008, for God's sake! And I need even less of a reminder that transformation is our 'raison d'être'." Weaver's animated side rarely emerged in public, but Béthany knew it well. "Now, I will also tell you this: you're famous for identifying issues, but everyone can do that and dress up problems as scarecrows. I don't need that either. I need sharp, original, disruptive risk analysis as much as I need sharp, original, disruptive options for deciding what will work best. I do need NAF and I do need NIF, because what I need are leading edge research **and** effective, scalable*

solutions. And yes, you can call me H.P. here, but not elsewhere, you know the rules. Now, I really could use a cup of coffee, Jim, could you take care of this?"

Major Jim Gruber, General Weaver's personal security officer, well-known across NATO for his instinctive shooting prowess, immediately offered "Sure, Sir. How long are we staying here?" and started fiddling with his phone after getting Weaver's answer: "10 minutes, not one more".

"Thanks, H.P.," said Béthany. "So, in true military fashion, I'll start with my BLUF statement: Whether you like it or not, there's some truth in the harsh statements made in the early 20's by some Allies who saw NATO becoming obsolete.

NATO's main issue is its positioning, positioning between being a defense actor or being a security actor. Everything else, short, middle and long term threats stem from this existential question.

That's it, my one-sentence, risk analysis.

Now, I do have a one-sentence proposition, too, for cutting this Gordian knot: **Make the 'Human Domain' NATO's sixth domain of operations."**

"Is this 'Human Domain' just another label for the 'Cognitive Domain' that I keep hearing about?", asked General Weaver. Béthany saw Weaver's gaze wander to the rooftop architecture, a tell that his interest was waning because, his friend knew, he was already convinced of the relevance of the "Cognitive warfare" concept.

"No, it's not. Well, actually, cognition is, natively, included in the Human Domain but a Cognitive Domain would be far too restrictive, as tempting as it may be. I know the human brain, this extraordinary piece of 'connected flesh' – Béthany made another finger quote gesture –, "this unbeatable 'thinking machine' has been luring some into advocating the Cognitive Domain should become NATO's sixth domain of operations. I know this from experience; they tried to corral me in their little club but, believe me, this would be a half-baked decision. Cognition is of course crucial to any decision-making process and key to any individual or organization's behaviour but, as discomfiting as it may sound, 'cog-weapons' only fill one drawer of the arsenal our adversaries are designing right now.

Adding a Cognitive Domain to NATO's list of domains of operations would certainly look cool and make headlines, but relief would be very short-lived.

Now, you asked for disruptive solutions, well, none of them are low cost. No pain, no gain! Pain will mostly come from organizational inertia and it will be just massive but, believe me, the hill you want to plant your flag on is the Human Domain."

"But, what do you really mean by Human Domain?", General Weaver asked, a bit unsettled.

"Well, the Human Domain is the one defining us as individuals and structuring our societies. It has its own specific complexity compared to other domains, because of the large number of sciences it's based upon. I'll list just a few and, trust me, these are those our adversaries are focusing on to identify our centers of gravity, our vulnerabilities. We're talking political science, history, geography, biology, cognitive science, business studies, medicine and health, psychology, demography, economics, environmental studies, information sciences, international studies, law, linguistics, management, media studies, philosophy, voting systems, public administration, international politics, international relations, religious studies, education, sociology, arts and culture ..."

"H.P., none of these is addressed by your current five domains, and this is NATO's most serious issue."

"Sir, we need to keep moving," said Major Gruber, gesturing toward a couple using the shelter of

trees to embrace.

"Calm down, Jim, I know from experience that this is one of Tallinn's most romantic spots."

"Sir, I recognize them from the event, they were volunteers. Badges said they were from 'Erasmus', and look!" pushing an augmented-reality notification to General Weaver, *"they shouldn't be here, they should be helping at the venue,"* Gruber said.

"They obviously found something better to do, calm down," General Weaver muttered, slightly irritated as he knew time was running out for Béthany to develop his point.

"Jean Bernard, I suppose this is linked to your initial statement, that NATO's dithering between being a defense or a security actor being the root of all ills to come?" he said briskly.

"Yes, definitely. I know time is getting short, but I need a few more minutes to put things in perspective to start sketching the proposal NATO should present to its members. I believe it can solve NATO's issue and win Allied nations' hearts and minds!"

"You have five more minutes," said Weaver, *"but remember, there's a bunch of other folks lining up to tell me how to lead NATO through its next major transformation. Now, you don't seem to have something to sell, like the next C2 system, except, obviously, ideas, and that's good. The snag is that ideas often look cheap until you implement them, go down the TRL scale and turn them into DOTMLPFⁱⁱⁱ, if you remember what this means."*

General Weaver waved at Major Gruber to instruct him to be ready for the rest of the walk to the Town Hall at exactly 7:45, a serious breach in the usual security protocol Gruber hadn't dared mentioning.

Taking a deep breath, fully aware of the importance of the moment, Béthany decided to hold nothing back from his friend.

"Look, H.P., NATO's invocation of Article 5 on 13th September 2001 marked the last clear-cut manifestation of its unequivocally military positioning. But, with the collapse of the Soviet Union, NATO had already found itself compelled to intervene in several crisis management situations. Initially, these crises had a kinetic dimension, like the Balkan wars, counter-piracy in the Gulf of Aden...or at least a clear deterrence goal such as air policy over Albania, Montenegro, Baltics.

Then, things got seriously blurred with the Ukraine and Crimea crises, and look what we're now witnessing in the Sahel region, in Indonesia and those places where China's Belt and Road Initiative progresses at forced march! These are no longer crises! These are crystal clear manifestations of today's full-fledge conflicts!

Isn't NATO expected to react when its allies are being aggressed? Yes! Aren't its allies directly targeted? Yes! Has NATO been reacting? You tell me.

And do you believe that disaster relief operations, contributions to nationals' response to pandemics, with no military/kinetic dimension whatsoever, do you really think these provide appropriate performance indicators for something as big and expensive as NATO?"

Concerned he had gone too far, Béthany added:

"Please forgive me, H.P., but there's no time for me to tiptoe around the truth. And now comes the real question: Why isn't NATO reacting against these new forms of threats and aggressions?"

This is my answer: Simply because it doesn't have the conceptual material, the taxonomy for

recognizing and labelling these deliberate attacks as ... deliberate attacks coming from identifiable adversaries.

When you're attacked, you'd better know that you are attacked, and what vulnerabilities the bad guys are exploiting.

You thought you had covered all bases by adding Cyber, and then Space to your list of domains of operations, but you've been missing the most important one: Human Domain."

General Weaver was by then doing his best to tame his impatience, playing with the Cyber COE coin he had been given earlier on that day:

"Why would this Human Domain qualify as a domain at all? Why would allied nations buy this? And you're now down to two and a half minutes," Weaver asked.

*"Ok, H.P., remember the beauty of early programming language? Well, how about this: **IF** one agrees that modern warfare is, for good, a constant/hybrid/ambiguous/below the radar kind of warfare, **AND IF** NATO sticks only to the unique 'military defense' segment of today's warfare continuum, **THEN** NATO will not meet the expectations of its allied nations because it will simply **NOT** respond to modern warfare threats. Very simple.*

Military power is of course one essential segment of security. But global security refers to a broad range of threats, risks, policy responses that span political, economic, societal, health (including cognitive health!) and environmental dimensions, none of these being covered by your current domains of operations! Our adversaries already use weapons that precisely target these dimensions, while keeping their traditional kinetic arsenal in reserve as long as they possibly can. NATO, if it wishes to survive, has to embrace this continuum and claim as its responsibility, together with its allies to, seamlessly, achieve superiority all across it.

