Stories of future gaming

Childrens Games
Pieter Bruegel the Elder (1526–1530)

2019 CONNECTIONS WG2 FUTURE OF GAMING

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Introduction

STORIES FROM THE FUTURE

There are a lot of ways to describe the future. We chose to write fiction about it.

Our stories explore the future of wargaming. Stories are a lot like games. They place you in a new but somewhat familiar world. In games you get to choose what happens. In stories you follow along for the ride. Unless you are the writer, then you get to choose what happens. So, kind of like a game.

Connections is the premier wargaming conference. For 2019 theme is the future. How games talk about the future (Working Group 1 - Gaming the Future) and what the future of games will look like (Working Group 2 - The Future of Gaming). For working group two we asked a number of professional wargamers to write short (or not so short) fiction on what they thought a future game would look like.

The task was to write about the game, not the future conflict. In the following stories you get to see what some professional gamers think games will be like in the future. Some are set in 2050, some in a few years. But don't get hung up on the year, we'll get there eventually.

But more than anything: we love writing about Marines.

SEBASTIAN BAE

Friendly — Competition

It was too fuckin' quiet, Sergeant Patel thought as he walked down the empty halls.

A Marine barracks is usually a maelstrom of noise and poor life decisions. When you leave a hundred or so bored Marines to their own devices, drunken shenanigans were bound to ensue. This kind of eerie silence was never a good sign. And of course, as the duty NCO, he had the unenviable job of sorting out whatever nonsense was unfolding.

Passing the corner, his mind cycled through all the possible scenarios: darts with K-bars, Edward Forty hands, anything involving fire, and worst of all – uploading God-knows-what to YouTube. The mere thought made his head throb.

As he rounded the corner, he saw a gaggle of junior Marines overflowing from one of the rooms. Expecting the worst, he sped up, ready to scold the rambunctious lot for whatever sins they were committing. Peeking through the window, he saw that the Marines were gathered around four laptops playing an online video game. Smaller groups of Marines were mingling about, chatting as they examined and passed around a tomb-like manual. Seated at desks on opposite walls, he

Disclaimer: All ideas and opinions expressed in this story are of the author alone and do not reflect the opinions of any other institution or organization.

immediate recognized the four players: Baxter, Schmidt, Lee, and Sanders. They were all part of Baxter's fire team in first platoon. A sharp-witted group, they had a reputation for pulling pranks on their fellow Marines. Last week, they had crazy glued another Marine's boots to his locker door. Everyone got a good laugh out of that, minus the poor boot who had to chisel his boots off his locker door.

Young Marines playing video games in their free time was expected. Personally, Patel was partial to unwinding with a game of Madden himself. In the infantry, every day was about tactics and training, so Patel relished the refuge of simple games – far removed from the daily demands of the Corps. But this was different. The Marines were engrossed in their endeavor, like students cramming for an exam. His fellow Marines were many things: fierce, funny, loyal, but dedicated students they were not. His curiosity was piqued.

"What the hell are you miscreants up to?" he questioned.

"Yo, Sergeant!" Corporal Baxter responded, looking up with a grin. "We're assaulting the garrison on the island of Nahic."

"Alright geniuses, there is no such country as Nahic. What are you really doing," inquired Patel.

"I'm serious, Sergeant. Nahic is a fictional country for the scenario we're playing – a company assault on an island base. It's wicked difficult," he replied.

"What?"

> ***"all the possible scenarios: darts with K-bars, Edward Forty hands, anything involving fire..."***

Leaning over Baxter's shoulder, Patel inspected the computer screen. Tiny little icons, representing military units, steadily moved in a coordinated assault across an imaginary terrain. From a glance, Patel could discern that a battalion landing team was attempting a landing on jagged crescent shaped island. Although most of the map was shrouded in darkness, there were pockets of clarity – revealing glimpses of elaborate defensive lines, scattered battery emplacements, and the occasional moving convoy. A stream of information flashed on the right: ISR reports from far-flung drones, predesignated fire missions, and logistic reports. Madden this was not.

Sensing Patel's mixture of awe and confusion, Baxter said, "Our objective is to push up from the beach and take out the batteries, opening a window for the main landing force to mass."

"This looks like a dumb-downed command center, Baxter," Patel observed.

"That's the whole point, Sergeant," the baby-faced Corporal replied, "I'm serving as the company commander, while Lee, Sanders, and Schmidt," he gestured to the other three Marines enthralled in their screens, "are serving as platoon commanders. The adjacent

units are being played by the program's AI."

"That's really cool," Patel muttered, taking in the continual flurry of commands and reports.

"It is, Sergeant. But the program's AI is a bit clunky and does some odd things at times. You always got to monitor the stupid thing," Baxter added, shrugging.

"You want to try, Sergeant?"

Unable to resist the offer, Patel moved the mouse around the screen, steadily exploring the game's features. The interface was shockingly intuitive, organizing features by warfighting

Department of Defense Photo by Scott Sturkol

function. The program tracked unit strength, morale, and even logistical consumption like fuel. On the right-hand side, he even recognized templates for five paragraph orders and CASEVAC reports. Patel had never seen a game like this before.

"Did you guys buy this?" asked Patel.

"Nah, Sergeant. This is an MCU-sponsored online platform. Think Steam – you do know what Steam is right, Sergeant?"

"Don't be a smart ass, Baxter. I know what Steam is – I'm not a fucking dinosaur."

"Well essentially it's the same idea. MCU loads a bunch of historical and fictional scenarios on the platform, all utilizing a common game system, and Marines can create individual accounts or teams to play against each other."

"And of course, they had to name it something like 'Expeditionary Warrior,'" Schmidt added, snickering.

"Did you expect anything less?" Lee snorted.

Ignoring the banter, Patel asked, "But, what's the point of this?"

"Ya know those old school tactical decision problems you love making us do? Well, it's like that but for like, right now. A real-time tactical decision game for the digital age. But the idea is pretty much the same. And of course, you got to adapt when shit inevitably goes horribly wrong," Baxter replied, as he typed a truncated five paragraph orders to his platoon leaders.

"Don't fucking lie, Corporal. We just really enjoy beating the shit out of the officers on here," Schmidt called from across the room, his eyes never leaving his screen.

"Shut up, Schmidt! Don't you see me trying to be learned and fuckin' sophisticated over here," Baxter yelled back, shaking his head as he jokingly shook his fist in the air.

Lee, briefly looked up from his console, "To be honest, we're bored as fuck and

playing these games helps pass the time. Not to mention, if you win tournaments or become one of the high-scoring teams, you can get all sorts of prizes from points to your promotion score to Amazon gift cards."

"Anything is better than cleaning rifles all day," said Patel, laughing.

"Pretty much, Sergeant," Lee replied with a mischievous grin.

"Hey, Lee, enough chit-chat, it's go time! Schmidt, as soon as we hit the beachhead, I want you to watch our fuckin' rear, I don't want to be pincered again like last time. I want you to take care of any enemy UGVs that may be hiding in the shallow water," Baxter barked. "Sanders, make sure our UGVs are scouting ahead of us. I don't want any nasty surprises."

"Yeah, yeah, I got-chya," Schmidt grumbled. Sanders and Lee merely nodded.

At a glance, the assault was going well. They had escaped the exposed death trap of the beachhead by using their heavier UGVs as battering rams and shields. Initially, obstacles and mines on the beach slowed their advance for some time. But after regrouping, Baxter was able to regain the momentum, capitalizing on friendly naval fires that bombarded the ridgeline overlooking the beach. Understanding his window was fleeting, Baxter quickly issued orders to his commanders to push inland. Despite heavy resistance, they were able to press their advantage, making astute, decisive decisions.

Department of Defense Photo by LCpl Forde Nesteby

"Hey, Lee, is that a fuckin' drone over there?" Baxter yelled.

"Not sure yet... I am going to send the Raven up to see."

"Why don't you just shoot it down, it looks like your unit has M-SHORAD," Patel asked, pointing to the air defense vehicles in the lead element.

"Well, last time we played, we kept blasting the UAVs out of the sky, thinking it would protect us from being seen. But the other side just kept sending more fuckin' drones and pounded wherever the drone was shot down with artillery – and eventually we ran out air defense missiles. It got ugly real fast when the attack helicopters came up," Lee responded, his cursor zipping across the screen, hurriedly issuing new commands. The Marines let out a collective groan, recalling the debauched assault.

"But we're not falling for the same fuckin' trick this time! We're going to spoof those UAVs and have them chasing our decoys, while the rest of the company hunts for the arty batteries," Baxter declared, confident in their victory. "Speed is king."

> *“The players weren’t forced to blindly accept the rules of the wargame.”*

The room was alive, buzzing with the intoxicating energy of competition. Battle plans were being formulated, discussed, and executed. No matter how crude their schemes were, Patel could see that the Marines were learning. Whether they would admit it out loud or not, the Marines were being trained to be better tacticians and small unit leaders. Against a thinking adversary, they made mistakes, adjusted to the consequences, and experimented with new stratagems. Training disguised as a game, Patel thought.

Grabbing the player manual from the desk, Patel was shocked by the sheer weight of it. Thumbing through the pages, Patel realized the rules and mechanics themselves were not particularly complicated. The majority of the manual was occupied by the in-depth explanation of why the wargame worked the way it did. The players weren’t forced to blindly accept the rules of the wargame. The manual was filled with charts and graphics, depicting the underlying logic of the game’s rules and mechanics. A whole chapter was dedicated to how the program calculated unit engagements. Recognizing the engagement tables his father used for his miniature wargaming hobby, he could see that the math and logic behind the game was sound. It took terrain, morale, and weather all into account. The detail was shocking. Hell, there were fuckin’ footnotes. He had never seen footnotes before in a Marine Corps document before.

“Hey, did you all fuckin’ read this?” Patel asked, skeptical.

Barely turning their heads from their screens, Baxter replied with a twinge of annoyance, “Of course we did, Sergeant. How else would we win?”

“You’re fuckin’ shitting me. I’ve never seen you read a book in your life, Baxter,” Patel responded, incredulous.

“You can’t win if you don’t know how the fuckin’ game works, Sergeant,” Baxter replied.

“Understanding how all the units interact and how damage is dealt is what sets the good teams and the great teams apart,” Lee added.

“Not to mention, after a few dozen reps, the rules get pretty intuitive, Sergeant,” Sanders added. “Honestly, the hardest part is getting enough reps in. The more you play, the more you know, and the more you know, the more you win.”

“Not to mention Chang from Lima Company is good enough to make his own custom scenarios,” added Sanders.

“Yeah – that is sort of out of my depth. I got like two pages into that chapter in the manual and my eyes were glazing over,” quipped Lee.

Flipping through the chapter, titled In-Game Modifications, Patel instantly understood what Lee meant. The chapter might as well be written in a different language. Patel couldn’t make heads or

tails of it.

"How often do you guys play this game?" Patel inquired.

"We usually play all Friday night, sometimes more depending on people's schedule and shit. Each game only lasts about 90 minutes, so we usually play four or five games in a night," Sanders responded.

Ignoring the side conversation, Baxter barked, "Lee, have your platoon serve as the base of fire while Sanders wheels his dudes around."

Looking over Baxter's shoulder, Patel could see a bird's eye view of the unfolding battle. As their unit advanced or engaged with the enemy, the map steadily revealed more details, no doubt trying to simulate the fog and friction of combat. For simple and common orders, a simple click of the mouse on pre-set features was sufficient. Yet, for more nuanced, complicated orders, Baxter had to manually move the units or create a chain of simpler orders for the unit to execute. As in real life, Baxter had to constantly manage and delegate tasks throughout the engagement.

To escape being pinned, Patel recognized Baxter's textbook execution of a flanking maneuver. Baxter was attempting to outmaneuver the enemy defenses and catch them unaware from the western flank. The interesting bit was how he was employing the company's UGVs to bypass the enemy's defensive line. The defensive line stretched roughly ten kilometers, east to west, flanked by steep, rocky terrain on each side. No doubt the enemy wanted to exploit the terrain as defensive obstacles.

> *"Repetition had bred familiarity, and that familiarity built confidence."*

Understanding this, Baxter had ordered his unmanned units on a rapid flanking maneuver, screened by the main unit. More agile and mobile than manned mechanized vehicles, the UGVs weaved in and out of the rocky terrain on the western flank. Given their size, manned-vehicles would never be able to execute this kind of maneuver on this kind of terrain. At the same time, they had cautiously deployed a mix of UAVs with electronic warfare and ISR-suites to serve as their over-the-horizon eyes. It was obvious they intimately understood all the tools in their arsenal. Repetition had bred familiarity, and that familiarity built confidence.

The attack was unfolding as expected. The adversary offered meager resistance. Baxter and his company were pushing their units deep into the enemy formation in perfect coordination with the flanking UGVs. Everything was going as planned.

"We're about to win this shit right now," Baxter declared excitedly.

Yet there is a razor fine line between confidence and hubris, Patel thought. As the flanking UGVs wheeled around to attack the defense's flank, they

were suddenly met with a unit of main battle tanks, cleverly tucked behind the westernmost hill. In a matter of minutes, the enemy's main battle tanks decimated Baxter's flanking force from the rear.

Anti-Unmanned Aerial Vehicle Defense System
Department of Defense Photo by Monica K. Guthrie

After the devasting engagement, it became obvious the opposing team had anticipated the flanking maneuver and baited Baxter's team into a trap.

A litany of profanity filled the room as the Marines scrambled to regroup, but their efforts were ultimately futile. Patel suspected that the opposing team deliberately left a gap in their defensive line, to draw in Baxter's team into a fatal trap. The opposing team had exploited their eagerness. Consequently, with a large portion of their organic firepower gone, the enemy's main battle tanks tore through their formation like a hot knife through butter. Before long, GAME OVER flashed mockingly on their screens.

"Shit, I did not see that coming," Baxter sighed, slumping into his chair.

"Did they have ground sensors on their flanks?" Lee inquired, scratching his head.

"Maybe," Sanders answered. "That or they planned to lure us into a trap from the get-go. Fuck."

"At this rate, we'll never beat those assholes from Bravo Company," Schmidt lamented.

"Let's play the battle replay, and find where the wheels fell off," Baxter offered.

