Robotic Arms, Crabs and Algos

The Arctic Ocean Floor as a New Financial Frontier

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Financial markets quantify and price everything: future hurricanes are compressed into catastrophe bonds, bets are made on the spreading of the Ebola virus, endangered species are vaporised into speculative financial products. Melting polar ice has also sparked great interest among financial traders, as it will allow access to the Arctic Ocean floor. This virgin seabed hosts a bounty of natural resources and offers new routes for trading algorithms. Femke Herregraven visited Murmansk to search for and document the projected landing point of the submarine cables carrying the financial world's data traffic.

The Arctic Fiction

Financial investors describe the Arctic as 'the best investment opportunities in the last 12,000 years' and ask us to imagine the North Pole as an undiscovered continent with untapped resources:

> It would be easy to think those with a thirst for exploration were born too late – to assume that humanity has already reached every corner of the earth there is to discover. But one region – the Arctic – still contains uncharted mysteries. … Imagine waking up one morning and finding that an entirely new ocean has been discovered – a frontier, ready to deliver shorter and more efficient shipping routes. Imagine exploring a continental region rich in oil, gas and other natural resources – one that is becoming increasingly accessible as the world's best innovators develop breakthroughs that enable us to use natural resources more responsibly. Imagine this taking place among developed, first-world economies with the highest standards, established laws, and unprecedented security. The Arctic belongs not only to the Arctic nations but to the world. Yet, it is the Arctic nations and those who seek to avail themselves of the opportunities there, of this New World, to safeguard the region as the stewards of this global asset.[1]

Framing the Arctic as an unexplored global financial asset is not something new. In 1890 Jules Verne wrote about the selling of the Arctic by a company called The North Polar Practical Association:

> It is natural to expect that opinions were very varied when the news spread that the Arctic region was going to be sold at auction for the benefit of the highest and final bidder … To use the Arctic region? Why, such an idea could 'only be found in the brain of a fool,' was the general verdict. Nothing, however, was more serious than this project.[2]

And indeed, today nothing seems more serious than this project. The eight Arctic nations – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States – all stake their claims in the region and on its resources. American investment groups, China and others claim however that the Arctic is 'the inherited wealth of all humankind'.[3] Making deeds of words, China sent the Snow Dragon icebreaker and scientists on Arctic expeditions, and supports Chinese businesses that have already purchased Arctic land two-and-a-half times the size of Manhattan. According to a Chinese professor of law and politics, 'China's exploration of the continent is like playing chess. It's important to have a position in the global game. We don't know when play will happen, but it's necessary to have a foothold.'[4] Based on a large underwater mountain chain in the Arctic Ocean that starts on Russian territory, Russia has claimed sovereignty over the ocean floor and its resources. On 2 August 2007 a robotic arm from the

1. Scott Minerd, 'We Must Avoid Seeing The New Arctic Through an Old World Lens', 26 October 2013, published on the site of Guggenheim Partners, investment firm headquarters in New York, http://guggenheimpartners.com/news/we-must-avoid-seeing-the-new-arctic-through-an-old
2. Jules Verne, *The Purchase of the North Pole* (orig. *Sans dessus dessous*), 1889.
3. Elizabeth Rosenthal, 'Race Is On as Ice Melt Reveals Arctic Treasures', in *New York Times*, 18 September 2012, http://www.nytimes.com/2012/09/19/science/earth/arctic-resources-exposed-by-warming-set-off-competition.html
4. Nicola Davison, 'China Eyes Antarctica's Resource Bounty', in *The Guardian*, 8 November 2013, http://www.theguardian.com/environment/2013/nov/08/china-antarctica-trip-icebreaker-snow-dragon