Look, H.P., tell me what's wrong with this assertion: An international security or defense organization is only considered relevant if it demonstrates efficacy in delivering on its mandate of protecting the citizens of its member states while adapting to environmental changes. And it is ACT's role to be designing and pushing Transformation.

I know, it's likely that a significant lobby within NATO and among its allies will want to stick to a 'military defense' comfort zone remit but, again, forgive me for being provocative, kinetic forms of defense may become the exception and no longer the norm."

After catching his breath while Weaver offered an appreciative smile at his forthright friend's boldness, Béthany quickly added, "Isn't alarming enough to realize that Human Domain related scientific disciplines can be found in each and every, call it the way you want, 'ambiguous' conflict situation we're witnessing today?

And yes, Human Domain does include cognitive sciences and information sciences, but also biology, psychology, sociology, economics... which are just as important. They're all part of the large multi-disciplinary approach that must be included in any multi-domain strategy worth its salt. And that's the real challenge. If you chicken out, you'll soon be irrelevant".

"Jean-Bernard" Weaver said, fully realizing the consequences of his friend's demonstration, "you may have a point here, but this is not a hill to climb. This is Mount Everest, and you still haven't told me why NATO's allies would follow along on such an expedition."

Weaver cast another glance at his watch. *"We're really running out of time, and I need to get going. Let's see if you can come out with the four, high-octane arguments that would help recruit national champions needed for me to reach a critical mass within the Alliance."*

"The walk to the town hall should take four minutes, but it's pretty dark now and we don't want to spill the coffees Jim managed, I don't know how, to get us. Good thing they came with sugar."

Gruber had been right, the two 20 something were indeed part of the Erasmus contingent helping setting up the NATO Academic Forum. They should not have been in the Garden that evening, but Gruber had struck a deal with them: his silence against three cappuccinos.

"Ok, H.P., let's give it a try. Four arguments, you said? Well, how about five? The first two focusing on NATO per se, the third one linking them to the next two, which will apply, and hopefully appeal, to nations."

Number 1: Warfare has changed radically away from kinetics, so must NATO. Traditional kinetic, military-only operations will always exist, but the overall threat picture is much larger, as demonstrated every day. If NATO sticks to its current five domains of operations, its capacities won't suffice to fend off attacks, and that's a direct path to obsolescence.

Number 2: Trust, in particular among allies, is a targeted vulnerability. As any international institution does, NATO relies on trust among its partners. Trust is based on respecting some explicit and tangible agreements, but also on 'invisible contracts,' on sharing values, which is not easy when such a proportion of allied nations have been fighting each other for centuries. This has left wounds and scars mapping a cognitive/information landscape that our adversaries study with great care. Their objective is to identify the '**Cognitive Centers of Gravity**' of the Alliance which they will target with 'info-weapons'. You know what I mean, the arsenal of fake news, deep fakes, Trojan horses, digital avatars ...

Number 3: It's about the Human Domain. 'Cognitive' and 'Information' play a significant part in these new menaces. But, unless you twist, distort their true sense, neither can embrace the full gamut of threats today emerging from other environments (just think biology and neuroscience, and then mix them together!). Human Domain does address these environments that the five current domains don't. So, **Yes**, we need a new domain, No, it can't be simply Cognitive Domain or Information Domain. And, by the way, **Yes**, we need the AFSC, which I understand is being delayed, to cover all six domains. Industry and academia **must** work together on that.

Number 4: Committed minorities : Progresses in science, all kinds of science, including Human Domain related sciences, have created a situation never witnessed in the history of mankind. Never before have individuals **and** committed minorities had such a devastating power at their disposal. And while CBRN threats are mostly the prerogative of peer, or near-peer adversaries, cross-disciplinary NBIC capabilities are the ones these committed minorities excel at utilizing.

Number 5: You won't solve it by yourself: Human Domain related vulnerabilities, like **Cognitive Centers of Gravity**, sure represent significant threats for NATO, but they also apply at the national level. Show me one, just one nation that does not have external forces **and** home grown committed minorities busy weakening its economy, its cohesiveness, constantly testing its resolve by launching attacks of all sorts? And you know what? The problem is that there is no smoking gun making it possible to attribute an attack to its author. I'm talking machine generated code, I'm talking sophisticated schemes like 'influencing influencers' who will then provoke filibustering campaigns hindering democratic process to legislate rationally on NBIC related topics. I'm talking gene editing, military oriented CRISPR-Cas9 manipulations. I'm talking debt-trap diplomacy, political warfare ... I'm talking bad guys constantly assessing allied nations' specific vulnerabilities and designing bespoke, customized strategies to address them. H.P., this is why NIF/NAF fusion is vital!

No nation, regardless of its might, can do this constant, mandatory multi-domain threat awareness refresh alone, because it's such an intertwined world we live in. Besides, technology alone can't do the job.

A committed minority determined to destabilize, from the inside, government of nation A, will happily trade with whoever in nation B has the appropriate tools for its attack. And the type of sensors you need for performing this permanent 'Emerging Threats' observation routine mostly falls into the sixth domain. A single nation, even a restricted club of nations, will miss parts of the global picture.

And that's just the first O of the OODA loop! Look at A, as in Act, how could a single nation retaliate, based on its own, personal, attack attribution procedure, unless of course it's ready to become a rogue state?

H.P., I'm telling you, this is how you will rally national champions, those who realize they're under fire themselves, sixth domain related fires whose arsonists are inside or outside their borders, and probably both! International policy is always a trade-off and I believe this should be NATO's roadmap: be the lead for coordinating R&D programs addressing, OODA loop style, threats emerging from the sixth domain. This will give nations the tools they need for their own security, but can't afford, alone. By doing so, NATO upgrades its mandate and solves its own existential issue.

I realize I got a bit carried away here, and there's so much I'd need to tell you!

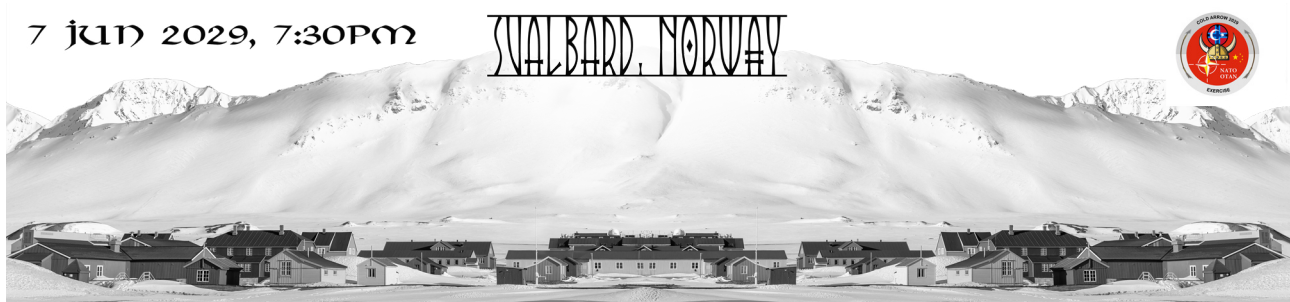
You know what, I'd love to draft the requirements for a proof of concept illustrating my Argument Number 5. Give me one nation volunteering for playing the game, some budget to put a couple of post docs on the case, privileged access to the AI tools and data lakes I know NATO has at its disposal and, within six months, I'll give you a fairly comprehensive map of sixth domain related threats this nation is exposed to, with a first stab at some mitigation plans. And you can plant the NATO flag on it."