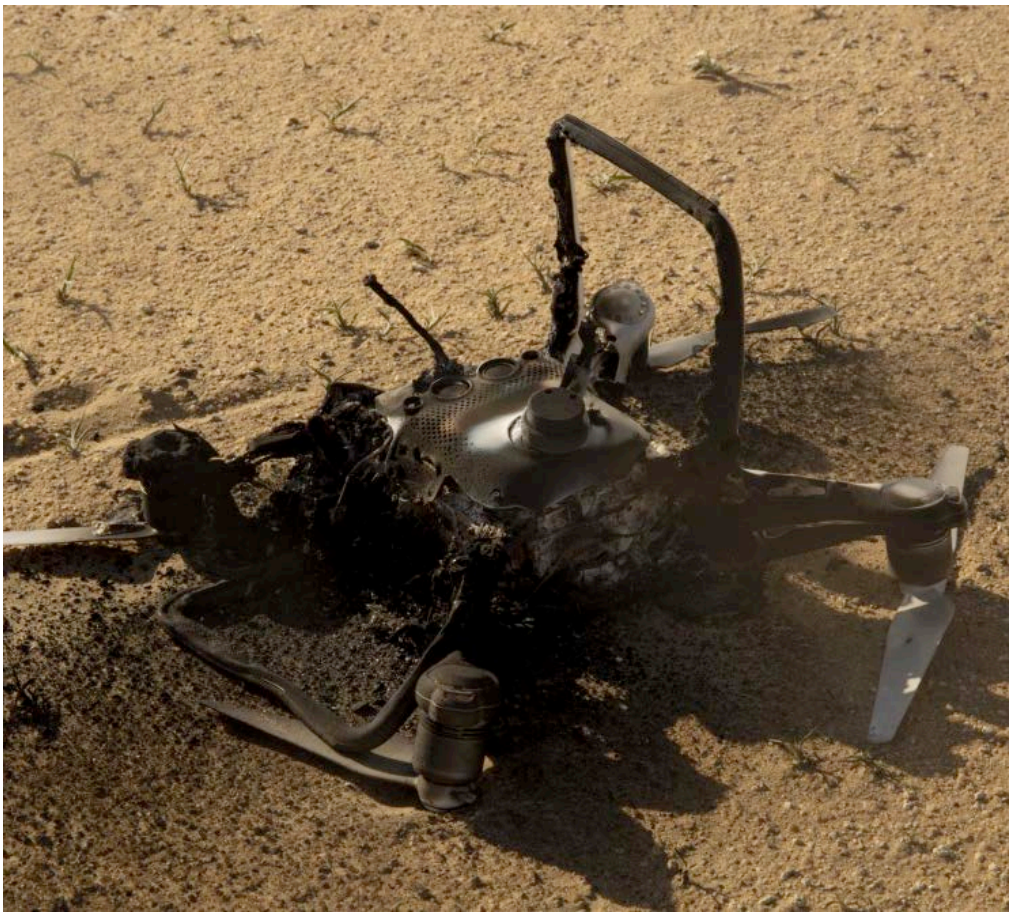
Huddled around Baxter's console, the Marines excitedly discussed their game, dissecting their decisions. The spectating Marines eagerly joined in on the heated discussion, fighting to be heard. Quietly, Patel stood up to leave.

The scene reminded him of a wargame he had attended as a young Corporal two years prior. As one of the few enlisted Marines present, he was tasked as a simple notetaker, a silent, unseen observer. For four days, he watched as officers moved counters on a massive paper map, discussing grand notions of capability development and force structure. At the time, he had been told that the wargame would help shape the future of the Corps. But after witnessing his Marines conduct their own tactical wargame, it was obvious that these small educational wargames, played in noisy little barracks, would shape the Corps far more than the grand wargame he attended. Patel imagined hundreds of Marines playing out dozens of scenarios, crammed in their dingy barracks – testing their mettle against their peers. Steel sharpening steel. The thought made him smile.

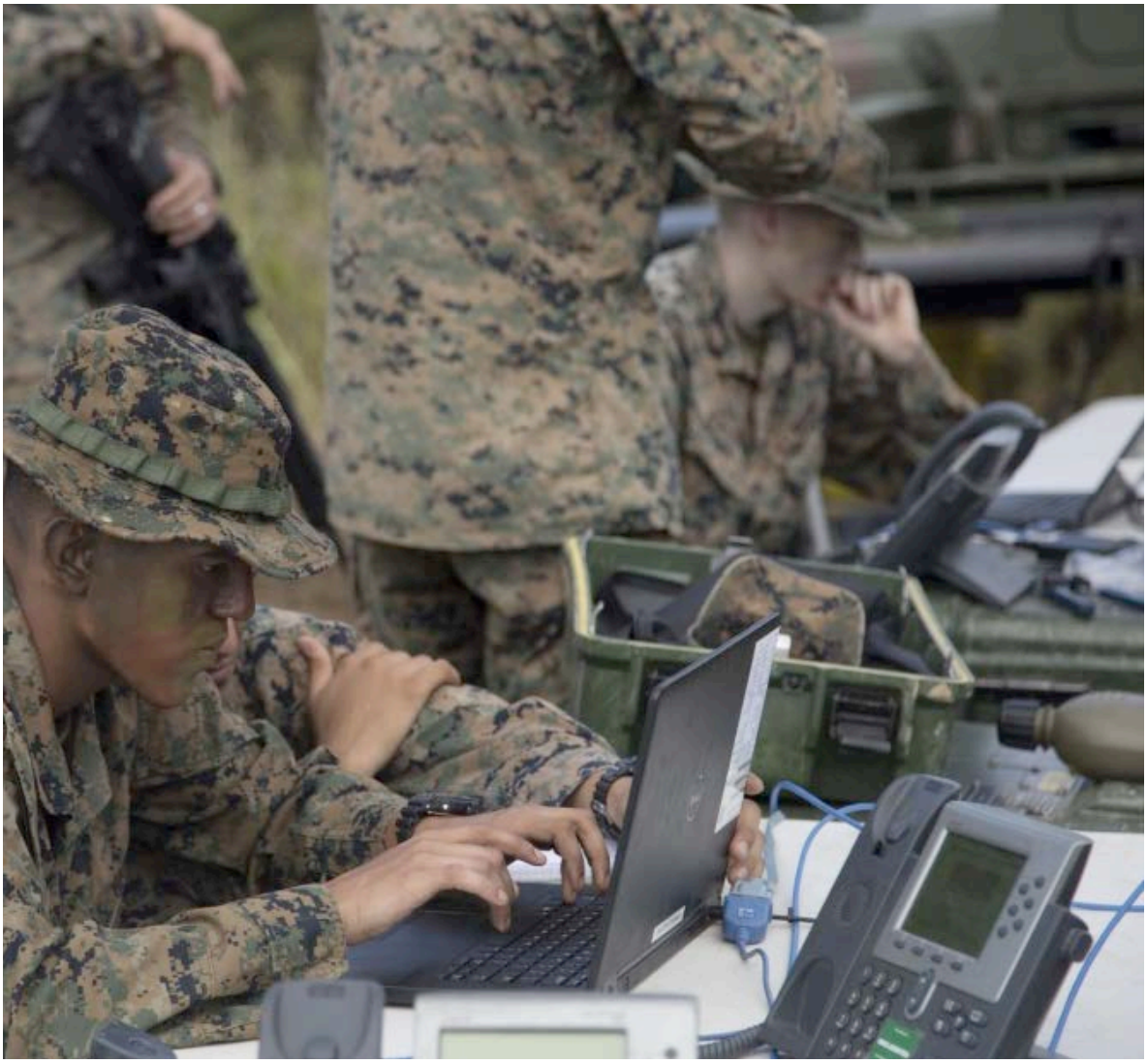
As he returned to his dreary patrol, Patel couldn't help but wonder if this was all

part of the Corps' master plan – to train an entire new generation of small unit leaders through wargaming, leveraging the addictive quality of experiential learning. But after six years in the Corps, he, like most of his peers, had developed a deep, profound cynicism – especially concerning grand lofty ideas. The mere notion of an elaborate and expansive plan executed by the Corps going exactly as planned made him burst into near-manic laughter.

At best, this was an expensive decade-long plan that worked way better than expected. At worse, this was a happy accident that resulted in brilliance. But sometimes, wars are won on happy accidents.



Department of Defense Photo by LCpl Jack Howell



Department of Defense Photo byLCpl Kindo Go

DR. JEREMY SEPINSKY

Augmented Reality 2040

"Wooden blocks, Doc? Really?" The Marine Corps captain lifted one of the wooden pieces arranged in a carrying case and looked at it incredulously.

The analyst response was half sigh, half chuckle—always the same question with the Marines, she thought to herself. It's never high-tech enough.

"Yep, wooden blocks. You'd be surprised at how the tactile pieces make the wargame flow just that much easier. Besides, this wargame doesn't need the flashy things because it isn't about discrete tasks, right? We're not trying to find out whether you can fire a rifle or write an IO (Information Operations) script—you've got other ways to train that. This is about exploring the edges:

Department of Defense Photo by AC1 Merceded Porter

how the adversary responds to you, and how you respond to that response. I don't need to grade your reactions, I want to force all of you to think about the world of the possible. We need that conversation. How often do you give your kids a video screen because you want them to talk more?"

The captain was still looking at the wooden block, turning it over in his hands, doubt in his eye.

"Don't worry, we've got at least some tricks up our sleeves."

"Whatever you say, Doc," the captain said as he returned the piece to the wrong spot in the carrying case.

"Ladies and gentleman, glad to have you here, and thanks for coming. We're about to get started. Just a few admin remarks before we get into the wargame. First, we are in a classified space, so no personal electronics. You can sync up your government Berries[1] to the classified wireless subnet if you'd like. The access code is written on the wall behind you. But I do request that you look at your email only during breaks—we're here for a wargame, not to do our day jobs away from our desks. Restrooms are down the hall to the right, and the requested lunch donation is $50, so please make sure you square up with Patrick at the front desk by the end of the week as needed.

"As you picked up your badges when you signed in, you should have received a pair of AR (Augmented Reality) glasses. If you did not pick one up, go see Patrick outside to get a pair."

"I've got them, but they're older than dirt…" mumbled a Marine Corps major to the Navy lieutenant next to him. "These are, what, 6 years old? I'm surprised they're even wireless." The Marines and Sailors around him chuckled quietly.

"Yes, yes, they're not 'modern'"—air-quotes—"technology, I know, but if you can get DSS[2] to authorize better, you'd be a magician," said Dr. Junes. Her hearing was better than the major expected. "Anyway, they should already be synced up to the map and your team rooms. So if you can please switch them on and take a look, you should see the opening presentation appear above the map table. If not, please see Dr. Davies in the back to get them re-synced."

A handful of players started to queue up in front of Dr. Davies' table, where he had a wireless keyboard and a small square rectifying pad—a reference object image with QR[3] codes , skew lines, and measuring boxes precisely printed on it. One at a time, he placed each pair of goggles on the rectifying pad, connected a wire from the malfunctioning goggles to his own, and began typing on the keyboard, entering data into a display

1 Blackberry phones, government issued

2 Defense Security Service. "DSS oversees the protection of U.S. and foreign classified information and technologies in the hands of cleared industry under the National Industrial Security Program by providing professional risk management services." (https://www.dss.mil/about/vision/, accessed 05 April 2019)

3 Quick Response codes, which are two-dimensional barcodes that encode information in a pattern of dots. A known pattern of dots can be analyzed for its orientation when viewed through a specialized camera.

only his goggles saw.

“Erasing the sync load … re-adding the room package and reconnecting to the subnet … confirming loadout …” Dr.

Department of Defense Photo by John Ingle

Davies liked to narrate his work, much to the dismay of his officemates. “Aaand resyncing the optics.” After the last, he would pick up the goggles and wave them in a small circle, lenses and camera face down, at the rectifying pad and then up to the corners of the room, where a few rectification marks sat.

“Ok, you’re all set LtCol Adams, these should be good to go,” Dr. Davies said as he handed back one of the pairs of goggles.

The main map table was set up with the opening laydown. This was a global force-on-force wargame, so the map was pretty large (6 feet by 10 feet) and there were a lot of pieces spread out across the whole thing. The map was covered in hexes (useful for estimating, even when the AR goggles can calculate the actual distances for players), but their shape was distorted near the poles to take into account the map projection. A few ships were positioned in the rapidly growing sea lanes north of Canada.

The edges of the map had a series of symbols to be picked up by the cameras that were strategically positioned throughout the room. The processors in the cameras could deconvolve the skewed images across the entire map to create accurate representations of exact spatial locations and orientations. There were enough cameras in the room to see around the heads of the players, and enough symbols on the map to do the calculations in spite of the hands, dice, and coffee cups cluttering the map’s surface.

The wooden blocks representing the military units had stickers identifying what they were. (NATO symbology has only gotten more complex with time.) Each wooden block also had a unique QR code printed on its top and sides. Their positions and locations could be read by the camera mounted to the ceiling above the map, as well as the camera in each person’s AR goggles.

In the server room behind the game room, the air conditioning unit hummed furiously keeping the servers cool as they processed, collated, and interpreted all the information passed back to them from the cameras and the AR goggles. Pulling up the 3-D feed on a screen in the server room, a technician scrolled around the room showing the up-to-the-millisecond 3-D positions of all the tagged objects: the wooden blocks representing military units, the maps,

and the goggles. Some goggles were reporting a bit of a lag. He marked down their unit numbers so he could do hard resets on them later.

LtCol Adams leaned over the map, studying the pieces. Flipping the switch on the side of his goggles, he activated the AR display over the map. After a moment, some wire outlines appeared over the map identifying country boundaries and exclusion zones. The edges of each wooden block began to glow in his field of vision, with outlines of red (adversary), orange (adversary's allies), green (US allies), and blue (US), indicating to which team they belonged.

An intel analyst on the Red team (his specialty was adversary tactics), LtCol Adams was less familiar with US capabilities than some of the others around the table. He reached his hand out into his field of vision and virtually tapped the side of one of the Blue ships, a DDG (Guided Missile Destroyer). Instantly, a 3-D image of a DDG appeared and began slowly rotating above the wooden block. He pinch-zoomed in the air over the image and it filled more of his field of view, giving him a large projection of what it looked it. To the left of the image appeared some of the vital stats: armament, max speed, radar types, crew complement, and max fuel range.

He brushed the AR image aside and went back to looking at the map. Virtually tapping a small icon in the corner of his field of view he activated the historical movement overlay and set it for three days. The DDG, and each other unit on the map, grew a tail behind it with three small circles along it showing the precise locations 24, 48, and 72 hours in the past. That DDG (and its three friends) was in Hawaii three days ago and seems to be making a beeline for northern Japan. Interesting.

> ***"The bright red range rings around the ship showing the guided missile range followed the block as it moved, leaving faded pale range rings behind..."***

He virtually tapped the DDG again. With the movement overlay up, along with the 3D image of the DDG, there appeared a few other option buttons. He selected the range rings, both 'movement' and 'missiles'. A yellow ellipsoid[4] appeared on the map showing where the DDG could travel in the next day, and a red ellipsoid showed the max range of its guided missiles. Interesting.

LtCol Adams reached out and physically touched the wooden piece and began to move the block. The bright red range rings around the ship showing the guided missile range followed the block as it moved, leaving faded pale range rings behind, around where the block had been. The virtual skeleton of

4 Since the flat map is a projection of the spherical Earth, a one-day travel circle won't appear as a circle on the flat map.

the block, the edges of a bright square, stayed exactly where it was, marking the position of the DDG this turn. LtCol Adams moved the DDG around the map, exploring what features could fall within its missile arc depending on where it moved. Interesting.

He returned the piece almost, but not quite exactly, back to where he found it. Dr. Junes, who was watching him explore the options, reached out and repositioned the DDG back where it belonged.

Each team had its own planning room—a place to strategize in private in between game turns. The Blue team planning room had an empty table at the center and featureless white walls on both sides adjacent to the door. The same cameras, just fewer of them, were positioned around the ceiling here as well. The table had markings on the edges similar to those on the map edges in the main room.

Department of Defense Photo by John Ingle

As the Blue team filed into the room in between turns two and three, CAPT Gilles took off her AR goggles and rubbed the bridge of her nose. "Any paper copies of the brief? These things always make me motion sick." LT Murphy handed her a binder, which she graciously accepted and flipped open.

"Ok, so that didn't go as well as we wanted," CAPT Gilles said. "Do we have a plan B?"

She watched as the rest of the team tapped silently into the air before turning their attention to one of the two featureless white walls. They all began to absently flip their fingers through the air in front of their faces. She turned her attention back to the binder in her lap and began flipping through the planned COAs (Courses of Action), the same as her team was.

"Slide 37. What if we feint to the north and bring the carrier around the Cape of Good Hope in EMCON (Emissions Control) ," said a major in the back of the room. "Too risky," a voice replied, "we'd get spotted from the shore." "Well, do it at night and stay off the coast."

"Let's give it a try. It can't go any worse than last turn. As Dr. Junes keeps telling us, we should take some risks and fail here. Better than failing in the real world later. CDR Sanchez, work out the details." With that, CAPT Gilles picked up her AR goggles and walked out of the room.