Mir-1 mini-submarine planted a titanium Russian flag on the Arctic Ocean floor at a depth of 4261 metres. 'The Arctic is ours', declared oceanographer Artur Chilingarov. A conservative Russian think-tank proposed renaming the Arctic Ocean as the Russian Ocean.[5]
In the scramble for the Arctic the region is presented as an uninhabited no-man's land ready for investment and capital. This ignores the fact that indigenous people have lived there for 5000 years, and also have declared sovereignty over valuable natural resources. This fictionalisation of a geopolitical zone simply functions as an economic tool.[6] Today the Arctic is a new frontier of imagination, with opportunities for financial markets that cater to their need for expansion. Obviously, the reality of investing in the Arctic is way less romantic and is accompanied by massive ecological, financial and political risks. Yet, financial markets thrive on risk. The Arctic boom has sparked a new generation of frontier gamblers.

Frontier gamblers emerged halfway though the nineteenth century in the American West. Before the American Civil War gambling flourished on the banks of the Mississippi, but with the discovery of gold in California in 1848 many gamblers moved westwards to new San Francisco mines. Professional gamblers were the aristocrats of American society – gambling was not controversial; as a profession it was a regarded as being equivalent a lawyer or doctor, and gamblers were a lot more respected than dentists. Today, frontier gamblers are once again well-respected people. The new generation is even so highly respected that they receive bonuses of millions and almost endless credit to speculate with our biosphere. The great age of Western gambling ended with the closing of the frontier;[7] the great age of Arctic gambling begins with the opening of the Arctic frontier. From Gold Rush to Cold Rush.

Today's frontier gamblers have outgrown the card games of the Old West: faro cards have been replaced by natural resources

5. 'Will the Arctic Ocean become Russian?', in *The Voice of Russia*, 2012, radio show, http://sputniknews.com/voiceofrussia/2012_07_25/Will-the-Arctic-Ocean-become-Russian
6. Andrea Phillips, *Making It Up: Aesthetic Arrangements in the Barents Region*, in Hilde Methi and Kristin Tarnesvik, eds. *Hotel Polar Capital*. Kirkenes: Sami Art Festival, 2011, pp. 55–68.
7. See http://www.frontiergamblers.com

Russian mini submarine about to dive beneath the ice at the North Pole to plant the Russian flag into the Arctic Ocean floor.

The Russian flag is planted on the Arctic Ocean floor by a robotic arm from a submersible vehicle.

Artur Chilingarov, Russian oceanographer and head of the Russian expedition Arctic-2007, showing a picture of Russian flag in the Arctic Ocean floor.

and unexplored territories, card playing tables by trading screens. Game dynamics are driven by climate change: rising weather volatility creates opportunities for speculation. Although it's complex to predict how and where it will become colder, drier, wetter, stormier, or where it will flood, the expectation is that the number of events will increase. More events means more changes to invest in and gamble on, more opportunities to win and lose. An investor says about the Arctic: 'Your choice is to either take advantage or let them pass by. This isn't going to be a political discussion. This isn't about politics, this is about investing.'[8]