By that time, the threesome had reached the town hall. While Dr. Béthany was trying to control his heartbeat, General Weaver had switched to strict diplomatic protocol as he was welcomed by Tallinn's Mayor. On the way to the lectern from which his prepared speech was to be given, he couldn't help from thinking about Estonia as a perfect example for demonstrating the relevance of Béthany's sixth domain.

In the meantime, Major Gruber was having a hard time justifying this thirty minutes getaway, while the young couple who had so obligingly provided him with the drinks was busy uploading their clandestine recording of Béthany's wrap-up speech, captured by nano-mics that they had stuck to the cappuccino cups.

2. *In Silico*

Svalbard, Norway
NATO EXERCISE: COLD ARROW
June 7, 2029



Credits : Marc Leydecker

Ny-Ålesund / Svalbard, Norway / 1143 Local Time

"Distinguished visitors, please take your seats. Once seated, please put on your goggles and headphones."

"Shame," said Bobbi Farlowe, carefully placing a faded black nylon backpack between her thick winter boots. The folding chairs creaked as the 40 or so VIPs sat down heavily, many of them ready for lunch after a wearying morning taking carefully measured steps across frozen ice and rock on Svalbard's northern shores. Farlowe was bored. At 25, she was younger by a decade, she guessed than the next youngest among the academics, executives, lobbyists, officials, and press who had flown in that morning. Plus, this NATO "LIVEX" called COLD ARROW was just that, an exercise. The first place she ducked a bullet was in Libya, when a quadcopter swarm found a rebel redoubt in Sirte. That was four years ago, and since then she'd never stopped chronicling the revolutionary fusion of digital and kinetic weapons in conflict zones most just wanted to leave unseen. The world needed to see what was coming. That she was invited meant people were finally paying attention, though she lately worried it might be too late.

Taking her eyes off the steely blue sea and crumb-like snow and gravel along the Kongsfjorden in Ny-Ålesund, she placed her personal AR/VR recording glasses, a pair constructed out of sleek glossy carbon braided with polished aluminum, in their padded case. She hefted a heavy-duty AR/VR helmet-like "rig" provided by NATO public affairs that looked like it belonged in the last century; hers wouldn't have been out of place at her favorite London nightclub. She paused to admire the sleek set-up of the uniformed woman sitting upright among the non-NATO politicians and military officials in the chairs in front of her. She wore an organic-looking dark-green camouflaged rig with incongruous chrome accents that befitted her rank as the senior commander of Taiwan's air force visiting these Arctic climes.

"View's pretty good already, isn't it?" Farlowe said.

The man next to Farlowe removed his hood and shrugged, a slow bunching of narrow shoulders barely visible beneath an oversized orange down jacket that looked like a sleeping bag. Farlowe watched him wriggle as he fitted the NATO-issue rig. He presented as a wholly organic shape in

his cold-weather gear topped by a matte-green crown of spiky antennae and lopsided tumor-like sensors. He looked like an organism that might be found wedged in a coral reef, desperately snatching at groups of indifferent fish that were always out of reach.

"I'd say we see better without our eyes," he said. *"I'm Jean-Bernard Béthany, UKHX lab at Ecole Normale Supérieure de Paris. Pleased to meet you. I know your reportage, very strong."* A yellowed smoker's smile, at least, betrayed his acceptance of irrationality as he tightened the chin strap before turning his sensors back to blindly gaze at the rough grey and blue seam splitting shore and sea.

"That's very kind, and we'll see about the seeing soon enough, I guess," she said. She stifled a chuckle, as this was a serious event, she reminded herself. And all that effort stage-managing and choreographing. That wasn't what war was like. So what was this, really? There were about 40 people sitting on a platform, set level on the ground as it sloped down toward the icy water.

"In a few moments, we begin," said a gravelly male voice in Norwegian-accented English. It was such a grave pronouncement that she wondered if they could detect her cynicism with the rig she now wore. Perhaps. She would have to ask Jean-Bernard when this was over. The announcer continued...

"This is a crucial moment for COLD ARROW 2029. To summarize the exercise so far, three days ago the island of Svalbard and its communities were physically cut off from the outside world by a fleet of the adversary's autonomous amphibious and airborne system, numbering in the thousands. As well, coordinated space-based energy- and cyber-weapon strikes were carried out, cutting almost all electronic and communications connections, reducing control of the island's satellite access systems so that only the adversary nation's systems remain functioning. It is a crippling blow for European governments and research efforts – prompting an urgent NATO Article V response to restore the status quo of Svalbard as a pillar of the international research and scientific community. This live exercise will begin momentarily."

Farlowe began blinking uncontrollably. Dry eyes' sudden rapid-fire signaling the onset of a grave and unnatural fatigue that stim users knew too well. She pulled a tin of stim gummies from a sleeve pocket, the candy still soft from the bark-like grey jacket's heating filaments. She swallowed one and chewed another. Steadied, she rechecked the NATO rig was recording to the drive and sat-server she had in her backpack. She would be livestreaming shortly. Once the exercise began she would blend in real-time the NATO augmented and virtual reality feeds from the soldiers in the exercise into her personal view of what was going on. I may be wearing their gear, but I make it my story.

Then, with a faint haptic tickle at the temples of her rig, the exercise began.

She experienced a sudden shift from the bright Arctic light into the NATO feed.

A gloomy void. Then a crescent of dark green it was almost black appeared before becoming a corona of what could only be Arctic sea. The audio switched on: heaving breathing, a thump followed by a curse in German. As the background came into view, she could see several combat swimmers climbing slowly aboard a small, open submersible. In the background, a leviathan seemed to absorb all light around it.

How cold they must be, she thought, after leaving the submarine, which was tagged as HMS Agincourt, a Royal Navy Astute-class vessel. Switching her rig's POV to her natural surroundings she scanned the water, whipped slightly with a southern wind, Nothing yet. The action so far in this simulated conflict was out of sight

Returning to the combat swimmers, she flicked between the different German commandos to

see the feeds on their tac-rigs, which were similar in function to the almost fashionable light-duty tactical setup that she normally wore when reporting from warzones. Hand signals in the frame indicated the six swimmers were all OK and aboard their submersible -- proceeding to their insertion point near where the distinguished visitors sat patiently as gulls. Flicking back to her surroundings, she could see a blue "X" superimposed on the water where the swimmers would emerge in a few minutes.

Guitar chords flooded her rig's audio feed. Angry slashes at the strings. Heavy distortion followed by a savage attack on a drum kit. What was this, she wondered? Slurred lyrics, which sounded German, cut through it all. She didn't speak the language, but in a moment she was watching the divers disembark from their submersible with a translation of a song that sounded like it was meant to start a riot.

And it was. Nationalist lyrics, conjuring the backward-looking darkness that she knew was growing throughout Europe in the late 2020s, emerging boldly from the shadows in a dangerous repeat of the folly and chauvinism that torched the Continent during the last century. Evil music, she thought, for an evil time. Farlowe dropped out of the swimmers' feeds, disgusted. Why would they be blasting this garbage when we're all here, she wondered. Instead she focused on the blue "X," then sighed and switched back to their stealthy underwater approach. She chose a perspective from an underwater countermeasures drone advancing ahead of the six commandos. She marveled at their beautiful fluidity as they swam, so out of step with the musical assault that now kept breaking into the feed no matter how many times she muted it. The swimmers all paused, their momentum carrying them forward as if reeled in by the tiny drone. Then they ascended toward the surface one by one.

