

9/1/2015



UNITED  
STATES  
COAST  
GUARD

## EVERGREEN IV SCENARIO: TECHWORLD

## Drivers

### Influence of Technology

**High: Radical.** Technology drives change and influences policies, with dramatic impacts on society. New technologies are pervasive and constantly changing. Use and application are innovative and unconstrained. Technological advancement is highly incentivized. Change is erratic and its impact on society unmitigated.

### Resource Availability

**Low: Scarcity.** Existing resources do not fulfill basic needs. Need and competition for resources are primary drivers of domestic, economic, and international policy. Resources are being consumed at a rate much faster than they can be replenished.

## Overview

Scarcity of resources is exacerbated by rapid and large-scale climate change manifested in rising oceans, more violent weather events, disruption of ecosystems, and consequent economic and social dislocations. Climate change is occurring faster than natural ecosystems or human

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*Climate change is occurring faster than natural ecosystems and human civilization can adapt.*

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*There is intense competition for resources. Shortage creates business opportunities for formal and ad hoc criminal organizations.*

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*Businesses are the pervasive force in domestic and international affairs.*

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*High tech and highly class divided society.*

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*Prevalent monitoring of human activity.*

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*A large and growing class of people who are attempting to leave society, disconnect from the grid, and live outside of surveillance and taxation.*

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civilization can adapt. Intense competition for resources is a social preoccupation, producing opportunity for both corporate and criminal activity.

Resource shortages create business opportunities for formal and ad hoc criminal organizations that compete with legitimate ones. Nations are highly protective of scarce resources, causing international cooperation to break down and leading to a global political climate of isolationism. Individual property rights diminish as governments exercise eminent domain and take control of scarce resources. Environmental policies are highly

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This is a plausible future scenario, part of a composite set designed to form planning space for foresight efforts. It is not intended to be predictive, nor does it represent the U.S. Coast Guard's assessment of the future.

restrictive in order to promote the recovery of fish stocks and prevent further depletion of natural resources. In some overexploited areas, protective regimes are in damage control mode, prohibiting any resource extraction. Businesses are the pervasive force in domestic and international affairs, and some corporations become more politically autonomous, to the extent of establishing their own “nations.” The definition of “legitimate business” is evolving as new types of organizations proliferate across and outside of sovereign nations.

Technology continues to develop at a rapid pace, leading to a high-tech and highly class-divided society in which robots, virtual reality, avatars, constant monitoring via millions of autonomous devices and sensors, sophisticated decision-making algorithms, and continual interaction between humans and devices are the norm.

Advanced technology is ubiquitous among legitimate private sector companies, pseudo-legitimate organizations that act within and outside the law, criminal enterprises that are entirely illegal, and government. This has produced a technology “arms race.” Sophisticated computing tools, enormous sensor networks, and vast communication webs filled with autonomous vehicles on land, on and under the water, in the air, and in space create a techno-domain.

Cutting-edge technology is a double-edged sword. Big data analytics enable governments and corporations to monitor the population, severely compromising personal privacy. High-tech military hardware with enormous destructive power raises the stakes for aggressive competition over nonrenewable resources. Extraction and weapons technology have proliferated to non-state actors and Transnational Criminal Organizations (TCOs), in many cases rendering them competitive with state actors. The fight for resources is dangerous, tech-enabled, and multi-dimensional. As a broad spectrum of actors increasingly struggle over minerals, oil, and food on land and at sea, the potential for confrontation escalates. Advanced medical technology has increased longevity. Overall health, even for the poor, has improved and produced an Elder Boom that further strains limited resources. Senior citizens are a solid voting bloc, with significant influence on public policy.

Society experiences increased polarization. The wealthy “Techerati” are celebrities, the middle class continues to shrink, the poor population grows, and there is a large and growing class of people who are attempting, with varying degrees of success, to break with society, disconnect from the grid, and live beyond surveillance and taxation. Many affiliate with the Hacktivist, Anonymous, and Occupy movements. Even as they move off the social grid, they bring sophisticated technology with them and attempt to create a parallel society with limited resources and lots of technical skill and ingenuity.

Thriving black markets are dominated by TCOs and local gangs. They peddle drugs and resources of all kinds to desperate populations. Their illegal commerce is based from remote compounds. Well organized and vertically integrated, they manage harvesting and extraction, production, transport, and distribution of their products.

## Vignette

### A Night on the Beach

Josh Parnault checked his watch again, and then secured his flashlight. He had synced the cheap thing up with the GPS just a few hours prior, since it lost time so quickly. Yes, he would definitely use his first paycheck to buy a new one. Nothing too fancy, since most of the money would be going to his mother. Definitely one of those tactical solar models. With tritium. “We’re seven minutes out, Stan.”

“Yeah. Scanners are still clear. Not picking up any police or Coast Guard chatter, no RFIDs within half a mile. Beaux, you got that sub yet?”

“I don’t know...maybe...I think...uh...” Josh exhaled impatiently.

“Either you do, or you don’t. Which is it?”

“Uh...I don’t.”

“Alright. Sing out when you do.”

“Uh...okay.” Josh thought Beaux said ‘uh’ too much. That was a departure for the scrawny criminal, as everything else he did was quantified by *too little*: worked too little, thought too little, added too little value. As this was his first job for the organization, Josh was in no position to pick his own team. At least Stan seemed to be sharp.