Arctic Infrastructure Space

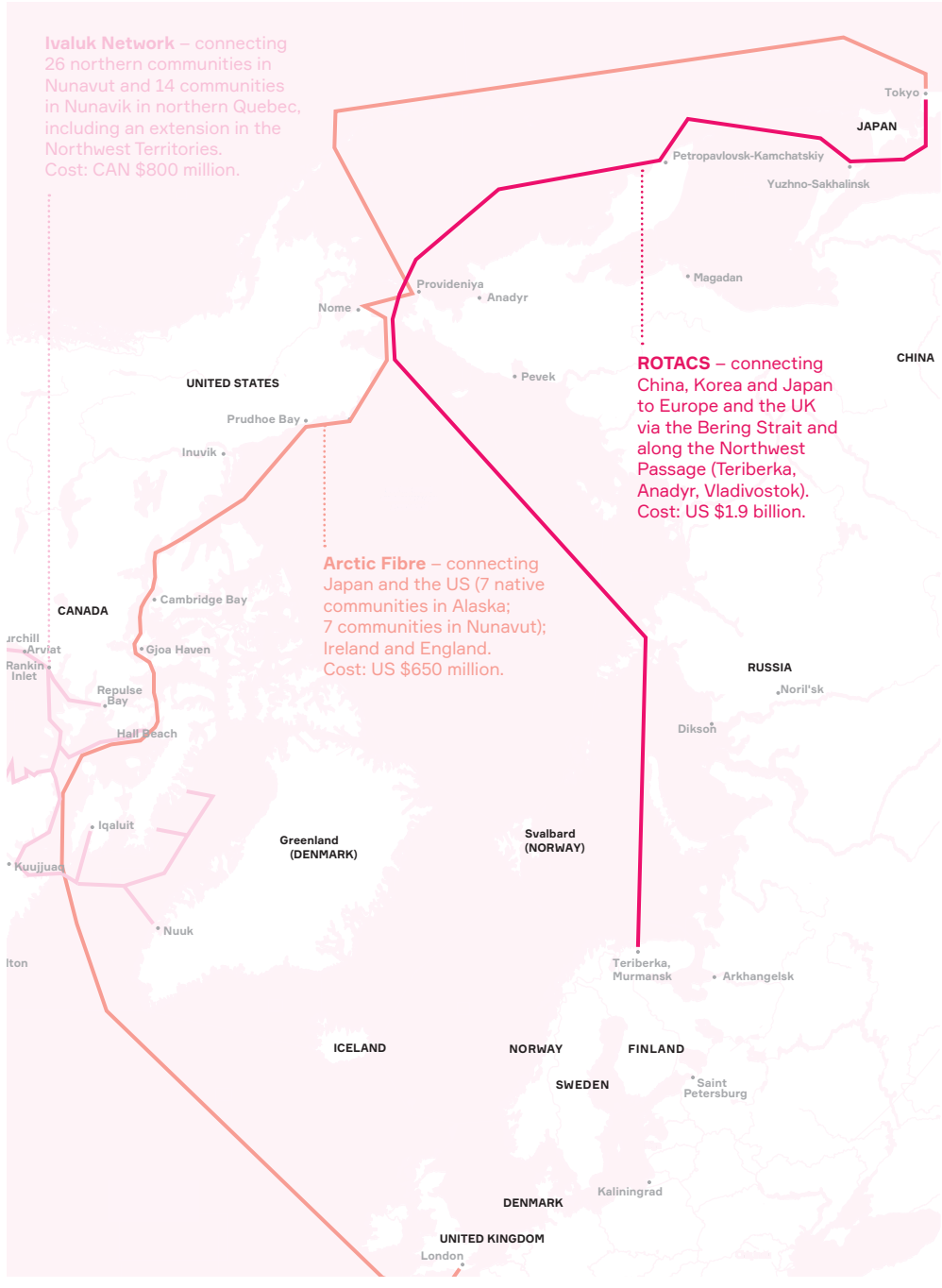
The Shtokman gas field beneath the Arctic Ocean floor shows that investment is – of course – all about politics. Although the partnership between Gazprom, Total and Statoil has been put on hold, new business models for exploiting gas and oil will emerge. After all, the melting ice makes the Arctic bounties more accessible than ever before. The frozen tundra will become suitable for agriculture, valuable minerals – zinc, iron, gold and nickel – of which the Arctic has massive reserves, will be easier to mine, and the Northern Passage will be open for much longer every year, offering faster and shorter routes for container ships. Yet, the least visible though most powerful consequence of the melting ice is the possibility of laying submarine cables across the Arctic Ocean floor. Yearly approximately 250,000 kilometres of new submarines cables are laid on ocean floors worldwide (the cables last a maximum of 25 years). About 95 per cent of all intercontinental data traffic is conducted through submarine cables. The so-called *cloud* is in fact more like ever-expanding underwater spaghetti. Today, submarine cables connect all the continents, with the exception of the Arctic and Antarctica. The Arctic Ocean floor offers a new horizon for expanding broadband. Even though there are obstacles in terms of financing, Arctic submarine cables will be realised in the near future. As of today three submarine cables are planned.