The drone surfaced first, its glossy mottled skin looking like a fish lolling sickly on its side. A moment later the first swimmer's helmet appeared, then the muzzle of a weapon.

"Formidable," sighed Béthany, the French researcher. *"But this music? Do you hear it too?"*

"Yeah, already flashed it out there into my feeds. Somebody needs to figure out what's going on. It's great footage but that kind of crap doesn't cut it with me," said Farlowe. She was flicking her AR/VR feed between the drone and her own rig to ensure she captured the harshness of the Arctic environment. That water would kill you in five minutes, she mused. Maybe less.

Béthany was writing in a notebook, mittens making the careful meeting of pencil and paper difficult. But not impossible. He was managing, but she had no idea why he wasn't just using his rig to record.

Farlowe now took the POV of the lead swimmer, stalking toward her. He advanced, bent under the weight of his weapons, armor, and rebreather. The wet crunch of his dry suit's boots on gravel was audible in his rig's sensor suite; the music was gone.

"Holy hell," said Farlowe. What was this?

The lead two combat swimmers were now kneeling, weapons up in defensive positions. But what Farlowe saw through their AR/VR feeds was not the assembly of dignitaries, executives, media, and academics before them but civilians of all ages bound and gagged in chairs on a beach with paper bullseyes pinned to their chests. The location data indicated was the Isle of Wight, and the timestamp said 1943^{vi}.

It made no sense to Farlowe. Then the music blasted back, so loud she had to rip the NATO rig's earbuds out of her ears. This was an affront to the very idea of 21st century Europe. To the carefully nurtured relationship between two of NATO's most powerful nations.

And yet she continued streaming it live.

COLD ARROW Command Post of the Future / Svalbard, Norway / 1210 Local Time

"Brussels, we have a problem," muttered Wout Dekker, a 28-year-old captain in the Royal Dutch Army's 11th Airmobile Brigade.

The only response he got was a flutter on the skin at the inside of his left wrist, no more than the brush of a feather. His prototype AI-interface hadn't understood him and wanted him to repeat the phrase. Even if he did, the experimental Allied Future Surveillance and Control system he interfaced with through a haptic suit would probably have taken too long to understand the reference to Apollo 13, one of NASA's most perilous Apollo missions.^{vii} But it had clearly showed him what was happening with the German combat swimmers that nobody else could yet see: somebody had hacked the team's audio and AR/VR feeds. In Dekker's rig it looked like waves of rainbow light washing through the commandos' video feeds, visible rending distortions where their reality was being redrawn in slashing, broad strokes through meticulous pixel by pixel deconstruction. The haptic suit's matte-black organic-looking weaves and armatures all over his body looked as if he had been reclaimed by flora possessed with a dark magic, befitting the fate of a fallen fairytale prince a century ago.

He heard a shout and looked around the command post as Farlowe's fusion feed, as well as those of other visitors, raced around the world at the speed of light. The AFSC interface still was a black-box nature of the artificial intelligence software it relied upon. Yet this was exactly what AFSC was designed for and why it was being tested in this OPEX at COLD ARROW. If it reached full development, the AFSC systems of systems would offer machine-speed insight and awareness in an era in which NATO's militaries had to thwart risks like an adversary's quasi-playful AI-powered disinformation campaigns while still remaining on guard against dire threats like hypersonic missiles hidden in Conex containers.

"Seeing this?" Dekker messaged as he cued his feed to the shared virtual environment he shared with other AFSC operators on Svalbard. But the AFSC had already done it for him. Those other soldiers sat in bunkers and armored vehicles, hiked with scouts atop icy ridgelines. It was as if a dozen of the specialists and the workstations normally aboard a NATO E-3 AWACS aircraft were instead scattered throughout the conflict zone with haptic suits and backpack-portable edge AI servers.

He tried to send a flash message to the exercise's command staff about the spoofed feed. It was midday and they were nearby eating lunch in an Italian defense firm's experimental deployable mess, a wing-like canopy arching over a trio of eight-wheeled wheeled carts the size of delivery trucks. An hour earlier Dekker had eaten what he deemed a very good pasta and lemon chicken served in a rapid-compost bag.

The haptic suit pinched Dekker's waist and he cursed at the apparatus – and the network troubles. *Message failed to send.* He could literally see through digital lies with unprecedented insight but still could not reliably communicate with senior officers less than a minute's walk away.

He sprinted out of the command post, tripping over the suit's network tethers and charging cables. Three steps outside the command post's entrance he pulled up short as Admiral Angela Alvarez, the US Navy officer and commander of Joint Forces Command, Naples -- known as "Triple A" -- collided with him.

"What the hell kind of Halloween costume is this?" Alvarez asked, looking down at Dekker, who was a whole head shorter and looked to her to be wrapped in delicate ribbons of black carbon fiber.

"Admiral, ma'am, Captain Dekker. The German LIVEX at Ny-Ålesund, it's been ..." Dekker said.

"Yeah, no kidding, I saw it too. The whole world did," said Alvarez. She cast a look back at her staff and started to push past Dekker. "Tell me they cut the feeds already, they did, right?"

"There's a journalist still transmitting on site, ma'am, an American, but we're..." an aide said.

"And get me General Zabel, we need to have a talk," Alvarez barked. "Or did somebody send him home already?"

Before they could answer, Dekker responded and took a step back. *"Yes, Admiral, but it's not the Germans' fault. Their feeds were hacked and spoofed. I've seen the code."*

One of Alvarez's staff, with a low-profile rig covering his eyes but not his scowl as he scanned the area outside the tent, said sharply, *"Let's move inside, all of us."*

Once inside, conversation within the command post halted. Alvarez motioned for people to get back to their screens or rigs, then watched as Dekker began plugging his suit back in.

"This is one of the experimental systems from the AFSC program, isn't it? The AWACS 2.0 that can tell me where the MiGs are and what my kids really say about me when they're plugged in? I still haven't been fully briefed on it, no time. But I know the outlines. You're seeing things nobody else can, that right?"

"Yes ... I ... I mean ... we... we're able to..." and then Dekker stopped, unable to talk as he was caught between two worlds, the virtual and real. The system kept pushing more and more information at him, a combination of haptic prodding and colorful icons dancing behind illuminated text. He felt clammy, claustrophobic even inside the suit like it might gradually squeeze the air from his lungs so gently he would not realize until it was too late.

"He OK?" Alvarez asked. "This thing safe to be around?"

Dekker nodded, his AR/VR rig moving up and down in an exaggerated affirmation. *"What I'm seeing is ... while I was going to find you, the other nodes my team and my system say this looks like Chinese code, the kind used by Resilient Dragon."* That was NATO's designation for the Chinese hacking groups focused on northern European targets.

"It looks like... that's the key here. It's too perfectly written – not just for effect, but to crack under analysis. How do I explain this... It's code written by one machine for another, in a sense. But that's not how Resilient Dragon works. So somebody else did this."

Alvarez's dour aide wedged in to hand his boss her customized command rig, a low-profile crown-like apparatus similar to those worn by technology executives, not soldiers. She waved it away. *"I don't want to spend 5 minutes authenticating and logging in, just show me a screen or tell me."*

"BLUF, ma'am, it's Chinese," the aide said. "DIA BACKSTOP analysis shows high confidence. And General Tsai, Taiwanese Air Force, was at the hacked LIVEX with the Germans."

"But it's not Chinese code even if it looks like it," Dekker said. He was losing his grip on the conversation, nausea building like somebody was kneeling on his stomach. Dekker's head ached, and so, inside the rig where nobody could see, he closed his eyes and wondered, what did his daughter and son really say about him online?