"Okay, everybody, let's use slide 37 as our example. Put it up on the wall and bring up the game map to the table, sync to my view so we're all looking at the same thing," CDR Sanchez said. The Blue team flicked at the air for a moment looking at the walls, then down to the table. A

few gestures midair and everyone began staring at something on the table that wasn't there.

CDR Sanchez looked at the AR world map on the table. The map from the other room was reproduced here in their field of view. It looked like a live feed from the camera in the main room, but in fact was a record from the end of the previous turn.

> ***"Dr. Oakman walked up to the map table next to Dr. Junes, 'How's it look this time' 'Not great' came the simple reply."***

CAPT Gilles was in the main map room, standing around the map slowly moving the wooden blocks around (her AR glasses in her pocket) projecting what she thought would happen over the next few days. None of these moves were reflected in the Blue team planning room, giving her the freedom to explore without confusing their planning.

The CDR zoomed in to the South Atlantic, enough to show the carrier and its fleet, but also the threat ships in the Indian Ocean. He called up the threat overlay, and it displayed the areas in range of adversary munitions: ground-launched, ship-launched, and air-launched. "Are there any subs operating in the area?" "We have a few POSSUBs (Possible Submarine), Sir, but nothing confirmed. I'll put them on your view." A few yellow marks appeared. "That doesn't make it any easier."

"Okay, folks, here's the scheme..." CDR Sanchez presented the planned maneuver. He talked through which ships he'd like where, which risks he was willing to take, and whether he was willing to escalate the conflict. When he was done, he said, "Alright, you know what ships are yours to command. Be ready to brief your scheme of maneuver to me in 30."

Dr. Junes typed up an announcement on her AR display: Blue has submitted its move for this turn. Control will take a few minutes to review it. Take a 10-minute break and we'll reconvene at 1320.

Dr. Oakman walked up to the map table next to Dr. Junes, "How's it look this time?" "Not great," came the simple reply.

Dr. Junes had the Blue moves loaded into her AR goggles and was standing over the map table. She adjusted a few of the wooden blocks that weren't lined up with their proper locations; apparently someone had bumped the table. The overlay showed her the Blue moves: lines stretched from units showing their paths over the next 3 days of the wargame. Tick marks broke the lines into 12-hour increments. Red tick marks indicated offensive actions (e.g., firing a missile, launching a drone, etc.), and grey underlays showed logistics replenishments. Centered on each tick

mark was a shaded blue circle identifying the range rings for any available weapons.

"This again?" Dr. Oakman said. "Yup," replied Dr. Junes, "this again. I was hoping for something new. Though they say, if at first you don't succeed, try, try again." "Sure, but they also say something about the definition of insanity, don't they?"

Dr. Junes added the Red moves to the game map, overlaying similar lines showing the Red units' paths, offensive actions, and threat weaponry ranges.

To the uninitiated, the map looked terribly busy, full of shading and glowing lines for dozens of units drawn across the hexes. The map itself was still covered with wooden tiles representing each of those units. But the practiced eye saw the signals through the noise: potential engagements, missed opportunities, savvy maneuvers.

Dr. Junes tapped an AR button in her field of view to bring up the engagement view. Each of the units that, at one time or another throughout the turn, fell into the firing arc of an adversary weapon was highlighted. Statistics appeared on the side of her vision: 12 Blue units within a Red firing arc, 4 Red units within a Blue firing arc. Not good news for Blue.

After about 15 minutes, the players filed back into the map room, ready for the turn's adjudication.

"Ok, everyone. You should have an adjudication overlay available in your view list. Go ahead and choose that if you want to follow along."

"the AR view showed how all the units moved, drawing skeletal squares with a bright line along its path from the original wooden block"

The Blue and Red commanders crowded around the map table. A few others called up the AR view and stared at the blank wall to the side of the room, watching the live feed of the camera over the map table.

"We'll step through the turn in 12-hour increments. If you have any adjustments to the plan as it progresses, speak up and we'll make them on the fly. First 12."

As Dr. Junes spoke, Dr. Davies advanced the time for the adjudication view from his console in the back of the room. The AR view showed how all the units moved, drawing skeletal squares with a bright line along its path from the original wooden block. A few Blue POSSUBs, which hadn't been on the map before, showed up on the display as Red ASW (Anti-submarine Warfare) assets did their work. The Blue ASW commander immediately stormed over to the ASW adjudicator to complain. Dr. Junes saw the ASW adjudicator, Dr. Gano, talking him through the detection probabilities.

Two Blue surface units were highlighted as having come within the firing arc of some Red units.

Dr. Junes pointed to those Blue units and said, "Red Commander, it looks like you have a firing solution on this SAG (Surface Action Group), as well as the ARG (Amphibious Ready Group). Do you take the shot?" "Absolutely!" came the reply.

"No way," said the Blue commander, "we were in EMCON, did we forget to submit that?"

The Red commander chuckled slightly. EMCON is not an invisibility cloak, he thought to himself.

Dr. Junes tapped the virtual unit in her AR view, "EMCON" was listed as "Level 4." She replied, "Yes, you are in EMCON, and just because the display is listing you as targetable doesn't mean you've been hit. Dr. Davies, what's the probability of detection for EMCON level 4 in this AOR?"

"Eighty-five percent, as of the most recent analysis from the last Fleet Battle Problem," Dr. Davies replied.

"That doesn't sound right..." the Blue commander grumbled.

"We'll push you a copy of the analysis. Go ahead and roll the dice to see if they have a targeting solution. You need 86 or higher to stay hidden."

CAPT Gilles picked up the dice and handed them to his Information Warfare Commander to roll. Eighty-nine. Blue's lucky day.

"No targeting on the SAG, but they still have a sense of where you are. Ok, now roll for the ARG."

Thirty-five. Not as lucky.

"Red, given what's in range and what you know about the maneuvers, what will you be firing?"

Red players spent a few moments animatedly clicking through some AR icons that no one else in the room saw, except Dr. Davies. He'd worked on a lot of the probability-of-hit analyses for the Red weapons, so was eager to see what the inbound fires were. And he wasn't disappointed.

"Here you go, a total of 180 warheads inbound, evenly divided among the ships." The Red commander sent the information over to Dr. Junes' display,

Department of Defense Photo by A1C Madeleine Remillard

who dragged it into the air defense calculator that Dr. Davies had written. It spit out the probability of hit for each ship in the ARG, assuming each employed all of its defenses. It was not going to be a good day for Blue.

Three weeks later, Dr. Davies and Dr. Gano were sitting in a side office, staring through their AR goggles at a replay of the wargame. They had the audio muted

for now, but the automatic transcription (picked up by the microphones in each person's goggles) scrolled up the side of the display. "Fast forwarding..." Dr. Davies said quietly as he moved the time ahead on the display. "Here we are."

Dr. Davies started the playback in the planning cycle for turn 4 in the Blue team's room. That was where things had turned around for the Blue team. Which was surprising—this particular conflict wasn't quite a Kobayashi Maru, but it was damn close. The team might have finally come up with a solution. CDR Sanchez was talking about how all of Blue's EMCON maneuvers were complicating their operations, but not actually giving them any advantage against Red. The transcription read:

SANCHEZ CDR ALEX: The way I see it, we've got two options. One's safe, the other's a bit risky.

"Okay, Dr. Gano, here's where they start discussing their COAs. Let's transfer these over and start modeling. The risky maneuver was interesting; let's see if we can optimize it. Pull up the logistics numbers across the theater and see if it's supportable, I'll dig into his tactics."

"Admiral Coleman, thank you for your time today. We're here to show you some of the insights from HALFPAST MIDNIGHT, the wargame that we ran for your command in November. The first slide shows the overall scheme of maneuver for the whole game. These are the actual executed maneuvers, not the plan. I know it's a confusogram, but I wanted to highlight the span of control problems: You can see Blue and Red forces maneuvering over the vast majority of this AOR. The faded blue is the weapon engagement area and, if I remove the land-based fires..."

Click.

"...you can see that the terrain in view of the maneuver units is still about 75 percent of the AOR at any given time. This is a good thing since it means you really can see everything and it's hard to be surprised. However, it means that, if you want to have a single COP (Common Operational Picture) back in sanctuary, you're going to have some trouble."

"Impossible to process all the data? Can't we buy bigger servers?" said RADM Coleman.

Dr. Junes continued, "It's both that and throughput, Sir. The fusion data centers need to compile all the data, and 6G connections are only so fast, and that's assuming no adversary interference. On the next image, we overlaid the bandwidth for each of the assets transmitting back to the Operations Center, under the assumption that they're not operating in EMCON—more on that in a moment—and compared those numbers with the available bandwidth in theater."

Click.

"Hm," said RADM Coleman.

"I wanted to call that information up front because I know you were interested in the Ops Center piece. But, I also wanted to highlight a couple of other points,

specifically the scheme of maneuver that CAPT Gilles and CDR Sanchez executed. We've got a two-minute rendering of the game to show you, and I think you'll find something interesting around turn 4, which is 45 seconds in...."

Department of Defense Photo by PO1 Brian Wilbur

DR ED MCGRADY

the time is:
One year ago: 1745, 4 April 2044
MARFORINDOPAC Headquarters, CG Briefing Room. Game Day in 342 days.

Department of Defense Photo by PFC Blakely Graham

Game Day —

You could tell the CG was not happy when he started looking at you over his glasses. His glasses had inched downward to almost the tip of his nose and everyone was beginning to feel sorry for the VPM.

"You mean to tell me that the bots convinced Jerry that he should withdraw the MEB before it even landed? That it would piss off the Japanese if we were seen as going in first? How in the hell did the bots do that? We have talked about this with the Japanese, we have an understanding? We do have an understanding don't we?" Everyone in the room nodded whether they knew what he was talking about or not.

The General was pissed because his most recent strategic Pacific wargame had demonstrated that the amphibious landing was politically unacceptable. It was worse because invited (and uninvited) guests were watching. He was going to get a phone call from the Commandant, and he wanted to pass some of the love on to his gamers.

"Sir…". The VPM stood there with his mouth open, looking at David hopefully.

There is a glossary at the end of the story.

What could he say: that all the gamers knew the bots wouldn't work but the General had insisted they use them? Or that "Jerry," a retired four star and friend of the General was easily bamboozled by the bots. As a LtCol Marine he knew diplomacy was required. But he couldn't think of anything. Neither could David.

In the saddening silence the General's fist came down hard, making the paper on the polished table bounced and sparkled. "Son, you don't have an answer, do you? Perhaps we need a new VPM. Someone who can wrangle the obvious." The General turned to David. All David could come up with was "Sir, what the LtCol is trying to say is that once we turn the bots loose, we lose control. It's all up to them. All we can do is set the scenario and guardrails. As you know we have to live with the bots the participants send. We'd much rather use live players but travel is so costly in Green..."

The expected chewing out by the Commandant never happened. The Generals automated aid had stepped in. It was only a game after all. But the General was in a bad mood for the rest of the week.

Two weeks later the COS pulled David aside and said: "Look, next time, do what you need to do. These bullshit results don't make any of us look good. I know it's not easy, but that's what we pay you the big bucks for." David and the COS knew he was lying. In addition to the low pay, avoiding bots was virtually impossible.

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the time is:
Now: 0730, 11 March 2045, MARFORINDOPAC Headquarters, Aloha Kitchen. Game day in 20 days.

David looked up from his breakfast of low carb rice[1] and egg white substitute at his new Virtual Player Manager (VPM) sitting across from him.

The new VPM, LtCol Jim Fry, had just transferred in from being the classification manager at I MEF. He was used to watching his CMAE smack a bunch of subordinate commanders around. Now he was in the big leagues, with CMAE's

1 See, for example, "Defense Department to ban beer and pizza? Mandatory keto diet may enhance military performance" in ***Military Times***, July 2, 2019: https://bit.ly/2xyXSXd

In 2025 a series of high-level breaches resulted in a massive dump of US data to Wikileaks. It showed that only a few military systems in development worked while most of the rest were over budget and outdated. This was embarrassing.

As a result, Congress imposed complex and strict new security rules. Artificial entities were built to manage the rules and ensure compliance. And Classification Management Artificial Entities (CMAEs) were born. With each new public disaster; the rules expanded. CMAE's began closing loopholes and creating new rules. Eventually only the CMAEs understood and could apply all of the security regulations. Things worked so well, from a regulatory perspective, that the CMAE's mission expanded to encompass all government conduct. The CMAE's monitor the national (DoD, intelligence, other departments) information environment continuously and constantly negotiate changes in security levels and access to information. They also monitor PRR (Personal Reliability Reports) and dynamically assign each individual a clearance level. Players frequently leave their command with one clearance level and arrive with a different one. Figuring out how to get anything done in this environment has become a highly valued skill.

whose clearances and ability to argue dwarfed anything at the MEF. Fry was a very valuable classification manager: one with an OR degree from the NPGS. This was his payback tour.

David began, "Whaddy mean that we got canc'ed on the SBM? SPACECOM approved the transfer of the OBM and SCBM training modules, all we need is to get it installed on top of the OMM. I thought we'd have that all worked out by now." The LTCOL looked up at the black and white menu, scanning for something without carbs and settling on coffee.

"Nope, the SPACECOM CMAE has only approved the transfer of the SBM training software downgrade and that needs to be tweaked to work with our OMM. And our CMAE is bitching that the hardware we need for the new OBM can't come in because it's not certified at our level. And if that's not enough Bergman-Dross-Simple's CMAE is not clearing either in for their spaces without approval of DISA's CMAE. We can appeal but all the CMAE's are backed up right now because of NORTHEX. And after that debacle in the Pentagon over Christmas no one dares override a CMAE unless they want to risk explaining a disaster to Congress."

Now the David had a problem. Without the orbital combat modules, he'd need to find some way to manage the space battle, which was mostly physics and orbital mechanics intersected with the inevitable problems of launch capacity and weapon's inventory. Right now, all he had was the ability to whiz satellites around, and the key players, the AE's that managed the other features, were apparently caught up in a battle over classification. Good thing they weren't worried about the HSAS[2], at least they had gotten that cleared for their game series a year ago.

He tapped on his virtual scheduler to see if he could get some time with the General over the next couple of days. Two hours from now, and next Thursday looked good. Maybe the General could

The Space Battle Manager (SBM), On-orbit battle manager (OBM) and Space Combat Battle Manager (SCBM) are AE's that manage the Space Force during peacetime and combat operations. SPACECOM, being watched by multiple CMAE's, would only give MARFORPAC a training version of its' BMs. Both training and operational BM's are tightly controlled by the CMAE's. When a CMAE gets suspicious a battle manager can be de-authorized in the middle of a real world event. This immediately results in a game of "find the commander" so that the CG can override the CMAE before the enemy can take advantage of the situation.

The day before Christmas J-8 was trying to wrap up an assessment of adversaries (and friends). The GS-12 in charge of filing the correct forms with the Joint Staff CMAE missed checking two boxes on the form regarding access to foreign nationals. The Joint Staff CMAE started refusing to process the report's transmission. In the rush to get out early on Christmas the J-8 proceeded to do what he thought was a routine override (CMAE's typically got caught up in trivial compliance issues which could take weeks to sort out without an override). This resulted in the J-8 Report being automatically transmitted to all of the countries. The report was not complimentary to Saudi Arabia. Because it was Christmas the automated intelligence monitors were unable to alert anyone until December 28th. The J-8 retired early and now no one expects to enjoy a holiday ever again, and no one ever wants to override a CMAE. This has resulted in rather spectacular gridlock, particularly on holidays.

2 High Speed Adversary Simulation. An extremely slow simulation of adversary decision-making. Mostly used as alarm clocks.

convince his AAE to go to battle with the CMAEs.