8. Barry Ritholz, 'The Losing Bet on Climate Change', in *BloombergView*, 23 June 2014, http://www.bloombergview.com/articles/2014-06-23/the-losing-bet-on-climate-change

Whereas the Ivaluk network aims at connecting communities, hospitals, and schools in the Canadian North with the rest of the world, Arctic Fibre and ROTACS will be constructed for the sole purpose of increasing speed. Arctic submarine cables will shorten the data connection between the financial markets in London and Tokyo that are presently linked via the Middle East and the Pacific. Latency – wasted time in financial terms – is expected to drop substantially by 62 milliseconds, data traffic is expected to be 30 per cent faster. No wonder the melting ice is so interesting to (high frequency) traders. Global warming is literally opening up the Arctic Ocean floor to trading algorithms. Less ice means more money in less time.

The never-ending race to reduce latency and maximise speed is also accompanied by the need to find less vulnerable routes. Cable systems providers are constantly searching for newer, safer ways to cross the ocean floors and avoid choke points. Nearly all submarine cables follow the old geography of early telegraph telecommunication that was largely constructed by the British Empire. Today, many fibre-optic cables come ashore in the ports of former British colonies such as Singapore, Alexandria, Hong Kong, Lisbon, Mumbai, et cetera. As strategic locations these ports are vulnerable to accidents, political instability and attack. Alexandria (Egypt), for example, is a major cable landing point but because of the current political instability is considered a choke point. If a cable linking the US and London is severed, the data can be rerouted almost instantly through any of the eleven other cables. But a cable cut in Alexandria could block data traffic between Europe and financial centres in the Middle East. Data would have to be rerouted through land-based networks or via Asia and then via the US back to Europe.[9] Singapore, another strategic port, is also considered a major choke point because of its many (18) cable landings that puts a lot of stress on the infrastructure. Currently there are three designated landing sites (Changi North, Tanah Merah, Tuas) that are all high security zones.

9. Samantha Bookman, 'Submarine Cable Operators Hunt for New Routes to Counter Congestion, Political Turmoil', 18 April 2013, http://www.fiercetelecom.com/special-reports/submarine-cable-operators-hunt-new-routes-counter-congestion-political-turm



The All Infrared Line, map, 2014. Three planned Arctic submarine cables.

The quest to avoid such vulnerable choke points brings cable system operators to the Arctic. It is a perfect location for submarine cables: there is hardly any marine traffic that could damage the cables and landing points are far away from densely populated areas. The US Department of Homeland Security points out that 'critical infrastructures' such as submarine cables and cable landing stations are essential assets on which international banking and financial markets are highly dependent.[10] These critical deep-sea infrastructures carve out new controlled zones worldwide. Infrastructural zones are often discretely hidden in remote areas, but they are increasingly visible in major ports like Changi North in Singapore. New protection zones for submarine cables are introduced in the oceans. Australia declared a submarine cable protection zone off the coast of Perth to protect the SEA-ME-WE3 cable connecting Australia to South East Asia, the Middle East and Western Europe. Marine life and submarine cables meet each other in underwater nature reserve zones around the world.

Deep-sea infrastructures produce a new space which, following Keller Easterling, we could call *infrastructure space*. She argues that infrastructure is often considered to be a hidden layer of reality, but that today's infrastructure has become the public point of contact and access for all of us. Special Economic Zones (SEZs), broadband and global standards all give form to that space, and consequently regulate the space of everyday life. Keller describes *infrastructure space* as a medium of information, and as an operating system that shapes the city in which information 'resides in invisible, powerful activities that determine how objects and content are organised and circulated'.[11] She writes:

> Contemporary infrastructure space is the secret weapon of the most powerful people in the world because it orchestrates activities that can remain unstated but are nevertheless consequential. Some

10. Protective Security Division Department of Homeland Security, 'Potential Indicators of Terrorist Activity Infrastructure Category: Cable Landing Stations', January 2004, http://publicintelligence.info/DHS-UCL-PI.pdf
11. Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space*, Verso: London, New York, 2014.