"You'll put this science experiment up against my DIA's best AIs?" Alvarez asked. "Because things are going to move very fast starting right now. For all of us."

Ny-Ålesund /Svalbard, Norway / 1320 Local Time

Farlowe stood with the sea at her feet and her back to the chattering observers who seemed shocked enough to have forgotten that they had missed their scheduled lunch. She had approached as close to the German combat swimmers as she dared. They stood in a tense cluster, dive suits speckled with ice. Bloodshot eyes stared emptily beneath AR/VR swim-rigs. The commandos looked like they might bolt at any moment back under the ocean to get away from the mess on land.

"Not a fan of your music. Or your movement," Farlowe said, perhaps a little too loud over the rising wind. She had learned when dealing with dangerous people that it was better they knew where you stood from the start. One of the swimmers looked over at her and shook his head. Then he nodded for her to come over to the group.

Farlowe shifted her weight, sinking deeper into the sand and rocks as she hesitated. Then she took off her own rig and made her way to them.

"You saw everything," one of the German commando's asked. He spoke perfect English and he shivered as he spoke, his jaw tightening with each syllable. But he wasn't angry, he was cold. All of them were.

"I always see everything. That's my job," Farlowe said.

"We are professionals. Somebody is making trouble for us," another commando, even larger than the first, followed up. *"We know our feeds are pooled on this objective so they,"* he nodded to the dignitaries, *"can see our show. If we are going to be bastards, we would do it when nobody can see."*

Reasonable, she thought, but hubris was not unheard of and who's to say an over-stimmed commando mistakenly added the overlay to the wrong channel. Happened all the time. Board room becomes a bordello, that sort of thing. But this was a strategic crisis for NATO moving at machine speed.

"Who did it then?" Farlowe asked. The icy wind played upon her cheeks. *"Look. we're just talking. My rig's turned off, see..."*

"Polish nationalists," said the second German, his thick accent deepening as he shivered. *"They don't like us. Maybe. I don't know. Many do not like NATO now, even in NATO."* That was true, Farlowe knew, the alliance faced existential challenges on many fronts, from budgetary to political. But hadn't it always? What was different now? She knew the answer, and it was present in every conflict she had covered. Technology driving people apart. All for PIP. Profit. Ideology. Power. That wonky acronym stuck around because it was true, though she felt like ideology mattered more and more now that the world's economic models – and therefore societies -- were being redrawn due to revolutions in everyday robotics and AI.

Then the second commando stepped closer and lowered his voice. *"Look at the audience here. You have too many experiences to believe what you see here."*

"You know what he's trying to say, because you see it all the time. This is war now," the first commando said. He pointed at the rig in her hands. *"Not this,"* holding his assault rifle in front of him as if he was trying pass it off to somebody else.

"So you are part of it just like we are," said the second German commando. He wiped his nose and coughed, fighting a shiver.

Before Farlowe could respond, the first German combat swimmer, who she guessed was the team leader, gave a series orders. Hefting their undersea scout drone, the commandos

walked off away from the distinguished visitors and toward a set of sea-scraped flimsy wooden buildings. Then the team leader turned to address Farlowe one last time. *"Just received word. All German forces at COLD ARROW are returning home. Remember, don't confuse the target with the effects."*

COLD ARROW Command Post of the Future / Svalbard, Norway

"Captain Dekker, I can call you Wout, right?" asked Admiral Alvarez. *"So Wout, I'm going to need your help. But to get that, first I need to show you something."* They had moved inside the command post to Dekker's OPEX area: a circular arrangement of five high-backed chairs studded with network and charging ports.

Dekker's suit squeezed his lumbar area, a gentle pressure like a hand propelling him forward. *"Admiral, ma'am, Wout is fine."*

Meanwhile, one of Alvarez's aides appeared to help the commander put on her rig.

"This is Major Ashley Tenet," Alvarez said. *"She has the latest intelligence assessment on the attack."*

Attack. Dekker checked his suit's power levels, then plugged in as he mulled the considered what the word really meant in a fast-moving situation like this one.

"Thank you, ma'am. Are you all seeing me? If so then follow me into the SCVE; we'll have about 15 minutes," said Major Tenet. She didn't mean the Major Tenet sitting in the chair an arm's length away. She meant her avatar inviting them into a "ski-vee," or a secure compartmented virtual environment (SCVE) used for sensitive meetings.

The temporary nature of a SCVE reflected the understanding that all networks were compromised to some degree. The other advantage, appreciated by staff officers everywhere, was the short-lived protection kept meetings short.

SCVEs were more about seeing than speaking, anyway. Dekker watched a topographic-like representation of the Germans' AR/VR feeds, which began during their egress from the HMS Agincourt. The culprit was a corrupted wireless camera inside the external lock-out chamber. The camera's antennae were updated during a recent retrofit, creating a vector for the hackers.

Dekker waved his gloved hands, virtually sorting through the US analysis. Beijing wanted to discredit the NATO exercise and technological demonstrations to poison Taiwan's interest in the future AFSC system, with a secondary goal of dissuading NATO from further outreach to nations in the Asia-Pacific. Nor could he find any signs the BACKSTOP neural network analysis detected data that somebody was pinning the blame on China. BACKSTOP showed total confidence in that conclusion based on analyzing the code, as well as other factors he did not have access to.

His stomach knotted again, and vertigo slammed into him. He pitched forward in his chair, a sensation of total free fall. But as he caught himself from hitting the ground in the physical world, he scattered a mosaic of information he had been carefully assembling to show Alvarez and her aide.

"Captain Dekker, are you... OK?" the aide asked out loud.

"Fine, Major, I'll be fine," Dekker responded, wondering why the suit wasn't flashing any alerts. Had he botched his pharm loadout?

Alvarez reached out and put a hand on his shoulder. *"Hang in there, we'll get through this."*

Rather than keep talking, which made his head hurt, or feed the commander's condescension,

he started to push his analysis to them inside the secure virtual room. At that moment, he nearly threw up all over Alvarez.

"Admiral, I'm sorry," he said, abruptly standing up and tossing his AR-VR rig onto his chair. "I need to go to medical, now."

COLD ARROW Echelon-2 Level Deployed Medical Facility / Svalbard, Norway^{viii} / 1417 Local Time

The robot's needle looked like it could punch through a foot of concrete, but Dekker barely felt the blood draw. He had closed his eyes in anticipation of the pain, and when he opened them he took in the scene around him. Among the expected bruises and breaks he saw four other haptic operators like him in there too.

He had staggered to in about 10 minutes earlier, stopping once to vomit up his lunch. On arrival he saw Karl, the German operator. Daphnée from Belgium. They too had their haptic suits half-off, not feeling well enough to go through the complicated process of putting them back on. The others sat in folding chairs, waiting. We should have a port for needles, infusions, he thought. Must make a note to suggest it. He wanted to go over to them, but they weren't supposed to discuss their work outside SCVEs.

"Captain Dekker?" said a Norwegian soldier. "Thumb here on my screen, then take these. You should feel better soon. You've got food poisoning. We think there was a fault in the experimental mess' cold storage. It's too bad. The food was really good. What did you eat, again?"

"My lunch was lemon chicken with ...pasta," said Dekker. The mess prepared individualized meals based on extensive bio and social-media data it loaded before deployment.

"That's what it selected for me too. Bad luck, I guess."

"Thank you. What are these?"

"Anti-emetics, mild stim, salt. Here's some water."

"Can I have my test results?"

"Already pushed to you."