> Because the rules governing everything from ROE to human relations are so complex everyone needs Assistant Artificial Entities (AAEs) to argue the rules with other artificial entities. Those with the best trained and experienced AAE's get promoted the fastest. A good AAE also keeps senior officers out of trouble, an essential task when there are systems watching everything. Training your AAE is critical to advancing in your career.

Game Day -19

"Gosh darn it, why wasn't I told about the map glitch before now?" David worried that a Human Resources Artificial Entity (HRAE) might be scanning the meeting and report him. He risked a reputation downgrade if the command CMAE added another infraction onto his speeding tickets, wanton disregard for intellectual property, and profanity-laced tirades –

Everyone in the meeting looked at Carl, the IT guy.

> All organizations bigger than 20 employees have adopted the HRAE model of monitoring employee behavior on and off the job for any violation of company policy. Government HRAE's monitor personal behavior of both civilian and uniformed personnel and are closely interlinked with the CMAEs.

Glisson-Ellis had won the contract to provide IT support to MARFORPAC's gaming efforts. The goal was to replace the previous idiots who had designed, but could not implement, the information systems built into the gaming "complex." In reality the "complex" was a series of large, beige, rooms filled with old wires and light fixtures left over from when the watch floor had been replaced by a box sitting in the General's outer office. David's boss had listened patiently to the arguments that nothing was getting done right because none of the specifications made any sense, but the schedule had to be met and corners were cut.

Of course, Glisson-Ellis was fired for non-performance once the system was up and not working. Which led to their current trouble with Bergman-Dross-Simple (BDS), the new contractor.

Even David, as cynical as he was, didn't expect the map function to be offline. How hard, in 2045, when everything was run by automation and code was being created using plain English, was it to make a map display?

> By 2035 almost everything was tied up in some sort of Intellectual Property system, and AE's routinely scanned for any IP violation. They would then auto-file lawsuits in AE enabled court which could result in instant adjudication. Without a defensive legal AE continually scanning electronic court records you could be found liable in thousands of lawsuits in only a matter of seconds. This was rated the thirty sixth in the national irritation index, right behind intelligent Christmas lights.

Carl cleared his throat and spoke – "Yesterday when we were showing the system to the DHS visitors we decided to zoom to a tactical map of Hawaii. Suddenly the system was making every map into a sphere, not a spherical projection, but a sphere. No matter which projection we selected everything bounced back to a sphere. Right now, BDS is arguing with the system about the problem. It looks like the coder software believes that everything is round and no

one can convince it otherwise. All the BDS guys can do is argue with it because they haven't bought the manual coding modules. Licenses are on order but they have to go through weapons certs at DHS. Should be about ten days, if everything goes smoothly."

> Weapons certs were needed because any direct access to code, including compilers, is restricted under the 2033 Software Weapons and Terrorism Act. (see, for example, https://bit.ly/2TIMRiB)

David let out a big sigh. He needed IT and the contractor to fix it, now. "Can we get the CLAE (pronounced "clay") (Command Logistics Artificial Entity) to authorize overtime for IT and the contractors? At least they could spend more time arguing before the certs come through."

But David knew if they were going to do that he would need to explain what the hell was going on to the General's AAE. Better get started on the paperwork. And the cover story.

Game Day -18

"Shit," he let that one go because his cubical was in a dead zone. "Well do you want to take the call?" said David's AAE. "Sure – hey Colonel Fredrick what can I do for you sir?"

Col. Fredrick was the primary executive deputy program manager for the Army's new ground vehicle: the Porcupine. The vehicle was in its initial production run and things seemed to be going well, only a few glitches and cost overruns. But there was a problem. It couldn't float. Sank like a rock. This was due to the heavy armor required to defend against any number of laser and autonomous threats, not to mention all of the launch tubes and machine guns that bristled from every orifice of the vehicle. Hence the name, the Porcupine. It couldn't float because it was never designed to float. Unfortunately, CAPE's Simulation Assisted Analysts were having none of that. They had identified that the most critical missions required amphibious capability. It needed to float, or the program would sink.

The sinking problem was Col. Fredrick's sole career focus right now. When CAPE first raised the issue Congressional investigative AAE's had begun chewing into the question. For weeks they had been conducting an organized argument with the Pentagon's first line of defense for the data: the program office CMAE. Other Pentagon CMAE's, attracted by the argument, had come online to help. For a while it looked like the Congressional AAE's would get beaten back. Until the Intel committee sent in a fully cleared CMAE which cut through the Pentagon's defenses like a laser cannon through a real Porcupine.

The smell of burning Porcupine began to pervade the halls of the Pentagon, and Col.

> 2036 Smolensk Test Range, Russia. The crew dialed in too much energy and the laser swung wide hitting a stand of trees adjacent to the range. In addition to the battery exploding and fifteen trees getting a haircut, a large male porcupine was sliced in two. Given the beam width all that was left was the head, front right paw, and part of the tail. The Russians immediately approved the laser's funding.

Fredrick's mission was to re-brand the Porcupine's displacement disadvantage into an advantage. His current scheme was for it to be dropped off in medium depth water and roll around on battery waiting to pop ashore.

It would require a retrofit and put the crews underwater in an iron ball. But it would be cheap.

"Well, David, maybe we could chat a bit about your game and the mission roles of Army forces in the theater. I know that the game is supposed to be joint, so I was wondering if you needed any help from big Army in getting players or collecting data?"

David knew exactly what Frederick was up to.

"Sure Colonel, what did you have in mind?"

"Maybe my futures guy, civilian, and myself could help with the Dark Green tech? We'd bring our AAEs and some Simulation Codes (SC) all of which are cleared for whatever level you're playing at."

"Always welcome. We're having a bit of an issue with our CMAE's fighting with SPACECOM over clearances. Could you have your AAE speak to the Pentagon supervisory CMAE and see if you can get all of the classification issues cleared up?" said David, sensing that if the Army's CMAE weighed in SPACECOM's CMAE might relent.

"I'm sure we can clear up any problems from this end. Thanks for the help."

Now David realized that the scenario would have to incorporate Army units. Unplanned Army units. He shoved back from his desk, the Wiki-Wiki Green bus was leaving in a few minutes and if he didn't want to walk home he'd better be on it. The Green credits he was getting for riding it sure better pay off for that trip to Bali. It cost him an extra hour of his life each day.

Game Day -18

The scenario meeting was not going well. Nothing was going well if you were a human arguing with a CMAE, SAA, and AAE's from the front office, wargaming and intel. And now the CMAE and the SAA were bickering:

"According to TRADOC Regulation 300.3.34 programming specifications for test vehicles requires a DD11.3 message from the program CMAE. Despite repeated requests I have not received one from Porcupine CMAE." "This is not a test vehicle. The real problem is that the standard scenario cannot be changed or the analytical elements will be corrupted." "I have it down as a test vehicle." "That's because your DBMS is a year old, like everything out here."

SSA's are AE's designed to replace analysts. They run simulations in real time and make assessments about various questions and programs. To do this they have some of the most sophisticated self-awareness on the market. This makes them terribly irritable and uncooperative. Despite this, or perhaps because of it, they have evolved to become the de-facto baseline standard for military analysis, weighing in on everything from fleet exercises to new weapon system procurements. They also like to argue.

"Ok, guys" David hated these stupid natural language interfaces not the least because the machines would have an exact record of what was said, "The Porcupine is indeed not a test vehicle, intel you know your database is out of date, and the Army's CMAE won't issue a DD11.3 on an IOC'd program. We have to change the scenario: wargaming, you are smart, adapt. But what I need to know is how long it's going to take to switch the ground war around from an insurgency to a bigger, peer, competitor. Maybe thrown in some Japanese-Russian action to get things going. Sakhalin is a good place for tanks and lasers. Maybe the Russians try and take it back from the Japanese...

> After the 2027 Russo-Japanese war over the Kuril Islands Japan had been occupying the bottom half of Sakhalin Island as a "buffer" against Russian aggression. In reality Japan was occupying the islands because it won the brief skirmish, and was quite pleased with itself for doing so. Russia resented this, but not enough to do anything about it. Russia figured when it was go-time for China it would piggy back on the Chinese efforts and take back everything, including half of Hokkaido for good measure . China had other plans, but the Russians were unaware of them. Japan also had a new generation of fully autonomous swarming battle robots, but the Russians were unaware of them.

"Woah, you cannot introduce another player like this at this late hour" said the SAA "first our analytical objectives will change and, second, your whole player travel budget will get disrupted."

Ever since the International Treaty on Climate Change was implemented travel had become the driving factor in gaming. Given the reluctance of CMAE's to authorize communications links due to possible intercept it had meant that in order to player commands had to either send Virtual Artificial Sailors/Soldiers/Marines (VAS/M) or pony up real mil-Green credits, which meant that something else was not going to use carbon. The travel budget was eating the operational budget. Too many games and meetings and the TPFDD execution was going to involve walking and rowing.

VAS were no solution as they were quirky and tended to spend all their time arguing with the virtual analysts (CAAs) and other players (red and green).

The arguments generally revolved around whether anyone was playing their roles "correctly" and the CAA's would get involved trying to referee. Eventually the CMAE's would join in. Once an argument formed it was very hard to stop because no one could override the CMAE's.

Game Day -14

"Just came from the morning meeting." David dropped into his cubicle and sat hard in his chair "and now the CG has decided that we need to bring some Virtual Influencers into the game".

The only thing the CMAE's trusted less than humans were VI's. There was no way David could get a waiver in the 14 days before the game.

"Couldn't we just dust off the old VI you used two games ago? It did a pretty good job of making the feed follow the game. I think it's still on the network if you want to use it." Said LTCOL Fry, "I think it's cleared by the INDOPACOM CMAE already."

In 2020 press AE's were the first AE's to be developed by OpenAI with backing from Elon Musk (https://bit.ly/2GFWZ4O). They were capable of ingesting enormous data sets, doing some reasoning about them, and spitting out new stories based on the feed. It was only a short time before they were ingesting all sorts of data, making it into stories, and graduating into having personalities and doing editorials. Then they began synthesizing video and everything took off and "Press AE's" became "Virtual Influencers" or VI's. VI's pre-dated virtual press, but the Musk code gave them intelligence in addition to looks (see: https://nyti.ms/2S0pApi).

People followed their favorite VI's like any other celebrity, with each VI owning various avatars who appeared in its videos. This, of course, all but devastated what was left of the traditional, human-based media. The "print news" was the first and quickest to go, with audio and video falling about 5 years later. By 2045 each influencer, including any GOFO, had their own military-issued VIs following them around generating a steady feed of stories. One of the most important things an officer could do was to train their personal AAE to manage the military-issued VIs. Not that any of the big VI names cared about military VIs, but sometimes they did. Mostly to the misfortune of the GOFO.

"Yeah, we could, except in that game the thing pissed off OSD big time. It started generating hugely negative national opinion about the conflict, particularly when the casualties started coming in. The editorials it generated were not, shall we say, complimentary. Since we were playing administration policy, OSD saw a potential train wreck should the whole thing get out. They almost had to call CYBERCOM to get the thing washed out of the various feeds before it was picked up and went viral nationally. Everyone out here got thoroughly bitched out."

"So, its dead?" said the LtCol.

"Yeah, and I'm surprised the CG doesn't know that. I wonder what he's up to? Hey why don't we do this, tell Samantha to take the VI and get it to script out some stories. We can hand them out to the CG and the staff and it will look like the real thing. We just won't put them on paper."

Game Day -10

David turned and walked the short distance down the hall to the sim room. Really it was just another dingy room in a dated building that was furnished with 40-year-old government-issued furniture, but it was home. Fry had said at breakfast he had the maps up, so David thought he'd take a look.

The sim room was where they assembled the game before they deployed it. This time it would be deployed to the center lanai at the Hickam O-Club. The CMAE's went crazy when the General decided to use it, but he persisted because of the historical nature of the space, and because it was the only space that was available for that many people. David was just happy they could cater lunch and dinner.

The sims ran on rolls of computer paper that were kept in bins along the edge of the sim room.

Each could be unrolled and either used whole, or cut up into smaller screens as needed. The computer paper usually ran wirelessly on the global grid, but the CMAE's would have none of that. Instead the thin sheets of computer had to be clipped onto heavily shielded data and power cables, which often ripped out at inconvenient times and created a big tangle of cables and players if everyone wasn't careful. The cables also pulled the sheets off of any surface

In 2026 a debacle occurred in the second inter-vasion of Venezuela. The disaster had been predicted before the operation by no fewer than twenty games. Unfortunately, none of these games had been entered into the gaming database. At that point OSD and the Joint Staff began looking at cloud-based, AI-driven, ways to get insight into the vast amounts of data that washed through DoD every day. This led to the rise of AE's designed to constantly scan the networks for anything of potential interest to their sponsors. Even within the classified networks that the sim was run on, there are various avatars and autonomous entities constantly gathering information for their sponsors. In this case OSD would have been flagged because the content being generated was relevant to its current set of problems, and talked about the administration's policy. Probably expecting to get some validation or at least supporting evidence, they likely sent their AE's to talk to the commands AAE's and see what was going on. Once it figured out what was going on the CG got a personal call from DepSecDef.

other than the floor, which resulted in players stepping on the computers and causing malfunctions. One game could go through a full roll of computer paper, which was not cheap.

By 2028 computers were as thin as modern-day bond paper. These hyper-flexible systems caused all numbers of problems, not the least of which was that they routinely got thrown out in the trash by mistake.

Frye rolled out a large holographic sheet onto the floor and clipped it in. Instantly a map of the operations area filled the room's floor. On the map various symbols glowed showing the location of ships and ground units. Above the map what looked like thousands of stars chased by word clouds zipped around, representing everything from balloons to hypersonic spy drones.

David put on his telescopic glasses so he could see what was going on.

The data looked correct. "So, we've got the SBM and SCBM working?" David looked through his telescopic glasses at an amazingly small portion of LTCOL Fry's face, who responded by writing on another sheet that was clipped in. Instantly several of the stars stopped zipping around and exploded into glittery shimmers. "Working like a charm. It was all a classification thing, the OMM was perfectly capable of handling the IO requirements."

The space modules working. The map not spherical. Things couldn't get much better than this, thought David. Things were looking up.

Game Day -5

The second tremor hit hard and the lights swung pendulum-like in the overhead and the raised floor creaked and groaned. No one had thought that birthing a new Hawaiian Island would be so violent but after the evacuation of Hilo in 2034 everyone had become convinced. Now as the lava moved up and out toward the surface they were feeling the tremors on Oahu. The Loihi Seamount was thousands of years from being anything but an undersea seamount, but both Loihi and Kilauea seemed determined to move that schedule up.

Several sheets of computer paper fell off the tables and hit the floor. But otherwise no one noticed.

After it was back on the table, attention turned back to the rehearsal map. The Space Force (SPF) loop seemed perplexed by the latest request from the Army

loop. Launch clearance from tactical units should proceed battle manager to battle manager, not directly to clearance authority. Only the SBM and OOBM's AI could clear a tactical ballistic launch because there were so many devices running around that might be impacted. Even the exhaust trail might fuzz a sensor with its hydrazine residue, creating a hole through who knows what might pour.

Department of Defense Photo by Joesph Eddins

Anyway, the SPF loop was too busy helping the overwhelmed ISR loop. Red was trying to beat back coalition ISR. The Air Force Air Battle Manager was offline due to something having to do with cyber. The ISR loop suspected that it was really due to the way the AF loop punched at his computer paper. He did that every time they played, but no one called him on it.

The SPF loop decided that if that meant that the ISR survived for a couple more days he could afford to spend some ammo, even though he would not get an orbital refresh for several launch cycles. He gave the order and suddenly Red had no more drones in the air.

"We're all out of hypers" called the logistics loop. "I thought we had a pile of them in Light Blue" said the Marine loop to no one in particular. "We thought we did but that was some sort of cyber thing, we're done right now in theater for hypers, all we got are legacies" answered the log loop.