> of the most radical changes to the globalising world are being written, not in the language of law and diplomacy, but in these spatial, infrastructural technologies – often because market promotions or prevailing political ideologies lubricate their movement through the world.[12]

In that sense it isn't surprising that Brazil – in its effort to control its *infrastructure space* – just announced plans for a $185 million fibre-optic cable. The Brazilian firm Telebras has teamed up with IslaLink from Spain to lay a new cable across the Atlantic Ocean to Portugal that excludes US technology in an attempt to prevent NSA surveillance.[13] The issues here are how the *infrastructure space* the submarine cables will produce in the Arctic will be organised and who will set the rules.

During my *Dark Ecology* residency I visited two locations that could possibly become part of that Arctic infrastructure space: Murmansk and Teriberka. In Murmansk I wanted to research the Special Economic Zone that ironically had closed one day before my arrival due to lack of success. No companies had established themselves in the zone since its opening and Murmansk as an SEZ turned out to be a failure. Murmansk's Special Economic Zone was what Keller Easterling calls the urban equivalent of MS-DOS: a relatively dumb piece of spatial software, quickly circulated in a world addicted to intensified urbanism.[14] Besides its brief SEZ adventure, Murmansk is also often mentioned as a cable landing point for the Arctic submarine cable ROTACS – following the old geography of strategic sea ports. Yet, its crowded harbour seems an unlikely location. Cable landing points are usually carefully located in areas with hardly any marine traffic or strong currents, and with a gently sloping, sandy seabed so that the cable can be buried. The tiny village Teriberka 100 kilometre north-east of Murmansk is perhaps a better

12. Ibid.
13. Anna Edgerton and Jordan Robertson, 'Brazil-to-Portugal Cable Shapes Up as Anti-NSA Case Study', in *Bloomberg*, 30 October 2014, http://www.bloomberg.com/news/2014-10-30/brazil-to-portugal-cable-shapes-up-as-anti-nsa-case-study.html
14. Keller Easterling, ibid., 2014.

The All Infrared Line, film still, 2014. Potential Russian ROTACS cable landing point in Murmansk harbour.

The All Infrared Line, film still, 2014. Potential Russian ROTACS cable landing point in Teriberka village.

candidate. This village recently became accessible, as it is no longer part of the Russian military border zone. Standing on Teriberka's remote seashore I was reminded of how the inscrutability of financial markets and the mysteries of the deep ocean floors are tied together by a single cable: a physical cable that allows light to travel across global ocean floors to connect people and financial markets. Rudyard Kipling already described the spellbinding activity of sending signals through cables on the ocean floor in a poem from 1893:

> **The Deep-Sea Cables**
> *The wrecks dissolve above us; their dust drops down from afar–*
> *Down to the dark, to the utter dark, where the blind white sea-snakes are.*
> *There is no sound, no echo of sound, in the deserts of the deep,*
> *Or the great grey level plains of ooze where the shell-burred cables creep.*
>
> *Here in the womb of the world – here on the tie-ribs of earth*
> *Words, and the words of men, flicker and flutter and beat–*
> *Warning, sorrow and gain, salutation and mirth–*
> *For a Power troubles the Still that has neither voice nor feet.*
>
> *They have wakened the timeless Things; they have killed their father Time;*
> *Joining hands in the gloom, a league from the last of the sun.*
> *Hush! Men talk to-day o'er the waste of the ultimate slime,*
> *And a new Word runs between: whispering, 'Let us be one!'*[15]

In the poem wrecked ships float above the submarine cables. At the time some scientists believed that shipwrecks floated in deep water and did not sink to the seabed because the deep water was supposedly denser than the materials from which the ships were made. Today we know that the density of deep seawater doesn't increase, yet when

15. The poem was first published in the English *Illustrated Magazine*, May 1893, as one of the six sub-sectional poems to 'A Song of the English'. It was collected in *The Seven Seas*, published simultaneously in London and the US on 30 October 1896: London, Methuen & Co. New York, D. Appleton & Co.