"Thanks," Dekker said.

Dekker rose and on the way to the exit passed close enough to Daphnée to see a fine bead of sweat along where her crew cut met her tall brow. Her skin looked green, as if painted from a palette drawn right from the tent's camouflage walls. Thinking of how abruptly he left Alvarez, he blurrily fumbled with the snaps on his haptic suit as he clumsily jogged across frozen dirt to the command post.

COLD ARROW Command Post of the Future / Svalbard, Norway / 1501 Local Time

Before Dekker entered the command post, he paused to collect himself. He should have gotten a wet wipe to clean his face.

The door flew open and a young woman in a sleek-fitting winter jacket and flowing black hair stalked past him with a predator's urgent grace. Two steps past him she stopped but didn't turn around. Was she waiting for him to approach her, Dekker wondered.

But he saw she was fiddling with her high-end rig; at any moment it would be switched on.

No, no, no, Dekker thought. Rather than risk getting caught on Bobbi Farlowe's feed like those poor German commandos, he shouldered the door open before she could wheel around.

There stood Alvarez, the entire command post all to herself.

"I told you this was going to move fast," Admiral Alvarez said. "Ten years ago a crisis like this would have taken place over three or four weeks. Now it's three or four hours. That too fast for you?"

Dekker drank the last of his water bottle rather than respond.

"Admiral, was that Bobbi Farlowe, the journalist from the LIVEX?" asked Dekker. Was he being impertinent? Maybe. Maybe that was the stim. Or just the rush of moving past acute nausea.

"SACEUR direct suggested it. He has a case to make to the American public, about China's continued and unrelenting interference in European strategic matters," she said.

"My system's analysis still points to Resilient Dragon code, yes, but not code written by Resilient Dragon."

"NATO defends its members, right? But who defends NATO? Time and time again, it's the United States," Alvarez said. "Farlowe can help us do that, whether she knows it or not. Though I expect she does. She's seen enough of how bad the world really is to know that none of us can take a tomorrow we can live with for granted. SACEUR believes that. So do I. But right now I've got member states throwing punches at one another over this German fiasco. We need a narrative everybody can get aligned around."

In the moment that Dekker took to pause and collect his thoughts for a response, his haptic suit rippled from toes to his shoulders with a wave-like pressure that it reserved for critical updates. It felt like being tumbled in breaking surf.

The message was about his bloodwork, and those of the other operators. It offered a surprising analysis pointing to the real culprits trying to undermine NATO. It wasn't China.

"Admiral, I need to show you something," Dekker said. "It's not just the exercise that's under attack, so am I..."

COLD ARROW Command Post of the Future / Svalbard, Norway / 1519 Local Time

Alvarez took it surprisingly well when Dekker blurted out that his body had been infested by nano-scale weapons and the entire population of Europe was under what he crudely called mind control, before regretting the dramatic simplification.

The admiral looked to the door, as if measuring the distance she could put between herself and the Dutch officer with his ludicrous fantasies. But then, Alvarez cocked her head, and leaned closer.

"Your AIs really tell you all this?" she asked. "Or are you just delusional?"

Dekker only nodded, unable to find the words. Was that the nano-weapons, he wondered. Or his horror? What he did next was virtually walk Alvarez through a bloodwork analysis by the network of AIs used by the other operators on the experimental AFSC program. A few minutes earlier, the exercise's medical staff sent him an urgent analysis: they detected nano-scale drug-delivery devices interfering with his neurological system. Before he had time to heed this warning, his AI had absorbed the information, combining it with the results of the other operators who were similarly targeted.

It was a good thing he hadn't learned that at the clinic. He might have clawed off his suit and run naked in terror across the frozen ground. But the revelation that the same attacker who

had invaded his body was also behind the spoofed feed from the German commandos kept him focused.

"Those nano-machines are just one weapon in their arsenal, the code used to overwrite the German KSM commandos feeds is another. There are design commonalities between them, something that you or I could never, ever see. But the AIs we're using with this OPEX can," Dekker told Alvarez in their virtual chat. The two stood at the center of a solar system made up of brightly colored spheres, cubes, and other shapes representing different data. "It's like stylometry -- recognizing a painter by their use of color, or their brush strokes."

"But whose brush strokes, Dekker?"

"The analysis has already gone to SACEUR, my system took care of that," he said. "BACKSTOP should have it too, rest of your IC. Same with NATO headquarters, the alliance members."

"Show me who's behind this. We need to start talking targets," Alvarez said.

"I don't know if it's that easy... look."

He showed her that the adversary was a European non-state movement calling itself Libertas. It had shifted forms at this acute moment of crisis it generated. Its goal was to accelerate the breakup of 20th century alliances and national boundaries in Europe that it believes are going to repeat the conflicts that ravaged Europe during the prior century. The group has been active since the early 2020s, recruiting people through programs like the Erasmus scholars initiative. Libertas often used cover for action by perpetrating hacks, data heists, and info ops as if they were Chinese, Russian, Israeli, or American efforts.

"They want to wage war to ... achieve peace, do I have that right?" Alvarez said, perusing the analysis. "I've heard that before."

"I don't think it's war like you mean," said Dekker.

"Just cyber, info ops? Look, they put that stuff in your body, and you feel that way?"

"See that image set? There? The nano-weapons in my body are already dissolving. It's similar to what doctors use for chemotherapy now. They tried to slow me down, poisoning me through my lunch. But not kill me. Or infect you, either. It's like they wanted to target the machines I work with at their weakest link, which is me. And what they did to my body, my system, they have been doing to the alliance nations for years. See there? But more gradually. It's the same tell-tale..."

"The same?" said Alvarez. "How do you really know?"

"Yes, this is the black box aspect to the intelligence analysis,^{ix} but the AIs are seeing it, and the more discoveries they make, the more they know. It's like a cognitive cascade for the neural nets in my system."

A pulse of blue light flashed through their virtual world.

"I need to take this call," said Alvarez, and she blinked out of the SCVE. "It's SACEUR calling... before I answer, has he been targeted too? Cognitively, at least?"

"You have to assume so, all of us," he said. As Alvarez took the call with an aide, Dekker remained inside with the data, virtually swimming in it. As he parsed through it, he got distracted, by protests at that moment erupting in Paris, Brussels, Madrid, Rome, Tallinn, and other major cities in Europe. It was a building crescendo nearly a decade in the making. From idea to action, at machine speed. And people assumed that using AIs would speed conflict up. It would. But it

also enabled a strategic patience that no nation could have, but an individual or a small group of people certainly could.

Dekker felt a tap on his shoulder, and he left the vivid swirl of data.

"What a mess," Alvarez said. Dekker sat heavily in his chair and cradled his rig in his lap. "Norway's parliament is calling for COLD ARROW to withdraw immediately. Riots in every European capital. French military just raided a server farm on the Italian border, pissed off the Italians, and now we've got a brawl here between some Alpini and Chasseurs Alpins who were supposed to be patrolling together. But aside from the French raid, no shots fired."

"What did SACEUR say is the next step? Article V meeting? Or Article XI?"

"Against China? You said it yourself that's a dead-end," Alvarez asked. "But if you think the members can get together and coalesce around a military response to a group like Libertas that's inside their own countries, then I have an alliance to sell you... Dekker, you've done excellent work here. Keep at the problem and take care of your people. Oh, and piss out those nanobots as soon as you can. Let my staff directly know what else your AIs find, if they don't tell me first. I'm headed to Brussels to join SACEUR in person. Sometimes you just need to be in the room.."

And with that the Admiral dashed out of the command post, leaving Dekker alone.