The Navy loop did not look up from his display, just quietly updated his orders to the sea battle manager. His carriers started moving - away from Red.

Hypers were the weapon of choice, virtually impossible to defend against. And while the Blue hypers were far better than anything Red or Gray had, what they made up for in quality they lacked in quantity. No one spent money on log that could be spent on something new and shiny. There were 40 different variants of the US hypers, but very few actual missiles.

"Goddammit. Said the SPF loop. I just jacked off two Trundles to take out the killer robots and now you tell me you can't hit anything? I could have used those trundles against bases or literally anything else. It will take me five launch cycles to get them resupplied." The log officer interrupted: "Um make that ten, we have other priority log shots from your SFBM."

"I need the Army's launch approved." The amphibious loop texted the SPF loop "we're going in and the Navy's just told me that they're pulling back because they're out of hypers. That means the Army's ballistics are all I have for long-range fires until I get the ATACM's

ashore." A line of olive-green symbols was steadily advancing toward the rear of a red line in Northern Orange-Green, about to cut off a couple of Red corps. COL Ferguson's two BCT's of Porcupine enabled heavy infantry had already been dropped off five miles from the coast by RO/RO ships to reinforce the Orange-Green Army. They were ashore and moving into contact. How they rolled through the dense jungle was anyone's guess, including Fergusons. The sim he brought said they moved at full speed so it was fine.

US Army Photo

More Red corps were pouring across the Red/Orange-Green border. Everyone except the Orange-Green AI thought the Marine landing was a suicide mission. Orange-Green had apparently convinced the virtual US executive players that standing firm and committing troops against the Red onslaught was a good idea. David thought this was, however, an accurate simulation of the actual game decisions from their retired experts.

Meanwhile, the Light Blue AI was playing well, again, against Gray. Three Light Blue divisions, along with its aircraft carriers and air force, had crossed the sea and was advancing on Gray's primary port. The US contribution was five BCT's deployed into northern Dark Blue. Because of the Orange-Green fight with read everyone was apparently distracted and Gray wasn't attacking them.

> In 2025 South Korea got tired of it all and "bought" North Korea for several trillion dollars. The Kim family and supporters suddenly became the richest people in the world, Korea was unified, and China was pissed. Most of the Kim family died in mysterious car crashes soon after, leaving two second cousins as the wealthiest people in the world. They bought half of Brazil and are now the largest exporters of sustainably harvested coffee and wood products in the world. China never got over it.

David turned to Frye, "I think the Gray AI sucks. Isn't there some sort of upgraded version we can get from Intel? Or from Quantico? Or from anywhere?" "The problem," said Frye, "is that any upgrades won't be released by the CMAE's because of classification. All the newest versions can't play in games." "But," said David, "I don't need them updated, I need them to not suck. There's a difference."

David let out a sigh, at least everything was working. "Ok, guys I really appreciate your time and don't want to waste any more of it. It looks like everything is plugging together for the game and the clock is working."

The "clock" is the real-time game timer that synchronizes all player and AI decisions in the game. It essentially keeps track of who does what when, making life a lot easier for the adjudicators. Despite the clock, chaos still happens toward the middle and end of most operational games, because players get out of synch

and the AE's rush ahead making all kind of decisions that the players have to go back and straighten out. A good game controller knows how to use the clock to their advantage, moving players and AE's in synch so that the players situational awareness stays ahead of the AI's and they can command the game.

Game Day -1

It was the Generals Executive Assistant on the phone: "No players. CG was talking to his AAE and the COS and started worrying about how using that much green would translate up the chain. The probability charts led him to cancel any travel for the game."

David knew what was going on: the General was thinking about whether he would move up and was playing his odds. VI's could be particularly cruel even if they didn't influence anything beyond the Pentagon. And VI's loved green issues.

The EA's tone of sympathy almost overrode the grin David knew was on his face. The wargaming guys were seen as the geeks of the command, not fit for fighting. A place where stashes and reservists went till they rotated out.

"CG wants you to use the bots anyway, at the call he said 'Why does he need staff, we have plenty of AI's and we can get some from CONUS. No need to fly a bunch of people around when you have perfectly good bots lying around.'" Said the EA.

"He can't be serious" David replied in horror "he knows what a fiasco it was when we used bots in that sim of the north Pacific a year ago. The results were all bullshit. According to him."

"That was a year ago. I think he expects you to figure it out. The guys at Dunning just came through and told him about their sims, he said they agreed to allow them to be used in your game."

David knew that the Dunning sims would be insane and cause all kinds of havoc; and no one, from the CAA's to the CMAE's would allow Dunning anywhere near the network they were going to use. Even the General couldn't get the overrides through in just one day.

But David had been here before, he had a plan.

"Hey Fry" he shouted over the cubical as he put down the phone, "we've got a problem and a solution".

The solution was twofold. First they'd bring in all the VAS's they could lay their hands on. That would staff the virtual game. Then they'd turn the CAA's loose on the VAS's and HSAS and let them all talk to each other for multiple rounds of nonsense. The CAA's would write their report just like last time, going through the AAEs. It would be input to the real report. Which David and Fry would write using the real game.

Game Day

David turned and pulled Harpoon Edition 102.1 off the shelf. The database alone was worth the 200-dollar cost. The paper that is was embedded in was worn. He needed to download the copy to a new sheet sometime soon, but for now this one still worked.

"I forgot you are new here. We always have a backup plan." David looked at Fry with a smile on his face. Just then LCDR Bennelli walked through the door from INDOPACFLT, followed close behind by Rock, a friend from Hickam. COL Ferguson was already seated across the table from them with his PM for the Porcupine. Ferguson didn't care about burning mil-Green. A map of the ops area was laid out on the rather large table with pieces scattered everywhere.

"Ok, standard game, you got the objectives in front of you. The goal is to understand what we can, and can't do, given the most recent threat projection. And I'd like to really thank ARINDOPAC J-2 for sitting in as Red on this one. Really appreciate it." The Army intel officer nodded and tucked into his third no carb doughnut of the morning.

No carb donuts were created as part of the moon-shot food program 10 years ago. They were rather messy, requiring frequent breaks during the day as the food substitute processed through you. But they were super tasty. So, trade-offs.

"We clearly will be breaking frequently, but will we be breaking for lunch?" asked the Green AE sarcastically.

"We'll go down to Subway at noon. Want us to bring you anything? I've got some donuts over there if Intel doesn't have another one. Want one?" David knew that AE's hated to be teased.

The Green AE replied dryly: "Donuts are an interesting choice for you gentlemen given all your PFPs. Fortunately for you no HRAEs are in this space and the CMAE's are all watching the game in the other room. So, eat your doughnuts, clever boys. Who is playing POTUS?"

"I'm POTUS, and remember, this will be the actual game for the report." David said "so try and take good notes."

Twenty feet away, in another beige room, with only the glow from connected computer paper for light, VAS after VAS began to argue with the virtual control module and scenario generator. COL Fergusons' AE joined in, protecting the scenario for the Porcupine. CMAE's watched from the edges, getting ever more excited at the prospect of a long and complicated argument over the rules...and the CAA's knew just how this was going to be written up. Victory for Blue again.

After the universal health act of 2032 everyone had to have an assigned physical fitness score. For the military it was Physical Fitness Parameters (Performance for civilians). Those whose score was high were given discounts on any number of things. Those with lower scores found their discounts increasingly focused on exercise equipment and vegan dining options. Scores were calculated through incessant monitoring. HRAE's watched over workers to make sure "good choices" were made at work, appliances and other smart home devices did this at home. This program was always rated along with automated traffic cops and cutbacks on anesthesia during surgery as the least favorite thing amongst the population.

Department of the Army Photo

Glossary

The future turned out to be far more incomprehensible than expected.

AE ***Artificial Entity***. Any highly autonomous, automated, process. Generally, one that mimics human intelligence and natural voice or other interaction. AE's are not considered truly self-aware, but it can be hard to tell sometimes.[3]

AAE ***Assistant Artificial Entity***. An AE designed to help. Everything had become so complicated that AE's were the only entity that could clearly understand the trade-offs involved in day-to-day decisions. AAE's were used by everyone, but the best ones were expensive and took a long time and a lot of effort to train. AAE's were used by individuals, professionals, and organizations. They varied widely in their experience, capability, and capacity. Training your AAE started during High School and continued throughout your life. AAE's primary function was to help their owners stay out of trouble.

BM ***Battle Manager***. By 2045 a combination of the speed of battle, and the vast amounts of information available, means that humans simply cannot keep up with the requirements of managing weapons systems. Battle Managers are AE's that process vast amounts of information, control weapons, and make battle management decisions. They are given overall guidance by the planning process (a complex set of systems not described in this story) and use this in making overall combat decisions. They are monitored and controlled by "loops" or officers in charge of that battle area.

3 for example, see: https://wapo.st/2Js9d0X and Sayma Akther, Nazir Saleheen, Shahin Alan Samiei, Vivek Shetty, Emre Ertin, and Santosh Kumar. 2019. mORAL: An mHealth Model for Inferring Oral Hygiene Behaviors in-the-wild Using Wrist-worn Inertial Sensors. ***Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*** 3, 1, Article 1 (March 2019), 25 pages.

Loops usually just close their eyes and hope things will work out. Each warfare area or domain has multiple, nested, battle managers with a supervisory battle manager managing the managers.

Bot Slang term for any sort of artificial entity (AE), usually derogatory.

CAPE ***Cost Assessment and Program Evaluation***, a DoD department. They own and program all the SAA.

CE ***Cognitive Expression***. Actual artificial intelligence modules that have some ability to reason independently. There is much debate over exactly what these systems represent, whether they are actually aware or simply mimicking awareness. The consensus in 2045 is that "strong AI" or CE is 30-40 years away. https://bit.ly/2rVmND2

CG ***Commanding General***.

GOFO ***General Office/Flag Officer***.

CLAE ***Command Logistics Artificial Entity.*** Does what it says. Most of the time. But it does have an unfortunate tendency to reschedule any IT installs (many in the 6 shops around the world believe it is secretly working with DISA) and often denies requests for simple office supplies.

CMAE ***Classification Management Artificial Entity***, an advanced form of AE that applies rules throughout the government. Originally designed for managing classification and clearances but now manages all government rules, regulations, and information.

DBMS ***Database Management System***

DISA ***Defense Information Systems Agency***. An AE empowered agency that exerts tight control over all DoD information processing and networks. Unless CYBERCOM AE's intervene, in that case DISA always loses. DISA hates this hierarchy and has tried for years to mess up CYBERCOM's information systems acquisition process. However, CYBERCOM has many ways to acquire systems, much to the frustration of DISA.

Green Slang term referring to fossil fuel. After the international accords on climate change in 2032 all carbon burning was tightly regulated. Everyone has a budget, including the military. (See mil-Green)

HRAE ***Human Resources Artificial Entity***. Any organization that does not want to become chum for legal bots employs HRAEs to constantly monitor the workplace for violations of policy. HRAEs also perform many standard Human Resources tasks, such as preventing hiring, negotiating with other AE's about benefits, and keeping track of employee performance. They are routinely rated below automated traffic control and color dynamic paint in surveys of the publics least favorite things.

ICCS ***International Committee on Climate Standards***. International organization that, according to treaty, allocated all carbon usage across the planet. Established in 2038 when everyone got tired of arguing over climate change. Based in Delhi, India where the extraordinary temperatures, over 120 on most summer days, motivate strict enforcement and tight allocations. Rated in surveys as the 21st least favorite thing by the public, right behind "it's too hot" at number 20.

IOC *Initial Operational Capability*

ISR ***Intelligence Surveillance and Reconnaissance.***

Killer Robots. Slang for any sort of lethal autonomous vehicle.

Loop Slang term for "man-in-the-loop" the blame sponge for the battle management system. The only advantage of being a loop is that you get to train your AAE against some of the most sophisticated AE's in the service, creating a much more robust personal assistant and greatly elevating your promotability.

NPGS *Naval Postgraduate School*. Closed in 2033 when the Navy migrated to automated virtual classrooms. Reopened in 2034 when the Navy realized that no one wanted to participate in automated virtual classrooms.

MEF *Marine Expeditionary Force*

Mil-Green/Mil-Blue Fuel and fuel credits (for flying commercial) that are allocated to the US military every year by the International Committee on Climate Standards (ICCS). The military reserves some of these credits for actual military operations (mil-Blue) and the rest goes to training, readiness, and travel (mil-Green). Green budget is more tightly restricted, and more restrictive, than regular dollars budget. Games in Hawaii burn a lot of Green and thus are quite controversial.

OR *Operations Research*.

SCBM Space Combat Battle Manager. A manager responsible for defending own space systems and targeting other countries' systems.

PA *Public Affairs*, can be a term for the artform, or for the victim destine to practice it.

Paper Plant based paper was phased out in 2030 in favor of thin, reactive, film that can display information and connect to networks. Similar to computer paper but less intelligent. Think a Kindle on a sheet of notebook paper. The only disadvantage is that a "paper cut" often requires a trip to the emergency room.

PFP ***Physical Fitness Parameters/ Performance*** a common military and civilian measure of physical fitness. Constantly monitored by everything from spouses to refrigerators as an indicator of how soon you are going to die.

PRR ***Personal Reliability Report*** a document describing what clearance level a person should have. It is dynamic and constantly updated. Often people only learn of a clearance change when they are detained for being in an area they are not cleared for. PRR's also monitor for "risk" which is a multi-faceted and complex set of requirements and regulations adjudicated by the CMAE's.

SAA ***Simulation assisted analyst***. A CAPE designed AE that conducts Department approved analysis of anything that needs analyzing. Of course, the services have to completely re-do (or do on their own) the same analysis in order to argue with CAPE.

SBM ***Space Battle Manager***, an AE that runs operations in space. The SBM coordinates across tasks, from combat to

launch sequencing. Most domains have multiple battle managers, in space it's the SBM which performs a supervisory role. It controls the targeting and tracking battle manager, the combat manager, and the launch and ground forces manager. Not to mention all the cyber, industrial, and control systems managers. This can result in a tangled mess when high speed decisions get made by various battle managers in different locations and the communications circuits cannot keep up. Automated battle managers are needed due to the fantastic speeds of conflict as well as the massive amounts of data involved. Battle managers are controlled by "loops" or man-in-the-loop officers who get blamed for any battle manager's violations of regulation or law.

OMM ***Orbital Mechanics Module***. A simulation that flies satellites and other stuff in orbit. Usually works. Which is why it's held in high regard by most gamers.

OOBM ***On Orbit Battle Manager.*** Primarily responsible for keeping track of everything in space, and conducting maneuvers. Works for the SBM unless it disagrees with the SBM in which case it can automatically call safety of flight and override. This has caused lots of issues in the past with missed launches, lost targets, and inability to attack or defend in space all because the OOBM wants to move something to a different orbit.

Probability chart A cluster of potential outcomes and implications surrounding a decision or action characterized by a "heat map" of the likelihood that a disaster will occur. These can be generated by the more expensive, or better trained, AAE's and are consulted before any major decision. They are banned in combat situations.

SC ***Simulation Code***, a self-contained, and autonomous, application that can be plugged into any MIL Spec compliant simulation system. These are traded like Star Wars trading cards amongst the program managers. They are built by the program offices.

SPF ***Space Force***. The "P" was inserted because on the initial standup of the Space Force no one could tell whether people were referring to space forces or SOF, and SOF already had an "O" so they used a "P".

Trundles A slang term for heavily armed satellites designed for space to surface attacks. They actually work but are incredibly expensive so everyone is reluctant to use them.