Another watch check. Four minutes out. Josh couldn’t take it anymore. He climbed out of the bucket seat and moved aft in the large, customized Sprinter panel van. There was an impressive array of electronics back there. It looked like a command center from a movie. They had night vision, infrared, satellite communications, myriad radios scanning every open and encrypted band, and RFID chip scanners. The last reminded him of his little surgery two days ago. The partially healed incision in the web between his thumb and forefinger still stung a bit. His RFID chip taken, he could no longer be detected by any scanner. It also meant that he could no longer conduct bank transactions or have a plain old phone or computer of his own. He was locked in, and had to work for cash to survive. There was no going back, as there was no explaining the loss of his chip without going to jail. If this was the price of a better life for himself and his mother, he would pay it over and over again. He couldn’t spend the rest of his life as a janitor, and he could no longer watch her do that thankless work, either.

Josh gently lifted the glasses from Beaux’s face, not out of regard for Beaux, but out of fear of damaging the equipment. He settled them onto his own head, and the world transformed. The glasses were actually a compact, virtual reality heads-up display that integrated data from half a dozen sensors, to include the one actively searching for their target.

The van around him disappeared, and he seemed to be floating a few feet above the dune grass and scrub brush. Instead of the pitch black, rainy night and the storm tossed ocean, the scene was calm and well illuminated by moon and stars. He looked around. Whalehead to his right and Whalehead Creek to his left were rendered perfectly. The parking lot just above the beach was abandoned. A perfect night on the beautiful Oregon coast. Well, perfect for his work.

The most alarming aspect of this virtual world was the change in the water. It had become absolutely transparent, a ghost of its true self. He could see the ocean floor for miles, every bathymetric feature defined in clear detail. And then he saw it. No more than a thousand yards out, a dim blue light appeared. It was gliding right toward him several yards above the sea floor. His heart beat accelerated. He removed the heads-up display.

“Alright, gents. Here she comes.” The three men sprung into action. They donned night vision goggles. Josh returned to the driver’s seat while Stan and Beaux readied the back bay of the van. Entirely electric, the vehicle was silent as it rolled over the brush and onto the beach. Equipped with all wheel drive and knobbed thirty-six inch tires, it had enough low end torque to maneuver cleanly, even with the dual wheel sets in the back. Josh turned the van tightly and backed toward the water. The surf was high tonight. He hoped he was close enough. He put the van in park and moved toward the cargo bay.

Stan rolled the rear door open, and they were met with an icy blast of late fall wind, laden with rain and sea spray. They searched the stormy ocean, straining their eyes. All three jumped when it suddenly lurched onto the beach right in front of them. Waves continued to break over the small, autonomous submersible.

“Unload her and send her back?” asked Stan.

“No time in these conditions. We need to grab the whole thing and go.” Josh wasn’t sure if that was the right protocol, but he was sure he had to deliver the goods. Stan nodded and they moved to a bracket holding a ramp. Josh directed Beaux to begin paying out cable from the winch mounted forward in the bay. He was certain the little sloth would have stood and watched all night unless tasked.

In less than a minute, the ramp was rigged. Josh and Stan moved to either side of the submersible to stabilize it in the violent surf. Beaux was about to hook the cable to the trailer bolt on the sub when Josh noticed a vital piece of equipment missing.

“Beaux, where’s the remote?”

“In the van.”

“How are you going to operate the winch?”

“I’ll do it from the control box.”

“Listen, I know it’s cold and wet, but I need you out here, so that I don’t have to yell commands.”

“There’s a storm going on, in case you hadn’t noticed. No one will hear.”

“Beaux, go get that remote right now.” His icy tone brooked no argument. As Beaux returned to the van, Josh and Stan looked at each other, both shaking their heads in dismay. There was no time for this. The storm and the seas were picking up.

Beaux returned with the remote and picked up the end of the cable from the wet sand, where he had carelessly dropped it. Josh made a mental note to make him pay out all of the wire and clean it when they got back to the warehouse. Just as he clipped the snap hook, a large wave heaved the sub up and forward, driving it over Beaux before dropping it to the ramp with a sickening crunch. The receding water hauled the machine back to sea, violently parting the cable with a sound like a shotgun blast and revealing what was left of Beaux. Josh retched violently onto the sand. Beaux hadn’t made a very good team member, but he was a far worse boat cradle. Josh wiped his mouth and straightened up to find Stan looking at him stoically.

“What now, boss?”

“We unload the cargo, scuttle the sub, and get the hell out of here.”

“Sounds good to me.” Josh knew this kind of loss would be frowned upon, but as expensive as the sub was, its cargo was far more valuable.

They worked at a frenzied pace to open the hatch and transfer the load: 600 kilos of Oblivion. That magical cure-all that could make you forget your troubles, forget the world, forget you even exist. It was the hottest of the hot drugs in this age of despair.

They recovered the ramp and retracted the ruined cable. Josh opened a locker, withdrew a grenade, and placed it in his cargo pocket.

“If you could help me with this, please?” Both men grimaced as they transferred what was left of Beaux to the foundering sub. The corpse was worse for wear, as the seas had dropped the vessel on it several more times during unloading. Stan coolly recovered the broken night vision goggles; the only indicia of who Beaux may have been or what he had been doing.

“You want me to do it?” Stan asked.

“No. This job is my responsibility. He was, too.” Stan nodded and moved off to the van. He closed the cargo door and climbed into the driver’s seat. The van silently rolled off to a safe distance and stopped, waiting. Josh marveled at how the dull gray paint vanished against the landscape. He drew the grenade, pulled the pin, and tossed it through the hatch. He ran for the van and felt, more than heard, the dull THUMP. Between the parting cable and the grenade, they hadn’t been as stealthy as they needed to be. He climbed into the passenger side, slammed

the door shut, and sat in silence as Stan cleared the beach, the scrub, and then the parking lot. Soon, the little access road gave way to Highway 101. They turned south, toward Brookings. A few miles down the road, and Josh allowed himself a sigh of relief. Or was it resignation?

“Mr. Madsen is going to end me. I lost Beaux, I lost the sub. What the hell was I thinking, volunteering for a job like this?”