He sat for a moment, looking around for a freshwater bottle. After a long gulp, he put his rig back on, reflecting back on something the Admiral said earlier in the day: *This is one of the experimental systems from the AFSC program, isn't it? The AWACS 2.0 that can tell me where the MiGs are and what my kids really say about me when they're plugged in?*

A few minutes later he was inside one of his program's virtual vaults, going over the growing mountain of information about the cognitive campaign in his own company, the Netherlands -- going back almost a decade. Then he scanned the most recent social media feeds for his daughter, Corine, 14. Her location indicated The Hague. She was protesting at a Libertas demonstration with 23,756 other people near parliament, according to Dekker's access to ambient snapshots and other data, as well as her live location and own feed. The wrist cuffs on Dekker's suit tightened, calling his attention to new information he needed to see. It was a deeper dive into Corine's social networks. The analysis and calculations were complex but the spherical-shaped model's conclusion was simple: Libertas had been influencing his daughter's digital existence on everything from the movies she loved to the friends she thought she chose. This had been going on for over eight years.

He expected the system, and the haptic suit, to fight the angry tension building within him. It should be trying to calm him so he could keep an even keel. A gentle nudge or caress-like pressure at his side, perhaps. To steady his breathing at the periphery of a dangerous zone where ideas mattered less and less compared to the appeal of indulging raw feelings. But it did not hold him back.

What the system did next in the virtual environment surprised him even more: it offered up a glowing green orb, a marbled surface that seemed to vibrate. That was his own digital twin in the system, essentially how the AIs saw him. They offered up a mirror to look inside his own soul. Dekker nearly ripped his rig off at the realization at what it held. If he accessed it, it would reveal a split or bifurcation with who he thought he was before the Libertas revelation -- and who he actually was. It would reveal the entirety of this new adversary's impact on Dekker's life. The white veins through the sphere's marbled surface were like the crenelations in his own brain, a distinct physical manifestation of what made him neurologically unique. He could turn away from what it represented and delete it in the cloud in order to postpone the revelation. But it would do nothing for his own mind -- or for the future of Europe.

3. *The speech that never was.*



Credits : NATO

Ladies and gentlemen, President Franklin Delano Roosevelt in his First Presidential Inauguration speech delivered on March 4th, 1933, famously said, "... the only thing we have to fear is...fear itself"^x. This was eight and a half years before the United States entered World War Two and, yet, this quote is still applicable today although the kind of fear we should fear the most has, to a large extent, evolved into something far more ominous.

In his own words, the *"nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance"* President Roosevelt was pointing out was related to *"only material things"*, such as (stock) values, taxes, payment, income, trade, markets, savings ... issues he reckoned had been caused because *"the rulers of the exchange of mankind's goods have failed"*.

In many places across the planet, these words would still ring today. In many places across the planet, a new President coming to power in harsh and demanding times would exhort his or her Nation to embrace change, not fear it, as fear of change is a sure recipe for dramatic and utter failure.

But, while still edifying today, President Roosevelt's speech's logic was, for the most part, relying on one human trait whose strength, but also resilience, are today jeopardized. Allow me to quote him again and highlight what I think epitomizes the danger we're facing today: *"Practices of the unscrupulous money changers stand indicted in the court of **public opinion**, rejected by the **hearts and minds of men**"*.

Back in 1933, the call for change that President Roosevelt firmly advocated was provoked by *"**public opinion**"*, and failing rulers were to be rejected by *"**the hearts and minds of men**"*.

But today, what is “*public opinion*”? How is it formed? Bent? Distorted? And how does one court, and then win, “*the hearts and minds of men*”?

Some 96 years later, how do our adversaries develop their strategies, how do they identify our centers of gravity, those of the Alliance, of its participating nations, of its key people, of its influencers? What tools and weapons do they design to tamper with “public opinion”, to conquer “hearts and minds”?

Do we have evidence they’re doing it today? Yes, plenty of it.

Do we have an appropriate response to it? No, we don’t. Moreover, no joint operation drawing from the immense resources we concentrate upon our five current domains will suffice to address some of the existential threats modern warfare poses, be they coming from state or non-state actors.

Modern warfare heavily depends on what some refer to as the “information sphere”, that is the domain where “influence” can be exerted. This is the world of fake news, organized disinformation, constant erosion of the public’s morale, as well as targeted actions aiming at specific exploits. This is so blatant and real that it has been part of some of our adversaries’ doctrine for decades now! And we saw its efficiency during the Ukraine and Crimea crises ... in all recent crises actually, let alone the tailored external social media influence campaigns that afflict any democratic election!

The “information sphere”, and the most visible vulnerabilities it exposes our democratic societies to, is today entirely digital. Each and every point of information -- to be created, conveyed, shared, whether it is based on actual facts or totally fabricated in order to confuse or deceive its targeted audience, each and every information -- emerges as digital data and remains digital for the duration of its life, which happens to be infinite as there’s no “delete history” for fake news.

The massive digitization of our societies has provided our adversaries with an opportunity rich playing field for waging all sorts of new forms of attacks, underscoring the clear-sighted decision made in 2016 to make “Cyber” NATO’s fourth domain of operation.

But, if modern threats all include a Cyber dimension, the devastating issue they pose, for nations just as for NATO, transcends this labelling.

In these days of constant and growing deluges of information, we may have the impression that our main problem is a technical one, that is to plunge these petabytes of data into decision-making tools that will guide us toward a perfect solution. We may be led to believe that Artificial Intelligence, Machine Learning algorithms will be obedient tamers, capable of filtering big data into what we, commanders, need and rely on in order to do what’s expected from us, that is, command and control. We may even be comfortably numbed in our reliance on these data and algorithms, by the promises of computer scientists assuring us that, yes, “*post-quantum cryptography absolutely guarantees our data and processes aren’t compromised*”.

Well, I’m afraid this is a fairy tale for grown-ups. Sure, we need robust multi-domain data fusion to aggregate the data produced by sensors operating in our current five domains of operations. We need immersive visualization tools to “feed” our senses with the best digital models but this approach, simply stated, won’t suffice, can’t suffice.

Digital twins fueled by Artificial Intelligence are great for cloning human-created devices, systems, or even a system of systems. They will get close, really close, to simulating natural phenomenon, like weather forecasts, or the logic behind formation flights of migratory birds. Yet all you have to do is look back at the global COVID-19 pandemic in the early 20s and, for argument’s sake, put yourself “in the shoes of the virus” and ask yourself: “*Which vulnerabilities*

should I exploit from human beings to maximize my growth?" You know the answer: human behaviour. Human behavior was the vulnerability targeted by the virus that had the best cost-effectiveness ratio. It was not technology.

Technology ended up triumphing with eventual vaccines, but it's human behaviour, social organization (or disorganization) that enabled this novel Coronavirus to fulfill its programming.

For this particular enemy, an unknown virus in some ways comparable to what Cyber experts call a "zero day exploit", the most efficient way to wage its war and to reach its objectives was its "knowledge" of human, social, natural sciences, not of hard sciences.

Sounds too much of a sophism? Well, think twice and look at what China achieved with its "Three Warfares" strategy. What supported their recent victories, epitomized by the global success of their "New Silk Road" was their mastering of diplomacy, economics, and legal warfare, that is warfare related to human and social sciences.

Whether we like it or not, whether this clashes with what we consider consistent with our military history and traditions, or in line with the "Just War Theory"^{xi}, a common denominator to our forces, we can no longer fulfill our mission by "simply" achieving superiority in the air, on land, at sea, in cyberspace and in space.