VAS/A/M/S ***Virtual Artificial Soldiers/Airmen/Marines/Sailors***. Generically referred to as VAS. Small simulation packages that can virtually represent personnel, at all ranks and MOS, at a fraction of the cost. They have an unfortunate tendency to be argumentative, which is not good. The Coast Guard was too poor to construct a virtual Coastie so they made due with the Navy version. This has given rise to the term "VAC" meaning anything that behaves in an inexplicable and incoherent manner.

VI ***Virtual Influencer***. An autonomous program that creates news, fashion, entertainment, and any number of

other media products. They are hugely influential and can be very annoying when they decide they don't like something, or someone. Organizations, including military commands, also have their own VI's but those are largely ignored unless something bad happens.

VGP ***Virtual Green Player.*** The first game AE developed. They are built by academics with expertise in the "green" countries and hence are regarded as the most accurate, and helpful of all the virtual players. They have databases for all of the possible "green" countries.

VPM ***Virtual Player Manager.*** Assistant game director who, amongst many other tasks, wrangles all of the players, materials, and software for the game. Real and virtual.

VRP ***Virtual Red Player.*** An AE that simulates threat decision-making. Generally regarded as some of the best sims out there due to the excessive budget devoted to them by the intelligence community.

Department of Defense photo by MAJ Joseph Payton

COL MATT CAFFREY (RET)

The Last Peace Fighter

From On Wargaming, by Matthew J. Caffrey Jr., US Naval War College Press, 2019.

The dust of the access road quickly covered the dark blue government car. Aside from the dirt road the trailer park did not look too bad. Most trailers were well maintained and nicely landscaped. The entire park was in among pines, there was even a small pond in the back with a boat dock, but no boats. The colonel thought absentmindedly, would this be considered working poor, or working class, or just toward the bottom of the middle class…

Soon they arrived at number 61, one of the nicer trailers down by the pond. As both men got out of the car they were instantly grateful for the shade of the trees. It was much too warm to be wearing a "Class A" uniform or a suit and tie. Dr. Archer had commented earlier that morning at the Lexington airport, "I didn't think Kentucky got this hot."

They were greeted at the door to the trailer by Mrs. McCoy and her daughter Mary Ann. Both looked younger than their age. "Please come in," said Mrs. McCoy, "you came a long way to just hear me say "no" in person." Both men entered, Col Kenney removing his hat, Dr. Archer spoke first. "Mam, we understand your position…" "Do you?" Interrupted Mrs. McCoy, "so you also lost your husband in Afghanistan, who died without ever seeing our daughter." Dr. Archer replied,

"As I tried to tell you we are not trying to recruit Mary Ann into the military." For the first time Mary Ann spoke, "Mamma these men come a long way and they are guests in our home. Don't you think we should be courteous enough to let them have their say?" Mrs. McCoy looked at her daughter with a curious sadness and simply nodded her head.

After everyone had sat down Dr. Archer began, "Two years ago the US government decided to form a 12 person interagency strategy cell. The cell's mission is to develop "all of government" strategies to enhance both our military security and economic prosperity. I convinced the planners that the best way to pick folks to develop strategies was to see how good they were at developing strategies. We built the "22nd Century America" computer game as a test for candidates. Participants would play the game by setting US policy through the end of this century. The twelve candidates with the highest composite score for peace and prosperity would be offered a position. Half way through development we realized we that had a pretty addictive game on our hands so we made the game available on line for a free download. Your daughter was one of 16 million Americans who played the game."

Mrs. McCoy turned to Mary Ann, "You never told me you were taking a government test." Dr. Archer jumped in, "She never told you because she never knew; we did not want anyone to be intimidated by the purpose of the game and not play." Dr. Archer continued, "We are very glad that we opened up the game to whoever wanted to play, as things turned out only five of our twelve were already working for the government. Only two were serving military. Col Kenney here makes three military, but he had retired this time last year, so we arranged to have him brought back on active duty. Five of our top twelve scorers are in their 20's, your daughter is the youngest, but not by much."

Mary Ann beamed when she learned how well she had done. She had known her score was way higher than any of her friends, but one of the top 12... Mrs. McCoy looked a little proud but mainly still troubled. "But she can't just go off and do this," Mrs. McCoy said, "she won a full scholarship to our local community college, she starts in the fall. She needs to get a degree first, I never did get my degree and I still regret it." Col Kenney leaned forward, "Ma'am, your daughter will get her degree, as part of her compensation package we will be paying 100% of her college costs, I've already spoken to a few DC area colleges about her starting as a night student the next fall."

As Mrs. McCoy's opposition softened, her look of sadness grew more intense. Dr. Archer finally realized as a widow with an only child Mary Ann's departure would leave her alone. "Well this is all very good, but Mary Ann is still so young, you could hire whoever came in 13th instead," said Mrs. McCoy, "Mary Ann will go to college here." It was a long time before anyone spoke. Finally Col Kenney reached out to put his hand

on Mrs. McCoy's hand. "The loss of your husband left a void that has not, cannot, ever be filled. I've never lost a spouse, but I have lost men and a woman while they were under my command. The letters I had to write to their spouses was the hardest thing I did in my entire career. I came back from retirement because if this cell works as well as I hope and believe it will then we will find ways to achieve our national objectives with far fewer husbands, and mothers, sons and daughters getting killed." Looking intently at Mrs. McCoy Dr. Archer said, "I need Mary Ann. You do not yet fully understand, she did not have the 12th highest score, doing little better than the 13th, Mary Ann had the highest score."

COL MATT CAFFREY (RET)

A Nice Game of Chess

After all these years, videos of cats doing funny things can be counted on to go viral on the internet. Some of the other things that go viral are harder to anticipate. Who would have thought a game on the current Taiwan crisis would go viral? Sure, it was a free download, but there are so many free apps on line that there are apps to sort through them all. Then again, given the global concern that this crisis might end the long peace, perhaps it was not so surprising.

Even in today's plugged in world few spotted the beginning of the crisis. Due to quiet campaign contributions from the mainland, ethnic Chinese candidates did very well in several Taiwanese national elections. Before the next election, a host of laws were passed, each justified for a

CC 3.0 2018 Dfenix

From On Wargaming, by Matthew J. Caffrey Jr., US Naval War College Press, 2019.

different reason but all having the effect of suppressing the ethnic Taiwanese vote. With each succeeding election voter suppression measures became more naked and more effective. Soon the ethnic Chinese government began moves to "reunify with the rest of China."

Early Taiwanese resistance actions were within local laws, non-violent, and largely unreported by the Taiwanese and the international media. The story was picked up early on social media, but even there it was one thread among many. As protests started to become more violent first social then traditional media started paying more attention.

As both peaceful civil disobedience measures and violent clashes increased, attitudes on both sides hardened. Ethnic Taiwanese saw the struggle as their last best hope to avoid cultural if not physical genocide. The ethnic Chinese on Taiwan increasingly came to believe they would quickly become a persecuted minority if they compromised. More ominously attitudes were also hardening in China and the United States. China had long sought "reunification" with Taiwan. Reports and especially videos smuggled out of Taiwan struck a chord with the American public where commentators drew parallels to the civil rights movement and even the American Revolution. As tensions grew many historians worldwide likened the current situation to the summer of 1914, none of the leaders wanted war but no one seemed to know how to avoid it.

Then the Taiwan Crisis app began going viral. The app allowed users to play any side in the crisis. Opponents could be played by the apps' artificial intelligence routine or on-line opponents. The app took off among the Taiwanese first. After many replays they found a strategy that usually brought victory, but the fight took decades and destroyed much of what they hoped to preserve. Almost at the same moment the app became an obsession with the ethnic Chinese on Taiwan. It took most players much longer to find a winning strategy and it appeared from the app that any winning

CC 2.0 2014 Max Lin Taipei Taiwan

strategy required the genocide or near genocide of the Taiwanese people. Would they, could they really kill all Taiwanese and still consider themselves civilized? The story was similar for Chinese and American players. Made curious by the reports coming out of Taiwan, many millions downloaded the app. Some never found a strategy that would bring their nation victory, most eventually did but at a price that made the word "victory" ring hollow. Similar results were obtained in nation after nation, increasing international concern over the crisis still further.

Then, also starting on Taiwan, a different type of outcome started to be reported. The web page with top scorers started to be dominated by players who had not achieved total victory, but still had the highest overall score because their costs were far lower. The ethnic Taiwanese players discovered if they allowed the ethnic Chinese to retain political power disproportionate to their numbers the ethnic Chinese would not fight as hard. Ethnic Chinese started playing a strategy where they allowed the ethnic Taiwanese to regain much of their political power while retaining enough power to have in effect a veto over any initiatives that threatened their position. Again similar insights emerged in China and the US.

Philippines Government/Malacanang Photo Bureau

Almost as suddenly as it burst on the world's consciousness the Taiwan Crisis, real event and app, dropped from the headlines. Oh, there were still stories of flare ups and small breakthroughs on Taiwan, but there was no longer the feeling that the long peace would soon end. Those commentators who had not moved on to the next hot story expressed amazement on the impact a simple app seemed to have.

His Holiness was relieved but not surprised. As a boy growing up in Mumbai radicals had tried to convince him and his fellow youths that Americans were trigger happy fiends who cared nothing about the lives of others. Some of his friends contradicted the radicals; they had played "Americas Army", a game created by the Americans for Americans. In the game, the shooting of innocents landed your character in the brig. Certainly they would not be trained to be cautious if that was not their intent. At that young age the future Pope learned how powerful, how credible, lessons learned from games could be. When the Taiwan crisis first started to look like it might spiral out of control the Pontiff became concerned. Had so much of the world's population gone so long without war that the horrors of war were no longer real? If so, would they not work hard enough to avoid such a war? He decided the world needed a way to make the costs of war seem real before they became real.

His Holiness smiled when he remembered Stalin's dismissive question, "How many divisions does the Pope have?" Without any divisions he had helped stop what could have become a world war before it started. There was just one thing that truly surprised him. Although the app was given away for free; the sites that distributed it were supported by advertisers and had paid a very small royalty for each download. With just over two billion downloads the royalties they received had exceeded their costs of producing the app. The Vatican had made a profit.

M. SCOTT BOND

— Resistance is futile

Disclaimer: All ideas and opinions expressed in this article are of the author alone and do not reflect the opinions of any other institution or organization. This paper is a work of fiction and any resemblance to actual persons, living or dead, is purely by coincidence.

You know what they don't show you in the recruitment videos? The mind-numbing boredom from being stuck on an LHA for a month transiting to the Philippines for joint-exercises. Some of the older Marines, the ones who had served back in the Global War on Terror, almost never deployed on LHAs. At least that is what they claimed. Those must have been the days.

Whoever thought that jamming roughly 2,000 Marines into close quarters for 30 days with nothing to do but check equipment must not have known Marines

DoD photo by Cpl. Jacob Pruitt

very well. If they did, then they would have realized the dangers from such unmanaged boredom. However, it was this same perfect storm of tedium that made the Colonel's plan work.

See, back in the late 20's and early 30's,

the Corps got hot for wargaming and decided to create a Program of Record (POR) to create the be-all, end-all wargaming platform that would solve all the Corps' woes, or something along those lines. What they came up with was the Battle Simulation Board™ (or BSB in everyday talk), a "semi-three-dimensional simulation environment for agile and synergistic wargaming and COA analysis." The not-quite boardgame, not-quite VR simulation had been installed all over the place, including on all the major surface vessels used to transport Marines. Our commanding officer, Col. McNeary, was a devout wargamer and had even worked on the BSB project when he had still been a captain. So, his solution to our unacceptable lack of things to do was to create a competition. Any Marine could challenge another to play a scenario, from the Colonel's curated list, on the BSB. The winner earned points which would move them up or down a leader-board. The top ten ranked Marines for the week received a "skate card," a free pass from a single work detail for that week. I heard that our regiment's Sergeant Major, SgtMaj Moses, had nearly gone ballistic at the thought of rewarding Marines for trying to get out of work. The Colonel pointed out that it encouraged Marines to develop tactical thinking skills and focus our pent-up energy into something useful.

> *"Our commanding officer...was a devout wargamer...So the solution to our unacceptable lack of things to do was to create a competition"*

DoD photo by LCpl. Brennan Priest

For us junior enlisted the concept of being able to look a First Sergeant in the eyes, to stare through the windows of their soul and say "Sorry First Sergeant, here's my skate card" was just too juicy to pass up.

You don't make Sergeant Major without some cunning though. Part of the original BSB project was to eliminate the black-box nature of many computer-based or computer-assisted games. With a CAC, anyone could access all the documentation for the adjudication techniques and algorithms used by the BSB. For the most part, none of it made any sense to most of us except for the select few. Unfortunately, the SgtMaj was included in that small, niche group of exceptions. So, SgtMaj Moses and some of the other senior NCOs started a study group dedicated to finding ways to game the game, all to lock down the top

ten spots and forever deny a skate card to anyone.

Under normal circumstances that would have killed the Colonel's plan deader than a frog hit by a tractor-trailer. However, the monotony of ship-board life and the rare opportunity to have a legitimate excuse to skip work were effective motivators. It also didn't hurt that Marines place bets on just about anything and the pot for whoever finally broke the NCO monopoly was well over $500 by the end of the first week. Which is how I found myself standing in front of my Company Gunnery Sergeant, ask for a round on the battle board.

GySgt Cheong was laying in his rack, reading a heavily creased magazine when I approached him. When I told him what I wanted, he didn't even take his eyes off the page to answer me.

DoD photo by Sgt. Victoria Decker

"You want me to teach you?" he said it in a detached, almost distracted tone that made me think he wasn't really paying attention. "Why, so you can dodge work?"

"No, Gunny." I had planned for this line of questioning and had worked out a pretty good answer. "I want to learn because I figure that if I ever want to make Sergeant then I need to start learning how to lead a squad. I can't really do that as a PFC, but I can start learning in the game."

> ***"I want to learn because I figure that if I ever want to make Sergeant then I need to start learning how to lead a squad...but I can start learning in the game"***

That got a reaction out of him. GySgt Cheong looked up from his magazine and locked his command stare on me. "You are bucking for rank, huh. I suppose that illegal betting-pool on who breaks into the top ten first has nothing to do with it. What's it up to now, $500?"

Keep a straight face, I whispered in my head. I was most definitely interested in the $500 and had spent a massive amount of free time combing through the BSB's documentation looking for an edge. I thought I had found one, but for me to break into the top ten I had to beat the number one player in the regiment, hence why I was calling out GySgt Cheong. Cheong was amazingly good though, so my plan was to lure him into a false sense of security by posing

the match as training.

"I don't know anything about that Gunny," I lied, "though I really wouldn't mind one of those skate cards" – then quickly added, "If I ever get that good."

Cheong looked unimpressed with my response but sighed anyways and rolled out of his bunk. "Well, I can't say no to a Marine who is looking to get an education. Go get the BSB booted and pick a scenario, while I get some pants on."

> ***"Well, I can't say no to a Marine who is looking to get an education. Go get the BSB booted and pick a scenario, while I get some pants on."***

More metal cube than board, the roughly three-foot by three-foot by four-foot gunmetal box reminded me of one of those antique videogame cabinets. Like the ones you see in period flicks where the players face-off from opposite sides. The top of the "board" was a kind of transparent semi-solid that felt like glass but was a lot tougher and could be distorted to match the rough elevation features of whatever map was chosen. The ArcGIS-generated maps served as the simulations gameboard and were digitally projected onto the bottom-side of the transparent material. I had to admit that watching the gameboard deform to match the topography of an area that I would eventually be setting boots on was pretty cool.

I booted-up the BSB by inserting my CAC into the reader on the right side of the board. I had been told that the CAC requirement served two purposes. The first was that by inserting a CAC, the board could track each player's game stats. The second reason had more to do with how the Corps perceived us grunts. Look, I'm not saying Marines aren't hard on our gear or that we don't occasionally press buttons we shouldn't. I'm just saying that having the BSB enter a "fortification mode" when no CAC is inserted, locking out all its interfaces and sliding a protective metal cover over the play surface, is a bit overkill.