“Don’t be so hard on yourself. The conditions tonight were at the upper limits for this kind of operation. Likely past them, in fact. We thought it would be a good test for you.” A haze of confusion, tinged with alarm, broke through Josh’s musings.

“What do you mean?”

“I asked Dad to move the delivery to another night. He thinks you have potential, but wanted to see how you’d handle a bad situation before moving you up.” Josh’s stomach had to be sitting on the floor somewhere.

“So, that makes you....”

“Stan Madsen. Dad sent me to vet you. Assess your leadership and decision making.” *Holy Lord. The Boss’ son has been watching me at close range.*

“Looks like I failed on both counts.”

“On the contrary. You made the right decisions, at the right time, in a high pressure situation. You salvaged the load and tied up the loose ends.”

“I’d hardly call Beaux a loose end.”

“Nor would Dad. He calls him a waste of skin. Beaux was his buddy’s worthless son, and Dad agreed to hire him as a favor. He’s done nothing but regret it, but he didn’t know how to offload him without causing tension. That’s been taken care of.” Josh was growing numb. He had fallen in with a truly cold blooded lot. Stan continued.

“But, unlike Beaux, you’re an asset. You’ll do well with us, and your mother will be taken care of.” Josh’s heart skipped a beat. They knew about her. That meant they could hurt her. Worse still, Stan must have been a mind reader.

“Don’t worry. She’s not in danger. But, the better you serve, the better life she’ll live.”

It had been a heavy night for the newest member of the Madsen criminal organization. He was in deep, alright. But the deep end was the only place he could ever swim upward.

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He placed the cut crystal tumbler onto the mahogany side table and shifted his gaze from the tablet to the cozy fire bathing his study in a warm glow. The storm howled outside, and he could vaguely hear the sea crashing against the pylons, doing its level best to destroy Base M-I. It never would. Ira Madsen had built his mining rigs and his empire to withstand the whims of man and nature. The well-appointed room, lined with book cases and stocked with leather furniture and hunting trophies, belied the heavy industry of the offshore drilling platform in which it resided. He had a corporate headquarters ashore, but M-I always felt like home.

Seabed mining was a profitable business, and Madsen Industries was the most profitable in the business. He had mining operations up and down the east and west coasts and off of Alaska and Hawaii, and was now eyeing Mexican waters for expansion. M-I had been the first in the constellation.

Madsen believed in diversification, and had recently expanded his venture into the drug business. There was massive demand, and the platforms were well suited for producing and storing product. They were also ideal shipping hubs. It just made sense.

He took another sip of scotch and thought about the newest addition to the firm. Young Mr. Parnault had performed admirably. The tycoon had watched the entire operation from Stanley's body camera and an array installed in the van. His son's debrief to Joshua might as well have been his own: he was impressed. He brushed his finger across the tablet's screen. The feed shifted from the cab of the van to a small family room. The two candles illuminating it were there to save money on power; not to provide atmosphere. A lean, middle aged woman appeared and walked to a window. She was dressed in work clothes and had her own drink – a beer. She stiffly sat down on the wide sill and stared out into the pitch black, probably wondering if she would be able to make ends meet this month. She jerked as something evidently twinged in her back, and made a vain attempt to work out whatever knot plagued her. The lady jerked a second time as a heavy knock sounded at her door. She stared in its direction suspiciously for a moment before setting her beer on the sill and painfully rising to answer. There was no camera on the front entrance, but the sensitive microphone indicated a late, though otherwise normal, package delivery.

She returned to her sill with an innocuous-looking package and examined it. He knew it would tell her nothing about its origins or purpose. After assessing the predicted absence of information, she pulled out a pocket knife and carefully cut through an outer layer of heavy plastic sheathing, and then the tape sealing the box. She found the envelope resting inside and

removed it, again finding no address. She moved close to a candle on the lintel above a cold hearth and read the note. He knew what it said. *Dear Mrs. Parnault; It has come to our attention that you possess peculiar skills for which we have need. Our client requires a personal assistant, and you come most highly recommended. We pray you will indulge us with a meeting tomorrow. A car will be at your residence to pick you up at 8:00 am. Arrangements have been made with your current employer, and we have enclosed a stipend to cover your expenses until you receive your*

Considerations for seabed mining.





*first pay check. Sincerely...* The Madsen Industries corporate logo was the only signature.

Kayla Parnault returned to the box and withdrew a brand new suit, hand bag, fully networked digital assistant watch, and some very expensive Italian leather pumps designed for women with back problems. Finally, she found a brick of cash. Her facial expression never changed. She held the items and stared out into the night. Madsen was confident he knew her thoughts. *Josh, what have you gotten yourself into?* He was also confident she would make an outstanding assistant. A woman who appreciated such an opportunity would certainly be more discreet than the last one.

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The sky was still heavy with clouds, and the wind wouldn't give up. The storm had broken, and a few rays were actually daring to look over the eastern horizon. They provided a nice boost of energy, now that the coffee was wearing off. It had been a decent nighttime haul from the Portland office. Agent Elizabeth Sanchez, Federal Bureau of Investigation, rolled to a stop in the Whalehead parking lot beside a police cruiser. She emerged from the warm cab and into the chilly wind, closed the door regretfully, and made her way to the beach. She noted some faint tracks that hadn't quite been wiped out by the rain. They had been made by big traction tires mounted on a big vehicle. Interesting that it had been a dually. She wasn't sure she had ever seen off road tread on such a rig.

The locals already had crime scene tape around what appeared to be wreckage on the beach. As she neared the site, a state policeman approached her. She showed her badge as a courtesy.

"Agent Sanchez? Sergeant Ian MacGregor, Oregon State Police. We really appreciate you coming out so early, Ma'am."