The All Infrared Line, photo, 2014. Barent Sea coastline in Teriberka village.

The All Infrared Line, photo, 2014. Barent Sea coastline in Teriberka village.

The All Infrared Line, photo, 2014. Collapsed building in Teriberka village.

The All Infrared Line, photo, 2014. Shipwrecks in Teriberka village.

The All Infrared Line, photo, 2014. Derelict pier in Teriberka village.

The All Infrared Line, photo, 2014. Shipwrecks in Teriberka village.

you walk around in the village of Teriberka it can seem as if the surrounding shipwrecks – straight from Kipling's poem – have floated up from the depths. A remote fishing village, Teriberka was once famous for its shipyard and shark fishing industry, but fell into decline after the Soviet Union collapsed. It has seen dramatic decreases in population and prosperity: only 950 of a population of 12,000 remain. Of the 52 buildings still inhabited in the village, 39 have officially been confirmed as unsuitable for living.[16] Yet, in Teriberka there is a contemporary *infrastructure space* at work that has created a boom in property prices and the price for the only Airbnb room is equal to one in Oslo. Why?

A massive natural gas field 550 kilometres from the coast was supposed to turn this tiny village into the natural gas capital of the world. The developers of the Shtokman field thought that Teriberka would become the site of a liquefied natural gas plant, after which Gazprom declared the village as its first onshore transit point for Shtokman gas. The agreement between the Shtokman partners, Gazprom, Total and Statoil, expired in 2012 without the development getting off the ground at all.

Teriberka's population is disillusioned: after all they had been promised jobs and prosperity. Still, it is likely that huge amounts of wealth will arrive in the village, though not as long-term investments in the community but as financial data travelling at the speed of light through the proposed ROTACS submarine cable. Plans for Teriberka as a strategic landing site for gas pipes and submarine cables shape a new infrastructure space that its population will have to adjust to. This infrastructure space is made up of booming real estate prices, Airbnb room rates, shipwrecks, broadband, a cable landing station, investment portfolios, an imported skilled workforce, a border casino and new global standards of different sorts. The decaying shipwrecks in Teriberka perhaps project a nostalgic picture of a collapsed society, a place disconnected from global trade and capital. Yet, these shipwrecks could also symbolise the new infrastructure space.

16. 'Russian Village Loses Faith in Arctic Gas Bonanza', *Reuters*, 21 April 2014, http://uk.reuters.com/article/2010/04/21/russia-village-shtokman-idUKLDE63I0G020100421?irpc=932

With regards to the physical architecture of cables that will be laid on the Arctic Ocean floor, it is good to mention submarine cables and gas pipes are actually not that harmful to ocean life. They only disturb the seabed habitat temporarily during construction, but provide a solid substrate for a variety of species in the long term. This 'reef' effect creates new habitats and attracts non-local fauna.[17] A marine biologist from Murmansk told me that the Red King Crab and the Snow Crab are originally not from the Barents Sea. As an invasive species they came here on ships from other places. If we, like financial investors, consider the Arctic Ocean floor as a new frontier in our imagination it's easy to see these crabs co-existing with other invasive species like a trading algorithm that goes by the name 'Sniper' and colony of robotic arms planting national flags. Global warming isn't bad news for everyone.

This text is part of the ongoing work *The All Infrared Line*, which researches the historical and contemporary construction and geography of the telecommunications infrastructure that serves as the backbone of today's financial markets. This part of the research and this text were commissioned by *Dark Ecology.*

17. Olivia Langhamer, 'Artificial Reef Effect in Relation to Offshore Renewable Energy Conversion: State of the Art', in *The Scientific World Journal*, (2012), Article ID 386713, http://dx.doi.org/10.1100/2012/386713