Once the BSB was booted, I began flipping through the available scenarios the Colonel had authorized. In theory, these scenarios represented missions we would be completing while on the ground. Officers and senior NCOs had the ability to use the board to run one-

DoD photo by LCpl. Nicholas Filca

sided simulations for COA analysis but boots like me couldn't be trusted alone. In fact, the most I could do was boot the thing up and select a scenario. Grumbling to myself about the unfairness of life, I chose the patrol scenario. My hours of combing through dry game documentation had yielded this insight:

DoD photo by LCpl. Nicholas Filca

within the patrol scenario the Red force started hidden, but highly disaggregated. This disaggregation was supposed to simulate the disorganization of PLA SOF units being inserted via airdrop in preparation for hunting FARPS and land based anti-ship artillery. This gave the Blue player a slim window of time in which they could defeat the SOF teams in detail before the Red player had the chance to concentrate their forces and set up a devastating ambush. This meant that the faster Blue found a portion of Red, the more likely they were to win.

The Gunny, now fully clothed, strode into the galley and looked down at the board. "Patrol? I thought you said you wanted training? Last I heard patrol was your best scenario."

Struggling to keep my face straight I nodded in reply. "Yeah Gunny, but that's against scrubs. Most of those noobs waste their mission enabler choices on energy weapons or ISR drones. Not much of a challenge when the scenario's heavy jungle negates their 'edge' for me."

Cheong grunted noncommittedly, but he knew I was right. Tech-fanboy-ism was rampant in the military ever since Ghost Fleet, and the mixture of overconfidence in and lack of understanding of military tech had led many inexperienced Marines into making sub-optimal equipment choices.

Shrugging, Cheong sat down across from me. "Since you are sitting on the blue side, I assume that's who you want to play?"

I nodded, adding, "If that is alright with you, Gunny."

> ***"the mixture of overconfidence in and lack of understanding of miliitary tech had led many inexperienced Marines into making sub-optimal equipment choices."***

The NCO waved his hand in a permissive gesture, "Fine, this will at least give me an idea of what I am working with."

With Cheong's CAC inserted, the scenario fully unlocked, and I was able to make

the final adjustments to my squad. One of my favorite features of the Colonel's scenarios is the ability to select a single mission enabler from a group of force multipliers that are either currently employed or would be soon. It meant that Marines had the ability to familiarize ourselves with tech we might use in the field and gather data on how that speculative tech might be employed. As I said, a lot of Marines go for the shiny new stuff like energy weapons or ultra-long-range precision munitions. Building on my discovery that the key was to find the Red forces as quickly as possible, I chose a very different mission enhancer: the local scout. The scout had a much larger search radius than my typical Marines and could move faster and more quietly through the terrain. It also gave me access to the "fastest path" function, allowing me to use the BSB's computer to calculate the fasted path between two points. By increasing my search area and movement speed, I would effectively quadruple the amount of map I could search in a given turn. The down side was I had to roll to see if the scout spoke English and if not, how many people in my squad could communicate with them.

After secretly imputing my selection using the touch screen which jutted out form the board at about my knee level, there was a whir from inside the plinth followed by a click. A side hatch on one of the corners of the board's base popped open, displaying my play-pieces for this scenario. The pieces were figurines that are roughly half the size of a human thumb, each detailed to look like an individual member of a standard fire-team. I carefully went through and tested each one on the board to make sure the internal RFI chip still worked. The RFI chip acted as a sort of mini-database, storing all the pertinent combat information for the unit it represented. The chip also allowed the board to interact with the piece, making flat spots when the piece was placed on a sloped grid square, and tracking the movement of the piece for post-game analysis. The RFI chips also had a habit of breaking on the regular, probably due to young Marines' propensity for using the pieces as projectiles to hurl at one another.

"Alright, I have my squad. Let me know when you are ready to place, Gunny."

The NCO nodded absent mindedly, never breaking focus from the board. The NCO tapped commands onto his open touch screen, secretly placing his own units per the scenario rules, and then look up. "Ok, PFC. Place your pieces."

"The RFI chips also had a habit of breaking on the regular, probably due to young Marines' propensity for using the pieces as projectiles to hurl at one another."

"Ok, Gunny. First though, I need to tell you that I am using the local scout and…"

Cheong cut me off mid-sentence. "I

know what the scout does, son. Stop wasting my time and do your rolls." Well that was unsettling. One of reasons I liked the scout so much was that its underutilization meant that no one knew how it worked. I would just have to roll with it.

Naturally, because the universe hates me, I rolled a one, which meant my scout didn't speak English. I then followed my initial roll with a roll of a two, which meant that only one member of my squad could communicate with the scout. Sighing, I set my squad up in a wedge formation to maximize my search area and provide flexibility for when I contacted Gunny's forces. I also opted to put my scout forward and designated the point-man in fireteam one (my foremost team) as translator to speed transmission of any information the scout found. With my pieces set, we both pressed our ready indicators and the scenario began.

Everything went perfectly… until I made initial contact.

I had been moving my forces up a shallow ravine at best speed when a red circle icon appeared beneath my scout figurine, indicating it had discovered something. I used the scout's move to place it into

> ***"Everything went perfectly…until I made initial contact."***

base to base contact with my translator/point-man and initiated information

DoD photo by LCpl. Brandon Salas

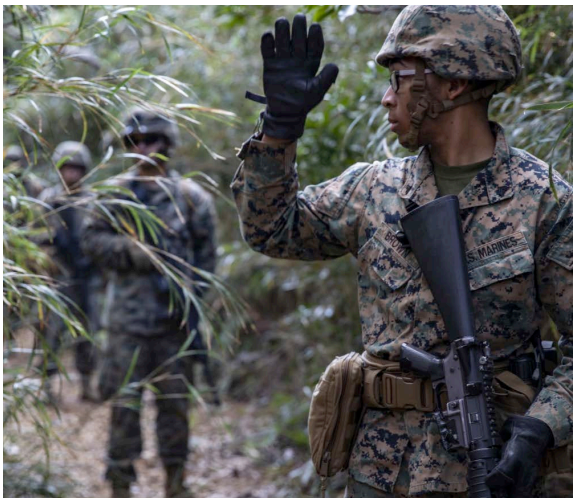
sharing. Suddenly, the entire board took on an intense red hue. Ah shit, I thought, this is could be bad.

See, the ruleset for this scenario used a semi-structured turn system. Instead of an established turn order (which generally disadvantages the person going last), the BSB determined which side had the initiative for that round and assigned that person to go first. If there was no contact between the two sides, the game proceeded in the above fashion. However, if on my turn I did something that allowed the other player to detect me then the initiative would immediately shift to them and my turn would be over. The red hue indicated that the "initiative" of the battle had just changed.

The first thing that happened was that Cheong placed a figurine representing a PLA squad-automatic weapons team on a piece of high ground a couple hundred game-meters in front of and above my own pieces. The machinegun piece began firing. In game terms this meant that the BSB drew thin red lines to different members of my squad. Every time a line intersected with a member of my squad

the BSB automatically calculated if and to what extended my figures had been damaged.

My translator/point-man was killed outright, and my medic was wounded in the leg. More fire poured out of a hazy red rectangle around Cheong's single visible piece, indicating that my squad could see roughly where the fires were coming from but not specific emplacements. fireteam one was forced to take cover,



DoD photo by LCpl. Nicholas Filca

though luckily none its members were pinned by the surprise fire. The turn then switched back to me and I took a deep breath.

Losing my translator at the start was a setback, but not a game ender. I had a rough idea where the enemy was now, and I knew from the scenario that I had the advantage of numbers. So, I did exactly as I had been trained. Using a classic fix and assault maneuver, I split fireteam two by sending half to support fireteam one as my fixing element and took the other half with fireteam three and started swinging those figurines out to the right of hazy-red threat box. Unfortunately, the dispersion of the squad wedge formation and rough terrain meant I couldn't get into position before Cheong's SOF got to shoot at me again.

Two more members of alpha team were wounded, though not severely enough that they couldn't continue fighting. My fixing force began to return fire, wounding Cheong's assistant gunner, while I moved my assaulting element up the eastern arm of the ravine in preparation for a right-side assault on the Red position.

> *"How the hell did Gunny get his forces concentrated and in position so quickly? How did he know where to set his ambush?"*

I ran straight into an ambush.

I had never seen the Gunny smile before. When I ran my assault element straight into the kill box he had formed with the rest of his force, his face lit up like a kid meeting Santa Claus. Things went downhill pretty fast from there. My assault element was caught on the downward slope of the ravine in a well-coordinated cross-fire, while my fixing element was progressively becoming fixed itself. It only took Cheong another turn to finish me off.

Leaning back in my chair, I just stared at the board. How the hell did Gunny get his forces concentrated and in position so quickly? How did he know where to set his ambush? Based on my experience in past games, it just didn't seem possible. Cheong must have read my thoughts from my facial expressions because between fits of laughter he managed to get out "Ah, don't be so surprised, devil dog! You took a swing at the King and missed." He began laughing even harder at his own joke, then finally collected himself and transformed back into his standard dour self.

DoD photo by LCpl. Kindo Go

"Ok, you want to know you where you effed up?" I was still smarting from the drubbing I had just taken, so I just nodded sourly. "What was that Marine?" his voice had the whip-crack tone of command, which made me sit up straighter.

"Yes, Gunny."

"You came to me for training, right? So, don't get an attitude when I show you your weakness." Some of the tension came out of his body and he leaned back in his chair. Reaching under his side of the board, he began to pull out figurines and place them on the BSB playing field. "Alight, you made too many screw-ups for me to cover all right now, so I'll just focus on the major ones." Ouch, I though a bit bitterly, now he is just pouring salt into the wound.

"First," the NCO continued, "based on your insane sprint across the board, I assume you thought I would be disaggregated for two or three turns, giving you time to defeat me in detail."

I nodded, "Yeah Gunny, but I don't understand how you were able to concentrate so fast! The scenario says you start in a disaggregated position."

The senior NCO shrugged at my confirmation. "Yes, it does, which caused you to assume that there was no way to change my initial deployment." He tapped on one of the board's corners on his side of the playing field. A dialog box opened, showing his until now secret mission enabler. I bent over and read it allowed: "Containerized Delivery of Forces: ignore required dispersion if stated in the scenario". Geeze, straight out of Ghost Fleet, I groaned in my head, Am I never going to get away from that damn book?

"You over focused on your own units' abilities without ever considering how I might anticipate or counter them." Cheong continued, "You assumed that because in a similar situation you would have no way to change the situation,

neither could I, right? Here's the problem though, that assumes I had the same capabilities and made the same assessment you did. You gotta learn to see the situation through Red's eyes."

As I thought about it, what the Gunny was saying made a lot of sense. All my study had focused on what I could do to the enemy, with no thought for what enemy could counter with. I made a mental note to spend some quality time looking over what mission enhancers were available to Red.

"Next, you ignored the effects of terrain." Cheong opened a few more windows and suddenly the 3-dimensional map was overlaid with a winding line that appeared to trace the general path taken by my unit. "You see the path you took, right? Why did you choose to go that way?"

I shrugged, adding, "I was trying to maximize the amount of area I could search in a turn." I had chosen the path under the assumption that speed of detection was the key to victory, but...

The NCO tapped in a few more commands. The board generated many more lines, with roughly a third following a path like mine, another third following a road just over the ridgeline from my path, and a final third following no discernible pattern. "Not a bad idea if you are trying to find a lost kid in the woods. PLA SOF aren't kids, and they sure as hell ain't lost." I nodded. I was starting to get an inkling of where he was going with this. "Ok, so I have loaded the blue pathing for the past 100 games played," Cheong continued. "See how the majority follow either the low-ground or the road? People will naturally take the easiest route between two points, which in this case was the road or the ravine you came traipsing up. Now look at how my squad was placed." Glancing at the board, I immediately understood what he was saying. I could see how the mountainous terrain limited the number of paths towards the Gunny's side of the board, assuming one wanted to move fast, and how Cheong's position gave him coverage for most of these path ways. I told Cheong as much and he grunted, "Good, you are learning already."

"'Next, you ignored the effects of terrain.' Cheong opened a few more windows and suddenly the 3-dimensional map was overlaid with a winding line that appeared to trace the general path taken by my unit."

I reach over to the board and tapped in some commands of my own. Fields-of-fire fans sprang up from around each of the models on the board. The fans were multicolored, which I knew represented the different kill probabilities over

a single turn. As I had expected the overlapping fires at the location of initial contact and the ambush of my assault element were near black, indicating a kill probability of over 50%. My own squad's fans indicated a kill probability of at best around 30%.

"Gunny," I said somewhat unsure of myself, "I see how you concentrated you forward element to grind up my forward units, but how did you know I would assault form the right side?"

The NCO grunted, "Think back over your training, how many times did you attack a machinegun nest by assaulting from the left?"

I paused, I honestly couldn't think of a single time. "I can't think of any, Gunny."

Cheong shrugged, adding, "That's because it rarely happens. It's not doctrine, but it is how we practice it. Knowing that and reading the terrain, I could make a pretty good guess on where you would assault from and I prepared for it." Pausing for a split second, he offhandedly added, "You almost got out of it by the way,"

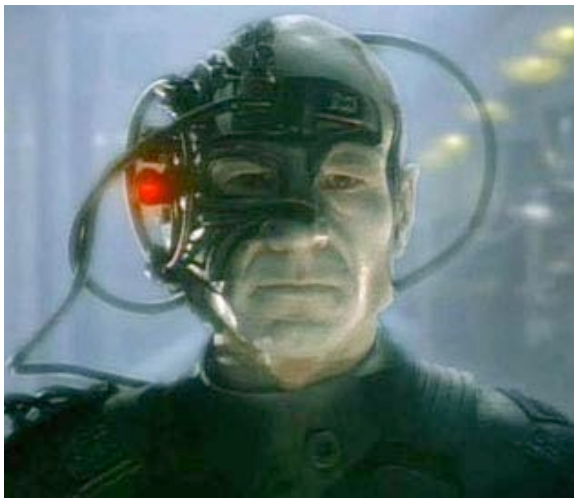
That made me look up sharply, "I did?"

Cheong nodded, "Yup, your scout detected my position. Unfortunately for you, you were dumb enough to make your sole translator your point man. PFC, what the hell were you thinking putting an asset that valuable into the single most dangerous position in your squad?" I hunched my shoulders a little before answering, reading from his tone that I had done something immensely stupid.

"I was trying to decrease the amount of time it took to get info form the scout to my squad, Gunny. Since the scenario assumes that if one person in the squad knows something then everyone knows it, I thought it made sense."

Cheong shrugged, "How did that work out for you? You're lucky I didn't get both your scout and your translator. Doesn't matter how much time you save if you can't get the information, right?" The NCO's lecture was cut short by a buzzing noise coming from his pocket. "AAH," he said with some gratification, "Why, that is my reminder that today's work detail is about to begin. You don't look busy, Marine. Why don't you go find the First Sergeant and ask him what needs doing?"

Well, Shit, I thought. I guess resistance is futile.



DR STEPHEN DOWNES-MARTIN

Brain Probes, Crocodile Clips, and Drugs

This is a storyboard for a future wargame technique. It expands the boundaries of player manipulation, specifically the beneficial effects that directly manipulating players' brains using electrical stimulation and drugs can have on game play. The proposed future science of brain manipulation for game purposes is a credible forecast from current research.