"Please, call me Liz. The pleasure's all mine. I understand you've identified some unique features on scene?"

"That's correct. But I won't insult your intelligence." He lifted the tape for her as she pulled on what appeared to be a pair of black latex gloves. She got to work.

It looked like a drug delivery gone bad. An evidently high end submersible had been blown in half. A frayed cable still hung clipped to a U bolt on the bow. She touched the hull. A small LED display on the back of her glove illuminated, informing her that the metal was an advanced titanium alloy. She brushed a finger against the blackened interior. A chemical formula appeared on the display.

"Email to Lance." The data was immediately sent via satellite to a very sharp lab tech in Portland. She drew a flashlight and shone it into the dark interior of what seemed to be the forward half. Wires, shredded metal, circuit boards. Everything blackened and charred. That included the human hand, reduced to little more than bones. Sanchez shifted her flashlight to

high power, stared at the center of the interior, and blinked twice. Her contact lens heads-up display indicated that the photograph had been captured.

“Email to Opal.” She continued her examination, collecting and sending evidence to her teammates even as she synthesized her own theory. Finally, she stood and took in the entire scene. She captured a few more pictures.

MacGregor was clearly astounded at the level of technology the FBI was leveraging. In reality, the FBI was nowhere near as advanced as Elizabeth Sanchez and her team. She had funded all of the gadgets and networking herself. It helped that her mother was an obscenely wealthy and connected defense contractor to whom the Defense Advanced Research Projects Agency, or DARPA, turned for the latest and greatest. Her mother was also a philanthropist, and believed in showing her daughter the world as it was. Little Elizabeth had grown up acutely aware of the trials and tribulations of those who didn’t have a lot of money. She had always wanted to help them, and had been encouraged by her parents. Elizabeth found her calling with the FBI’s Organized Crime Unit, where she could go on the offensive against those evil people who peddled misery and got rich off of the downtrodden.

“What do you think?” She asked the state trooper.

“Drug delivery. Gone south.”

“I agree. Oblivion.”

“Did you find a chemical trace?”

“No. The product was too well packaged. But only Oblivion would make destroying an autonomous submersible this advanced a viable option.”

“And the body?”

“Good eyes. I almost missed it. This was a makeshift tomb, but for friend or enemy, I can’t tell. I scanned it, and either the RFID has been removed, or it was too immolated to respond.”

“Guess the ME has some work ahead of him. It looks like they tried to salvage the sub.”

“It does. Either the cable wasn’t up to the task, or rough surf shock loaded it.”

“Strange that they didn’t choose a nicer night.”

“For an organization that can blow up a titanium sub, very strange. Well, there’s one thing I’ll say with confidence, Ian. Oblivion has arrived in your neighborhood.”

## Dimensions

## Technology

Technology is a pervasive aspect of the human experience. It continues to advance at breakneck speed and is improving all aspects of life, from education to logistics to finance. Nearly everyone, including criminals, is developing and using advanced technology. Corporations look for a competitive edge in new products and services. Sophisticated criminals use technology to make and sell illicit products and evade most detection. Citizens at all levels of affluence use technology in varying degrees in their daily lives.

Technology, in one form or another, is embedded in everything from clothing to food to packaging. Devices speak to devices, and great portions of social and urban infrastructure operate autonomously. Even people are chipped. Everyone living in developed society has an official, embedded RFID chip through which finances are managed, transactions are monitored, fraud is severely curtailed, and terrorism is deterred. While most perceive the chips to be an improvement over traditional Social Security numbers, a contrarian, shadow society has emerged that is adamantly opposed to this normalcy.

Embedded technologies and complex decision-making algorithms manage the most complicated systems. These include the power grid, automobile and air traffic control, and corporate and government supply chains. Sensors, automatic safety systems, and autonomous transportation platforms reduce land-, air-, and water-based mishaps. Driverless car technology has extended to nautical applications. Governments and companies use crewless ships extensively. Even supermarkets have been replaced by warehouses that operate with minimal human interface and deliver goods via autonomous drone. More than just convenient, this automation reduces energy consumption and is considered critical to resource conservation.

Wearable technology is universal and enables virtual travel and continuous health monitoring. Automated data analytics study populations for health trends and threats. Computers have replaced physicians for many aspects of care delivery, even for the poor. Some people have specialized chips embedded in their bodies to continuously monitor their metabolic activity and systems.

With the growth of biotech, the term “technology” itself continues to expand its connotation. Digital, biological, and hybrid “digi-bio-tech” tools and accessories proliferate throughout the U.S. and the world. Digi-vaccines are increasingly effective in targeting and destroying specific bacteria, viruses, and cancers.

While much technology is affordable, there is still a divide between the “haves” and “have-nots,” and wealthier citizens see the greatest improvements in their quality of life. The transparency afforded by digital media accentuates the divide: The poor are well aware of how much better the rich live.

Social media companies have merged into mega-enterprises and share data with the government in pursuit of criminals. Criminals use technology to perpetrate various forms of fraud, and hacking is a constant threat to all social and commercial systems. Software developers constantly produce new security patches and programs. The overall situation is akin to a technology arms race.

Racing to sell the latest technologies, some manufacturers forego testing and evaluation to quickly bring new products to market. Some of these initiatives have contributed to accidents involving small groups of people. Thus far, emerging technologies have not caused a major disaster, but many anticipate such an eventuality. Lawmakers and legislation have difficulty keeping up with technological developments.

Green technology is increasingly viable with economies of scale. Boutique power generation technology is widely available to consumers. Nearly all refuse is recycled, composted, or otherwise used, and virtually no waste goes to the landfill.