This would be totally vain in contemporary warfare, where ambiguous or indirect "non-obvious" conflicts are now the preferred path for our adversaries or competitors, to such an extent Clausewitz would probably offer today *"Peace is a mere continuation of war with other means."*

A few years after his first Presidential inauguration speech, President Roosevelt and his administration were brutally confronted by a virus-like invisible threat: a very well organized fifth column operating on the American soil.

As dangerous as they were, the members of this fifth column were active militants, forming what today's scientists would call "committed minorities", willingly operating under and reporting to a known and identifiable hierarchy their misdeeds could then be attributed to, should they be caught.

Today's progresses in nanotechnology, biotechnology, information technology and cognitive science (NBIC), boosted by the seemingly unstoppable march of a triumphant troika made of Artificial Intelligence, Big Data and civilizational "digital addiction" have created a much more ominous prospect: an embedded fifth column, where everyone, unbeknownst to him or her, is behaving according to the plans of one of our competitors.

This is not a threat that can be countered in the air, on land, at sea, in cyberspace, or in space. Rather, it may well be happening in any or all of these domains, for one simple reason: "you" are the contested domain.

Within you, as an individual, but also within you as part of a family, a community, a society, whoever, and wherever you are. Hacking the human being -- tampering with human's personal, individual Command and Control capacity, leading to meddling with a community's C4ISR, is today's most efficient and cost effective way for our enemies to reach their goal.

Make no mistake, today's target is human behavior, and that includes targeting human cognition through manipulation of the information sphere, but the threat goes beyond the mere damage that manipulating information can yield. The human, hence any community they belong to and work for, is a target for our adversaries and their diversifying arsenal.

This is a frontline. It is also a domain we haven't properly identified and labeled yet, let alone organized ourselves to achieve superiority in.

It is past time for us to address this new and disruptive challenge.

The recent crises, the hybrid wars I mentioned involved identified state actors, with their convenient yet still identifiable proxies. What should spur us to action is that NBIC capabilities today offer non-state actors -- some we have yet to even name or know their intentions -- -- devastating power for global influence never before witnessed in the history of mankind.

The adversaries we know are well-labelled organizations, but we are not good at identifying "committed minorities", these communities of zealots scattered around the world, focusing on our vulnerabilities and targeting our centers of gravity, threatening individual nations and international organizations such NATO.

Ladies and Gentlemen, time has come for NATO and its Allied Nations to brace themselves for the implications of what it will take to confront this threat. To that end, I humbly suggest that time has come for NATO to add a sixth domain of operations to its portfolio: *the Human Domain*.

The Human Domain must be seen as the foundational domain for all other domains. It is the hub for everything that can, and will, be designed to threaten peace and security on the international stage, especially threats to the very core of NATO's charter on behalf of its member nations.

Do we have a doctrine for this? No. Do we need one? Yes. Do our allied surveillance and command and control systems allow for capturing data from this sixth domain, fuse it and compose a complete multi-domain picture? Well, they'd better. As most of you know, we used our recent Cold Arrow live exercise to field test a beta version of a quite disruptive AI-enabled "Human Domain" component for our imminent **Allied Future Surveillance Control** system of systems, a capability that has drawn interest from non-NATO guests from Asia and Africa and could allow for a sort of rewiring of our alliance on a global scale.

That ambition remains, however, in the future and we have to begin by focusing on what we can do now. Is pursuing such an exhaustive multidisciplinary approach necessary as the Human Domain calls us to do? Absolutely, and I have become profoundly convinced that is the most existential issue we need to tackle.

Do I find such a journey intimidating in its scope and import? Yes, though I take heart in those leaders who surmounted similarly daunting challenges. Their success is testament to the vital idea in this endeavor that the only thing we have to fear ... is fear itself.

H.P. Weaver

Biographie

August COLE

August Cole is an author exploring future conflict through “FICINT” storytelling. His talks, stories, and workshops have taken him from speaking at the Nobel Institute to presenting at SXSW Interactive to tackling the “Dirty Name” obstacle at Fort Benning. With Peter W. Singer, he is the co-author of “Ghost Fleet: A Novel of the Next World War” (2015) and “Burn In: A Novel of the Real Robot Revolution” (2020). He is a non-resident fellow at the Brute Krulak Center for Innovation and Creativity at Marine Corps University and a non-resident senior fellow at the Brent Scowcroft Center on Strategy and Security^{xii} at the Atlantic Council.

Hervé LE GUYADER

Hervé Le Guyader, a qualified electronic engineer has been the President of eris@^{xiii}, a Brussels based ASBL made of a 50 EU regions network, while managing Bordeaux based CEC, the first French Regional ICT development agency. Expert for the European Commission, he is tasked by its DG CONNECT to conduct a study on “EU public policies on eInclusion”. Sworn judicial expert for the Court of Appeal of Bordeaux on telecom and ICT related matters he is, as ENSC^{xiv}’s deputy for NATO relationship, member of NATO’s STO^{xv} IST^{xvi} panel. He is the author of scientific studies and essays, including “Weaponization of neurosciences” where he introduces the concept of the Human mind, as NATO’s 6th domain of operation.

- ⁱ The first edition of the NATO Industry Forum (NIF) took place in Istanbul, Turkey, 14 November, 2013.
- ⁱⁱ BLUF: Bottom Line Up Front
- ⁱⁱⁱ <https://en.wikipedia.org/wiki/DOTMLPF>
- ^{iv} https://www.google.com/maps/place/Barentsburg,+9178,+Svalbard+and+Jan+Mayen/@78.0662667,14.2068863,3a,75y,273.14h,99.79t/data=!3m8!1e1!3m6!1sAF1QipMs3F8BoLAL4xdhyGeSI9LjhA_U4wb3ZRwSw9UM!2e10!3e11!6shttps:%2F%2Fh5.googleusercontent.com%2Fp%2FAF1QipMs3F8BoLAL4xdhyGeSI9LjhA_U4wb3ZRwSw9UM%3Dw211-h120-k-no-pi-0-ya209-ro-0-fo100!7i8704!8i4352!4m8!1m2!2m1!1ssvalbard+map+norway!3m4!1s0x459cf10742b2d9e9:0x3ec46948a0550240!8m2!3d78.0648296!4d14.2334747?hl=en
- ^v <https://www.nytimes.com/2020/07/01/world/europe/german-special-forces-far-right.html>
- ^{vi} Online controversy exists as to whether German commandos raided the Isle of Wight in 1943; it is a perfect wedge narrative that could be exploited. <https://onthewight.com/letter-time-for-government-to-confirm-or-deny-1943-german-raid-on-the-isle-of-wight/>
- ^{vii} Reference to HLG's essay, with a section on NBIC framework titled, "Norfolk, we have a problem"
- ^{viii} NATO field medical facility classifications <https://www.nato.int/docu/logi-en/1997/lo-1610.html>
- ^{ix} <https://hdrs.mitpress.mit.edu/pub/f9kuryi8/release/5>
- ^x March 4, 1933, First Presidential Inauguration of Franklin D. Roosevelt speech
- ^{xi} https://en.wikipedia.org/wiki/Just_war_theory
- ^{xii} <https://www.atlanticcouncil.org/programs/scowcroft-center-for-strategy-and-security/>
- ^{xiii} eris@: European Regional Information Society Association
- ^{xiv} <https://www.bordeaux-inp.fr/en>
- ^{xv} https://www.nato.int/cps/en/natohq/topics_88745.htm?selectedLocale=fr
- ^{xvi} Information Systems Technology