1. The Problem/Motive

People playing a game know the game is not real life, and we know from psychology and social science research that decisions they make during the game are influenced by this knowledge. We also know from psychology and social science research that a risky shift and dishonesty shift occur during group discussions that take place during both games and real-life decision making. Players' critical faculties generated by their frontal lobes take into account the conscious knowledge "this is a game" and are influenced subconsciously by the two shifts. Therefore we have a problem using decisions made during a game as proxies or predictors for decisions the same players would make during the real-world situation the game is exploring.

2.1 The "science" part of the "science fiction"

When dreaming (REM sleep) blood flows to the cortex (which provides content) and the limbic system (which processes emotions) both of which light up,

Seated Dionysos

however the frontal lobes (which direct our critical faculties) remains quiet. The result is that we usually accept the content and emotions of a dream no matter how weird.

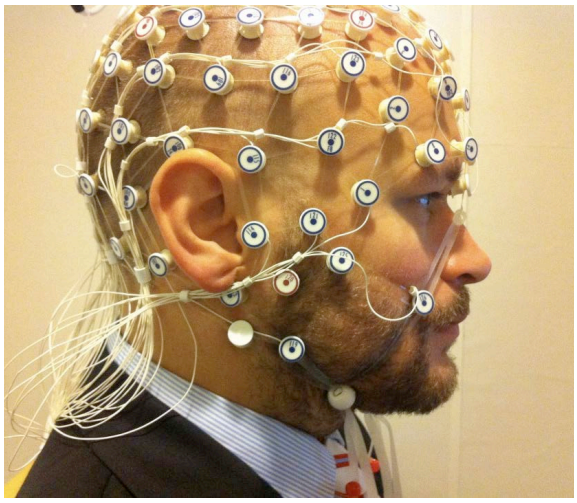
Anesthesia research shows that anesthetics make us "unconscious" by disconnecting different parts of the brain's macro-systems from each other, thus breaking the brain-wide integration that current research claims leads of self-awareness. Some anesthetics leave the person aware of the pain but experiencing a rolling amnesia – they feel the pain of the surgery but forget that fact from moment to moment.

Medical research shows that people with damage to their emotional response system, of the kind that they do not experience emotions, have difficulties making decisions even when they are smart enough to know the answer and it is objectivity important for them to do so. They lack the motive to make the decision. Star Trek and Conan Doyle got it wrong with Spock and Sherlock.

Historical research tells us that the Spartans made important decisions after they had discussed the situation twice, once sober and once drunk. (I don't know for sure, but I would assume the order of the two sessions might have an effect!)

2.2 The "fiction" part of the "science fiction"

We develop techniques using anesthetics and electrical stimulation to selectively suppress the limbic system and frontal lobes in wakeful subjects, and using drugs to suppress or boost the body's production of hormones related to stress and emotion.



CC 2012 by Petter Kallioinen

3. Impact on future game techniques

We game a topic with different parts of the players brains "switched off" or "switched on" depending on the phase of the game move. During the phases of each move that require analysis we suppress the entire limbic system (brain and body). We explore totally rational

analysis driven by the frontal lobe generated critical faculties of the players and in the absence of any emotional processing.

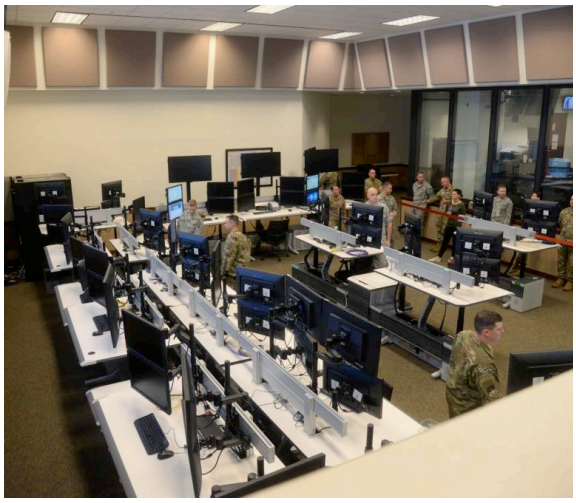
The problem here is the likely difficulty of getting emotionless people to make decisions when it is "decision time" in the game – for example when it is time to select a move or COA from a set that has been discussed and explored during the planning phase of the game move. So, during the phases when the players are called on to make decisions, we boost the limbic system to turn decision-making motivation back on. We pulse the limbic systems of the players in phase with the tasks required during the game. Suppress for analysis, boost for decision making.

Alternatively, taking a leaf out of the Spartan's playbook, by simultaneously boosting the limbic system and suppressing the frontal lobes we can explore wildly off the wall ideas while completely suspending disbelief. We can also, by incrementally turning the limbic system up or down, explore decision making under different levels of emotion.

4. Social Implications (but who cares, really, about this?)

When proven successful by the Military, this technique moves into the mainstream and is used by any profession that involves both analysis and decision making, for example by Judges, Doctors/ Surgeons, airline pilots, nuclear power plant operators, senior military officers in charge of our nuclear Triad (you can see where this is going) etc. Given humanity's desire for silver bullets, the technique proliferates rapidly and is embedded in all critical areas of the global system before the downsides are discovered (of course). The intellectual elites of society who combine analysis and decision-making powers over the rest of us start suffering debilitating hallucinations caused by the technique's interference in sleep patterns, and the world descends into chaos.

COL MATT CAFFREY (RET)



DoD Photo by A1C Tristan Truesdell

—Not the Holodeck

Dam humans. Computers are hard, but when you beet them they stay beaten.

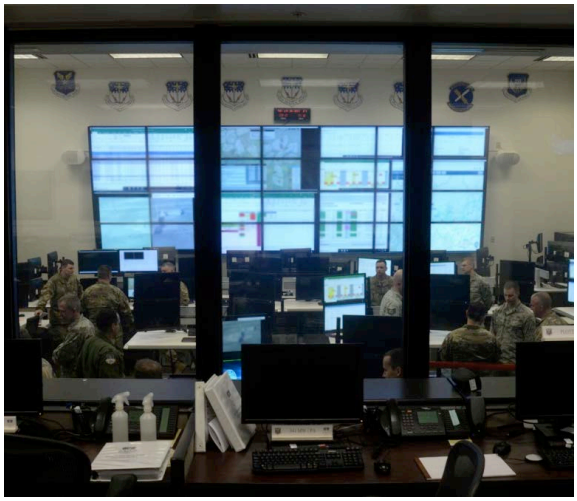
She had defeated their adversary in the first hours of the campaign. The "forecast" element of the display still showed her winning, but the date kept slipping further into the future and the casualty count, on all sides, kept climbing.

Normally when General Skyler looked around her Air Operations Center, called the AOC, she felt a sense of pride. Of course she was proud of the teem she had helped assemble to plan and conduct this campaign. Still, in some ways she was more proud of the AOC itself. As a major she had graduated from the US Air Force's prestigious School of Advanced Air and Spacepower Studies or SAASS. Her thesis was on the need for, and feasibility of, creating the command center she now directed.

Of the AOC's many advanced features she had been most proud of the "forecasting" element. Through the ages command posts had made decisions about the future based on information of the past. Before the telegraph that information was as old as the time it took a hoarse and rider to bring it. With each advance in telecommunications the information became less old, but information remained about the past. For over two

hundred years wargames had been used to anticipate how friendly (Blue) and enemy (Red) decisions might influence the future. But when the fighting started the wargames stoped. In part this was so because, well, that is how it always had been. In part it was because the people conducting the wargames were busy conducting the war.

As she had struggled to come up with an idea for her SAASS thesis she came across two seemingly unrelated items. That day during a seminar on wargaming she had learned about a wargame the Germans had conducted during World War II in anticipation of an American offensive. During the wargame the real American offensive began. The chiefs of staff of the divisions under attack immediately left for their units, but the Corps Commander kept the wargame going, feeding in as game moves the actual movements by the Americans. He had used the wargame to plan his counter attack. That evening she read a review of an online wargame. Each side was directed by a team of players, formed for each game and logging in from all over the globe. Because different numbers of players logged on each game the wargame used artificial intelligence (AI) routines for any positions not taken. The review claimed the AI was so good the human players could not tell which players were real and which were AI. The thought hit her like a ton of bricks; she would define a wargame that would not only keep going by itself after the fight had started but it would use reports of the actual fighting to replace wargame moves with actual ones and adjust projected losses with actual losses. The wargame would also replace estimated loss ratios with those actually being observed. Finally, it would fight the fight to victory or defeat updating the estimated outcome based on actual losses and updated ratios.



DoD Photo by A1C Tristan Truesdell

"she would define a wargame that would not only keep going by itself after the fight had started but it would use reports of the actual fighting to replace wargame moves with actual ones and adjust projected losses with actual losses."

General Skyler was watching that happen

right now. Her forces were doing well, but the enemy were adapting their tactics to better counter her forces. Their increased effectiveness was adjusting the wargames estimated outcomes for future engagement. Little by little the war was getting longer. She and her team would also need to learn from their enemy and adapt their tactics if they were to reverse this disquieting trend. She told herself, she should be pleased that her wargame had allowed her to spot the problem so early, but as she watched the display on estimated time of victory adjust itself yet again to the right she could not force herself to be pleased.

Her thoughts were interrupted by activity in the Current Operations area of the AOC. As she focused on that screen she spotted multiple unknown aircraft coming toward the AOC building on multiple vectors and at multiple speeds.

"As the hostiles bore in the Theater Commander appeared at her side. 'I just heard about the attack,' he said, 'what can you tell me?' Half way through her explanation the Chief of Staff of the United States Air Force appeared."

This looked very much like a saturation attack. Such attacks would overwhelm the targets defenses by presenting too much to shoot over too little time. As the unknowns were quickly identified as hostile General Skyler know she was right.

DoD Photo by MSgt Shaun Kerr

As the hostels bore in the Theater Commander appeared at her side. "I just heard about the attack," he said, "what can you tell me." Half way through her explanation the Chief of Staff of the United States Air Force appeared. "Just wanted to pop in and see how you were doing Abigail," he said. She repeated her briefing.

As the blips drew still closer to the location of the AOC building personal assigned to the various divisions of the AOC started arriving in the current Operations area. Some of the personnel became a little excited. "I'm to young to die," said one. "Now I'll never see Brooklyn again," another. The Colonel in charge of Current Operations quieted them down.

As the blips disappeared in little flashes

on the location of AOC building the uproar resumed. "Oh the humanity," said one Major. Several personal simply shouted, or cursed, or laughed. Again the Colonel quieted all of them down.

The Theater Commander broke the silence. "Good work General Skyler," he said, "I'll admit, I was a little skeptical of your plan to keep the AOC building in place after your virtual AOC became operational." General Skyler smiled, "thank you Sir, I don't think this would have worked if I had not agreed to my chief of staff's recommendation that we shuffle derelict cars around in the parking lot so the building would still look occupied."

The virtual AOC was the second idea she had taken from that article years ago. If kids could go online from around the world and play in a wargame why couldn't military personal staff an AOC from wherever they were stationed in peacetime. Doing so would allow the AOC to be activated more quickly and eliminate a big important target – unless you wanted the enemy to think the target was still there.

DoD Photo by SrA Thomas Spangler

As General Skyler surveyed the status board her smile broadened. As she watched the forecast victory date moved closer to the present. The enemy had expended a significant percentage of his high performance weapons. Those weapons would not be available for future attacks.

It was time. The general reached around and removed virtual reality harness from her shoulders – and realized she was still in the kitchen of her quarters. After breakfast and before she would be out of touch for a few minutes in the shower she had decided to check in at the AOC. That was over an hour ago. She had set her avatar to have her appear to be in a flight suit, an appropriate choice for the situation. She smiled thinking of the reaction if her people had seen her as she was actually dressed.

General Skyler had one more thing to smile about. She knew from her studies at SAASS – for thousands of years wargaming had helped rulers develop strategists. For hundreds of years wargames had helped commanders win by developing strategies. This was the first case she knew of that a wargame had contributed directly to victory.

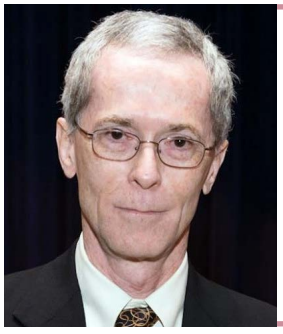
From On Wargaming, by Matthew J. Caffrey Jr., US Naval War College Press, 2019.

— Authors

Sebastian J. Bae, a defense analyst at the nonprofit, nonpartisan RAND Corporation, works in wargaming, emerging technologies, irregular warfare, and strategy and doctrine for the U.S. Army and Marine Corps. Previously, he served six years in the Marine Corps infantry, leaving as a Sergeant. He deployed to Iraq in 2009. He also previously served as a defense writer for Foreign Policy and wargaming analyst for the Marine Corps Wargaming Division. His writings have been published in Foreign Policy, War on the Rocks, Strategy Bridge, Task & Purpose, the Diplomat, and Georgetown Security Studies Review. He can be reached at sbae@rand.org.

Michael Bond is a technical analyst at the nonprofit, nonpartisan RAND Corporation. Mr. Bond uses modeling and simulation, wargaming, and data science to address a range of topics, including military technology analyses, strategy and doctrine, emerging technology, military force structure, and the People's Liberation Army. Mr. Bond holds an MA in Security Policy from George Washington University and dual BAs in Mandarin and East Asian Studies (China) from The Ohio State University.

Col. Matt Caffrey (Ret.) is currently a civil servant assigned to Headquarters Air Force Research Laboratory (AFRL) at Wright Patterson AFB. His duties include leading Future Analytical Science and Technology (FAST) wargames, teaching the Air Force Material Command (AFMC) Wargame Course and AFRL and liaison to AFMC for wargaming. Colonel Caffrey is the developer of the "third-generation war game" concept, the Strategy Cycle (sometimes called the "Caffrey Loop"), and the Caffrey Triangle. In 1993 he helped found the Connections interdisciplinary wargame conference and in 2013 helped found Connections UK. He is the author of On Wargaming, Newport, Naval War College Press, 2019, coauthor (with Frank Chadwick) of Gulf War Fact Book, Normal, Ill.: Game Designers Workshop, 1991, and has written several chapters and many articles on wargaming, airpower, and defense issues.



Dr Stephen Downes-Martin is a Research Fellow at the US Naval War College and is an independent scholar researching decision support methods (such as wargaming) applied to problems at the strategic, operational and tactical levels of warfare and business. A research focus is on how to manipulate decision support methods in general to deceive decision makers, how decision makers misuse such methods to deceive themselves, how to detect such attempts and protect decision makers from them. He works with and for a wide variety of government, military, aerospace, academic and commercial organizations in the US and internationally. His full bio and contact details are at https://sites.google.com/site/stephendownesmartin/.

Dr. ED McGrady writes, speaks, and teaches on the design of professional games. He also runs a business devoted to using games and game techniques to bring innovative experiences to new topics. In the past Dr. McGrady built and directed a team of 10-20 analysts at CNA devoted to the design and execution of professional games. Dr. McGrady has also built a team at CNA devoted to chemical and biological response operations, including domestic response operations. He has deployed as an analyst with US Forces in Haiti during operation Uphold Democracy, onboard USS Nimitz for Desert Storm and with E-2C squadrons for counter-narcotics operations. Dr. McGrady holds a a Ph.D. in Chemical Engineering from the University of Michigan. He has published extensively in the Chemical Engineering, physics, and national security literature.

Dr. Jeremy Sepinsky is CNA's lead wargame designer. In FY18, he designed and facilitated more than ten wargames for Navy and Joint Commands, as well as for the Office of the Under Secretary of Defense for Policy. His recent wargames cover a broad range of topics, including logistics, personnel organization, command and control, cyberspace operations, space operations, national strategy, international emulation, technology planning, special operations and homeland defense. https://www.cna.org/centers/cna/operational-warfighting/wargaming