## Cyber

The rapid development of technology drives the continuing shift of economic activity to cyberspace, which attracts criminals to the domain. Entire supply chains come under threat from rogue nations and sophisticated TCOs, while small-time cyber criminals hack local businesses. Enterprises, large and small, respond with countermeasures. A war of innovation is well underway. Cyber crime is a constant threat that leads to new commercial opportunities and, in turn, new forms of criminal enterprise.

Terrestrial sensor and satellite imagery is one area where governments maintain an advantage. They operate sophisticated air-, land-, sea-, and space-based electro-optical sensors, which they integrate with advanced data analysis to identify suspicious activities. Traditional forms of criminal activity detectable through electro-optical sensors have declined, but new forms have developed to take their place.

A new and chilling form of cyber crime is “Cyber Murder,” through which the criminal gains control of a victim’s car or home. The perpetrator then instructs various devices to inflict mortal wounds through “accidents,” or kills via outright assaults by home robots.

While cyber threats continue to grow in reach and scope, government efforts to secure cyberspace continue to fall farther behind concurrent endeavors by the private sector. Technologies move beyond regulatory definitions. Regulators are constantly overstretched, and criminals seek to game the system to their advantage. Legal changes generally occur only after major technology-driven events and disruptions.

Major U.S. government cyber security activities are outsourced to private firms; government forces can’t keep up with the changing landscape. U.S. Cyber Command grows as a percentage of the defense budget each year but demands ever more resources.

Cyber crime is a major and growing drain on the economy. A few rogue nations harbor vast criminal enterprises, and responsible nations work to cut them out of the global economy. Since the bad actors generally control significant resources, the tension between resource scarcity and cyber crime remains unresolved. A few nations maintain trading relationships with both sides. This serves to provide aligned nations with access to resources while keeping rogue states in business.

## Maritime Environment

Exponential increases in resource demand have led to higher levels of exploitation of marine living and mineral resources. Environmental policies are highly restrictive to promote the recovery of fish stocks, prevent further depletion of natural resources, and promote safety in undersea resource extraction. The latter is becoming a major economic activity as terrestrial resources dwindle.

Ocean resource harvesters collect minerals, fish, and even algae. Those who want to import legally to the U.S. must follow strict environmental regulations and are subject to regular inspections. A wide range of harvesters range in professionalism and legality.

Resource pirates and TCOs powered by slave labor take huge risks and suffer high mortality rates while decimating fragile ecosystems. These groups often operate on highly sophisticated, man-made floating islands in international waters, outside of any nation's authority. Acting as unregulated, sovereign nations, they often contain a mix of illicit drug factories and mining platforms.

Climate change continues to alter the fauna composition of fisheries. This affects fishing communities worldwide as stocks are exhausted in some places, flourish in others, or change composition. Illegal fishing is easily detected, but criminal fleets, protected by their own navies, remain out of reach.

Technology tracks fisheries and provides data on change, but major social and economic dislocation occurs as fisheries shift from their historic patterns.

The expansion of cyber capabilities is an increasingly prominent element in military activities on land, sea, air, and in space, offering new capabilities for monitoring operations around the world. Sensor networks enable surveillance of the entire ocean, but limited naval resources and lack of cooperation between distant nations mean that, in many cases, a government is aware of criminal activity but cannot respond.

As the new class of "resource criminals" uses increasingly powerful cyber techniques and tools, it fuels a war of innovation, funded on the criminal side by the value of increasingly scarce resources. With rogue state sponsorship, resource and cyber criminals prosper. They develop pirate navies to protect their illegal shipments, as well as their own fishing fleets. Smuggling

vessels grow more sophisticated and numerous, and the government lags behind criminal technologies.

In one recent example, a fishing vessel registered to a family in Texas made a distress call from 200 nautical miles east of the Yucatan. U.S. military forces requested that a Mexican patrol vessel with an embarked helicopter to render assistance. The responding aircraft was shot down, and the “distressed” vessel deactivated its distress signal and submerged. The decoy vessel was a “Smart Dropper” attached to a criminal smart sub. It successfully diverted the region’s manned and unmanned law enforcement vessels to a massive, multi-day search, during which a vast quantity of the new drug Oblivion was smuggled through the waters where drone ships normally patrol. Drug statistics showed a huge spike in Oblivion availability in northern Florida and up the East Coast following the incident.

## Climate Resiliency

Accelerating climate change has impacted many ecosystems. Changes have occurred so quickly that widespread resource scarcity has been an unavoidable result.

Environmental policies are highly restrictive. They aim to shift the carbon mix, promote recovery of fish stocks, and prevent further depletion of natural resources. In some overexploited areas, protective regimes are in damage control mode, but criminal enterprises continue to exhaust resources for short-term gain. Regulatory and policing efforts are severely challenged.

Spreading deserts, prolonged droughts, rising ocean levels, and stronger storm surges cause significant population shifts. Climate and weather modeling continue to improve, providing critical preparation time ahead of large storms. These are more frequent and increasingly destructive.

Emerging urban areas are located inland and on the ocean itself. Floating cities, located far from major storm and hurricane and typhoon zones, prompt a boom in construction employment. This is one of the few remaining middle class professions. Resources are scarce, and old cities are dismantled for resources. Old landfills are mined.

Coastal real estate plummets in value, and many families are economically devastated. Their coastal homes are sold for scrap value, and the land is worthless because insurance is no longer available and the government will not pay for reconstruction. A major debate in Congress surrounds the government’s role in housing the displaced and paying for the cost of new urban infrastructure. Policy fluctuates, depending on which party is in power.

In China, coastal regions such as low-lying Shanghai and much of the Pearl River Delta region of Hong Kong–Shenzhen become uninhabitable. Poorer nations such as Bangladesh also experience devastating floods. Fatalities are in the tens of thousands, while millions are displaced. In an effort to address its environmental problems, China passed stringent regulations. These affect

rare earth mineral mining. The unintended consequence has been a boom in unregulated deep-sea mining.

Popular protests in China over climate impacts and poor air quality, lack of freshwater, and corruption bring a new generation of leadership to power. They introduce sweeping reforms. In an effort to address environmental issues, China has strengthened its regulations, including those for mining rare earth minerals. With advanced technologies increasing the demand for these, deep-sea mining in unregulated international waters is now a booming business.

## Governance and Politics

Megacorporations and technology companies wield significant influence at all levels of government. When they can gain leverage with politicians or regulators, corporations exert strong pressure with the threat of relocation outside of tax jurisdictions. Some move to offshore locations, others to tax haven countries, and still others to poorer countries desperate for any economic activity.

The importance of maritime commerce and the growing threat of rogue state, TCO, and private navies lead to an increased focus on maritime security and the creation of the Department of Maritime Security (DMS). Similarly, NASA is transformed into an agency for Space Security as private companies assume its former roles in science and exploration.

Thousands of DMS remotely-monitored “ReMos,” or autonomous ships, are on patrol for surveillance and remote interdiction. Numbers of active duty personnel decrease significantly. The drone fleet has become highly specialized and includes fast-pursuit drones called “speeders,” heavily armed “interdictors” that carry specialized boarding robots, slow-patrolling fleets of “sensor-packs,” and long-range reconnaissance vehicles, or “RVs.”

Governments are heavily dependent on the private sector to provide social, production, and consumer data to track and regulate the consumption of limited resources and the activities of citizens. The populace insists upon resource price controls, but they often backfire and lead to higher prices and supply fluctuations.

Individual property rights diminish as the government takes control of scarce resources, driving more people into deep resentment or toward the shadows, where they live outside of the intense monitoring that is common in urban areas.

Robot Rights and robotics law are the most popular specialties among law school graduates. Numerous robotics-related cases are in the courts as robotics law struggles to catch up with advancing technology. Robo-Ethics, or the ethics of robots in society, is another expanding field. Many robotics-related court cases inevitably wind up in the Supreme Court, where the rights of robots, avatars, and “composite individuals” is a confused area of law and a source of tremendous social controversy.



## Culture and Society

There is increased social polarization between the wealthy leaders of the technology class, known derisively in the media as the “Techerati,” and the vast lower class who provide the necessary cooking, cleaning, and menial services to sustain the lifestyles of the wealthy. The wealthy and urbanized are increasingly dependent on technology, which is their primary source of wealth. In some communities, rich and poor live side by side. In others, the rich have retreated into enclaves where they live in luxury surrounded by human and robotic security systems.

Economic disruption from resource scarcity accentuates the divide between the rich (10% of the population), middle class (20%), and the poor (70%). The middle class continues to shrink, as more and more families lose their economic battles.

A significant percentage of people choose to live an off-grid lifestyle. In response to their own economic, moral, spiritual, religious, or psychological needs, these people live in varying types of survivalist, escapist, or cult-like communities. Whether or not involved in criminal activity, they desire escape from pervasive government surveillance. They refuse to use any type of technology that allows tracking.

A cashless, underground economy links many of these alternative societies. As in other aspects of their lives, it is characterized by high technology and innovation. They repair and refashion older technology and develop original approaches to recycling, while the rich and middle class buy newer, shinier, more powerful tools and toys. Using anonymous social media, they gravitate to radical ideologies and form sects, cults, and movements. In doing so, they become a significant opposition force, and a major political party emerges to represent their views. In some rural regions, there is continuing agitation to secede, accentuating the rural-urban divide.

While the shadow class is only about 5% of the poor, their impact is disproportionate, as they traffic in highly valued goods and services. The tech-savvy constitute a significant segment, with about 30% of the overall population engaged in the tech economy and 5% in the anti-economy of hackers and Anonymous activists. The rich and middle classes enjoy the full fruits of technological progress, while the poor struggle and own almost nothing.

The trifurcation of society leads to high levels of alienation. Drug dependency increases, suicides rise, and increasing numbers of people disconnect from society. Mental health resources are underfunded, and millions suffer without treatment. Many wealthy people are also affected. They feel guilty at their good fortune and overwhelmed by the sheer scope of poverty in society. At the same time, virtual reality technology is creating deep psychological impacts. Widely referred to in the media as “Digi-Shock,” many people have difficulty distinguishing between their real and virtual lives.

A wide variety of religions continue to thrive as people look for some form of stability and continuity in midst of massive and accelerating change. Fundamentalism remains a powerful and

occasionally violent force as people react to the psychological strains of changing culture and the impact of technology on every aspect of life. For some, technology is a debasing intrusion, while others embrace it and the choices it offers.

Life spans of the wealthy and middle classes continue to increase through science and medicine. While these medical advances also benefit the poor, inability to pay for the newest treatments and medications limits those benefits. Consequently, resentment and fatalism grow. Health care and education delivery become unbalanced. The rich go to doctors and schools that are augmented by sophisticated science and technology; the poor access care provided by lower level robots.

## Energy Revolution

Limitations on fossil fuel emissions forced the development of alternative energy technology. Renewable resource development is the developed world's primary investment priority. However, the upfront investment in science, technology, and manufacturing to produce the needed energy at scale is so expensive that the shift to renewables unexpectedly concentrates economic power in the hands of the already wealthy. This further exacerbates the divide between the haves and have-nots.

China has accumulated five decades of trade surplus funding. The country has invested this capital and gained control of resources to support its massive population through ambitious projects such as "Solar Sahara." This enterprise also provides power for Africa and Europe. Huge numbers of Chinese and Indians immigrate to Africa, bringing critical skills while driving social and economic competition among the blue collar and high tech work forces alike. In many cases, local workers are displaced by more highly trained newcomers, forcing them into the unskilled migrant labor pool.

Additive manufacturing (AM), or 3D printing, explodes, and oil companies shift major efforts to production of AM feed stock. Everything is recycled.

Black markets emerge, facilitated by the internet. They are driven by a variety of actors, from large-scale TCOs to small-scale, lone wolf pirates.

Government regulation of mining and harvesting areas is stringent. While global cooperation has significantly declined, bilateral agreements are common where resources straddle borders. Some resources sink past the recovery stage and are permanently destroyed, while others are brought under very careful management in an attempt to restore them to viability. Critical and rare resources, such as rare earth metals, are controlled by the government.

Commercial activities in space expand as corporations attempt to gain control of extraterrestrial energy resources, including solar power and lunar H<sub>3</sub>. Corporations setting up operations on the moon to mine H<sub>3</sub> claim sovereignty, elevating them to planetary-nation-state status. Numerous conflicts result.

The shift away from fossil fuels has radically reshaped the energy economy. The huge oil companies of the 20<sup>th</sup> century have seen their asset bases shrink as their untapped oil reserves are abandoned in the ground. Heavy restrictions on fossil fuels have made extraction far less profitable, effectively ruining their balance sheets. The firms that divested most quickly survived. Those that did not, failed.

Widespread use of plant-based energy sources has driven up the cost of food, significantly hurting those on the bottom rungs of the economic ladder. Whereas economists once measured the development level of a nation's economy by "energy usage per capita," the relevant metric is now "reduction of energy consumed per unit of Gross Domestic Product (GDP) produced." The wealthiest countries are those that produce the most GDP with the least energy.

Pseudo-colonization, or economic colonization, becomes common as wealthy nations invest heavily in poorer ones to control critical resource stocks and to access properties clear of storm centers. Large-scale population movements increase. Wealthy nations provide security, policing, and monitoring resources to the poorer countries, including maritime, land, air, and space.

Technology is commonly leveraged to offset resource shortages. Efficiency is improved in extraction, use, reuse, and conservation.

## Economy and Commerce

Lack of resources created rising commodity prices, leading to hyperinflation as supplies could not keep up with demand. Governments had no choice but to institute price controls, which produced bitter ideological battles between free markets and price controllers. They also led to black market expansion and higher rates of smuggling. Managing the national currency is an ongoing headache.

Scarcity of most resources, other than technology, is now a part of the human experience. Most ecosystems have been so severely disrupted by climate change that food, water, building materials, energy, and natural fibers are in short supply. Great numbers of people and robots are engaged in procuring resources or creating them. This is a lucrative activity for both legitimate business and criminal enterprises.

Food, water, and energy are expensive. Highly regulated and strictly controlled, they consume a much greater portion of the average family's budget. The resulting drop in disposable income leads to economic contraction even in wealthy countries. The line between recession and depression is hotly debated. New economic thought explores the possibility of economic health within a framework of limited consumption, without job or income growth, and with continuing concentration of wealth into fewer hands.

Businesses have begun to focus intently on efficiency, and many invest heavily in automation to control costs. This leads to further reductions in the workforce. The “kill the robots” movement has grown significantly. This produced a “Robots’ Rights” movement, which asserts that the cognitive capabilities of robots mean they deserve, and indeed require, legal protection. Robotics law has become the number-one specialty of law graduates.

## International Cooperation and Relationships

Nations are highly protective of scarce resources, contributing to a breakdown of international cooperation and fostering an isolationist culture.

Cooperation is almost exclusively on a bilateral or multilateral basis and typically revolves around a single issue, such as conservation or distribution of a particular resource. Coalitions are generally built to remove a non-state actor from resource competition.

Major global corporations have developed their own diplomatic corps to protect and assert their interests. A consortium of the world’s largest companies has established its own oceangoing colony. External to any existing sovereign territory, it exists to promote autonomy and protect intellectual property from government interference.

These corporations consider themselves as sovereign states. When one megacorporation sends its own team to the Olympics, a recasting of global relationships ensues as a new form of non-state actor emerges.

Some governments that still operate effectively band together when they are confronted with large-scale TCOs and terror threats, but cooperation on other topics deteriorates. Development banking decreases, replaced by sovereign wealth investments made unilaterally as a form of economic colonization. The IMF is dissolved, and the UN becomes a hollow relic.

Trade blocs tend to be local and regional. Because of scarcity, long-distance trade diminishes and global trade agreements languish. Nations are simply not interested in issues that fall outside the category of immediate needs. Free trade declines, serving to keep the poorer nations poor and concentrate power in wealthier countries. Many of the poorest deteriorate into regional blocs without centralized authority, accelerating the downward spiral. The lack of authority subjects the resources that remain to overexploitation in short-term struggles for survival and power.

The pattern of authority breakdown witnessed in early 21st-century Somalia is replicated in many other nations. Among those, many are coastal states that lack the capacity to protect their maritime resources. Individual actors therein resort to poaching neighboring countries’ assets. Nations with effective maritime police and coast guards band together to protect their shared interests, but regional conflicts ensue. With the absence of international governing bodies, many of these disputes fester unchecked.

The decline of national authority in the polar regions has become a global pattern. Every nation is forced to invest more resources in military forces for self-defense. Social spending declines. The poor have few paths out of poverty other than exceptional initiative, crime, or sheer luck.

Addressing nuclear proliferation is one of the few lines of effort with coherent international support. With the demise of the UN, a group of nations created their own multinational antiproliferation force. Restraint declines, and proactive military strikes against real, suspected, imagined, and alleged nuclear facilities are common. While these attacks are sometimes legitimate incursions, it is widely known that they are also a guise under which old hostilities and retaliation is common. They are also used to justify resource grabs. Trust between nations is at an all-time low, alliances are temporary, and virtually nothing is taken at face value.

Propaganda is pervasive. Cynicism is rampant. The remaining strong nations have amassed so much military and technological power that these forces seem insurmountable. The weak get weaker, and even technological advances offer little help or hope for the poorest nations.

Developing technology and the general decline in respect among nations increases the number and violence of regional conflicts. Battles are fought with robots, drones, and autonomous underwater vehicles. There is little regard for human life. People attempt to migrate from dangerous and chaotic zones, but anti-immigration sentiment is prevalent. Massive refugee populations become trapped on border zones and have little hope for improvement in their lives.

## Western Hemisphere

The United States, Canada, and Mexico form an economic and defensive bloc. Military forces of the three nations are under joint command. Technology sharing is common, and responsibilities for surveillance and defense in all domains are shared.

Economic competition between the North American Bloc and the Southern Hemisphere increases. The nations south of Mexico band together, with the exception of Brazil. The latter is afforded independence by agricultural and resource wealth.

As the geographic center of the North-South competition, relationships throughout the Caribbean become strained. Many smaller countries attempt to play North against South to gain trade concessions, and various countries accuse one another of harboring smugglers, protecting TCO fleets, and failing to enforce international laws.

Outside of strong blocs, alliances are in constant flux. Relationships between countries are opportunistic and temporary. Several major corporations banded together and acquired major portions of large island nations. They promised lifetime employment for the residents, creating a new hybrid form of corporate nation state, or “co-nat,” that became a diplomatic nightmare for neighboring states.

As national legislatures and diplomats deliberate on their relationships with co-nats, their navies lack guidance on how to interact with co-nat maritime forces. The situation only grows more complex as poorer nations perceive the advantage of partnering with global corporations. The diplomatic landscape is undergoing a fundamental shift.

The co-nats recognize the importance of physical and cyber security. Rather than develop organic military forces, they hire private military contractors. This creates a booming market for professionalized soldiers of fortune. Nation states provide military support for the co-nats, introducing a new type of global economic competition. These relationships are attractive to national governments, providing an increased geographic footprint and additional sources of revenue.

Coastal monitoring and defense is a major priority. With the rapid improvement in submarine technology, undersea human smuggling becomes more prevalent. The southern coasts of America are impacted by a steady influx of illegal immigrants.

Protection of fishing grounds is important to national and regional security, and millions of constantly monitored sensors are in place. They also deter smuggling and human trafficking. El Niño currents have changed from their historic patterns, accelerating North American climate change. California has suffered a prolonged drought. The state is investing heavily in desalination technology.

## Arctic

The character of the Arctic has changed fundamentally. Multi-year ice breaks down faster in summer than it can recover in winter, and Arctic waters are largely open in the summer months. Animal habitats have permanently changed, and many human settlements have been relocated or abandoned as they sank into thawed tundra. The impacts of climate change and technology have irrevocably changed native Alaskan culture. Many traditions will soon exist only in archives. Living memory of life on the ice is nearly gone. Numerous Arctic animal species survive only in zoos.

The huge increase in Arctic shipping traffic and disputes over newly accessible undersea resources has produced chronic mistrust among the states of the Arctic Council. There are frequent confrontations and near-misses among the navies of countries jockeying for advantage. The Council is being relegated to impotence.

Companies exploit newly accessible resources. Territorial disputes and general distrust proliferate, enflamed by the private navies deployed to protect corporate interests. While Arctic nations desire to avoid high-level armed conflict, they do not hesitate to harass, poach, and encourage piracy against their rivals. It is a highly unstable region. Russian, American, and Canadian interests and corporations compete in an environment analogous to the Wild West. In popular parlance, it is now the “Wild North.” Similar issues are emerging in the Antarctic, or “Wild South.”

The rest of the world helplessly watches the deterioration of the polar regions. It represents the demise of multinational bodies, the growth of national self-interest, and the general global fragmentation.

## Geopolitical Situation

Resource scarcity and resulting competition have fragmented the world. International agreements and governing bodies dissolve. While some organizations survive, they are primarily regional and local. Most global efforts are abandoned as futile. The IMF and World Bank no longer function, and the UN is a hollow shell. Multinational peacekeeping efforts have long been abandoned. Local conflicts fester with no recourse or intervention.

With the decline in global institutions, nationalism has strengthened. The world is now multi-polar as nations attempt to protect themselves, enlarge their spheres of influence, and access resources. Major power blocs dominate regional affairs in North America, South America, East Asia, Southeast Asia, South Asia, Northern Europe, and the Mediterranean. Many countries in other regions have become client states of the major powers. Regional land and sea border disputes are often tense. They are tempered by constant satellite monitoring that leaves few secrets surrounding the deployment of forces.

Piracy has increased, along with many forms of transnational crime, terrorism, and rogue state aggression. Bad actors gain access to many sophisticated technologies, making them formidable. Some newly resource-rich nations have benefitted from favorable climate change. In these select countries, agricultural output has improved from increased rainfall. They experience significant immigration and enjoy increasing power and influence on the world stage.

With its pervasive reach, the media continues to influence the geopolitical situation. Global politics resemble the world Orwell envisioned, with constant propaganda battles conducted through the media. Each interest group has its own media outlets, making the sense of fragmentation even more acute.

Because absolutely everything is broadcast or webcast on one of the 16,000 “major” channels, there’s no escaping bad news. There is a pervasive sense of “Today Shock.” All global traumas, events, disasters, and blackouts are immediately experienced worldwide. Due to advancing technology, even the most remote event is vividly played out in each family’s living room via “Immersive Holo-Sensor Vision,” or IHSV, which has replaced HDTV in every home and office.



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<sup>i</sup> Image courtesy of SeaPhantom International. <http://sl.seaphantom.com/>.