Makrolab as an Apparatus for Global Observation

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Imagine perceiving every radio signal floating around you. You could tune into news and hit tunes on AM and FM stations as well as transmissions at frequencies beyond the dial, like the unintelligible digital data streams emitted by cellular devices, wifi routers, and other wireless technologies. You could even hear strange bursts from outer space and audible traces of lightning from the ionosphere. This might remind you that radio is a natural phenomenon, a form of electromagnetic energy left over from the beginning of the universe that humans have only relatively recently learned to interact with for telecommunications purposes. Soon, you might begin to wonder about the potential of these omnipresent radio waves. Could they do more than simply transmit information? Could humanity's interactions with them change? Could they change humanity's interactions?

Now consider *Makrolab (Ladomir-Faktura: Third Surface)*: a mobile art installation that travelled the world from 1997 to 2007 giving individuals, like yourself, the opportunity to experience the planet's vast oceans of radio waves. This ambitious endeavor featured specialized equipment to receive signals at frequencies throughout the radio band of the electromagnetic spectrum from sources like shortwave stations, mobile phones, navigation systems, television broadcasts, and communications satellites. During intensive residencies, *Makrolab* participants worked on scientific and artistic research projects that creatively engaged with Earth's invisible wireless backbone, its "information networks that provide the operating systems of the planet" (Eshun 2003: 14).

The following discusses one artistic research project from *Makrolab*'s 1997 debut, an experimental composition for German airwaves entitled Signal Territory I, which was later released on CD in 2002. This sonic artwork inspired audiences to imagine new possibilities for global telecommunication by aesthetically repurposing transnational radio signals intercepted by *Makrolab*. This particular example demonstrates how the artistic and scientific research that took place aboard *Makrolab* helped answer the question: What can the public gain from creative engagements with transnational radio?

A Platform or Global Radio Engagement

In its ten years of operation *Makrolab* hosted over a hundred artists, scientists, and media tacticians to conduct research on "invisible power structures which at this very moment shape the state of the world" (Peljhan 1997). In particular, its crews studied three global systems: telecommunications, weather and climate, and migrations. This massive undertaking began in 1994 when Slovenian radio enthusiast and theatrical director Marko Peljhan travelled to the Croatian island of Krk during the Yugoslav Wars. Here, he noticed a juxtaposition between the region's silent war-torn landscape and its cacophonous electromagnetic sphere being used to facilitate nearby military operations. This experience inspired him and "a team of young Slovenian hackers, bedroom engineers and radio hams" (Haskel 1997: 60) called the Projekt ATOL Institute to develop *Makrolab* as a mobile and environmentally sustainable research and life-support station for the seemingly inevitable post-apocalyptic world. Their first diagram for the project – essentially a conceptual artwork – incorporated wind and solar power, heating and lighting units, audio and video manipulation, media transmission, and radio reception. These technological components all rested upon a foundation of theoretical writings by Peljhan, Projekt ATOL, and others like Russian Futurist Velimir Khlebnikov. In 1921 Khlebnikov envisioned "The Radio of the Future," where telecommunications provided "the central tree of our consciousness" connecting all humanity (1990: 155). Today, Khlebnikov's words read like a prophecy of 21st century networked culture, where individuals link to knowledge and one another via worldwide webs of data.

Peljhan's and Projekt ATOL's conceptual plans began to materialize in 1997 when *Makrolab* debuted as a massive heptagonal prism on Germany's desolate Lutterberg Hill for the documenta X arts festival. Solar panels, antennae, and satellite dishes protruded from this mobile and environmentally sustainable vessel for living and working, which could "support 3 people for up to 40 days" (Haskel 1997: 60). Peljhan described how this autonomous structure promoted a methodology of "insulation/isolation" because it insulated small crews in isolated locations to "produce more evolutionary codes in social relations" by encouraging collaboration among those in residence (1997). These small crews of so-called Makronauts remained wirelessly tethered to the outside world via radio equipment that received frequencies "from only 100 kilohertz to twelve or even thirteen gigahertz" (Marko Peljhan's Invisible Territory 2007). This gave crews access to local and transnational signals from things like satellite telephones, air traffic navigation systems, and the Mir spacecraft orbiting above (Lovink 1997). The angular construction of the *Makrolab* structure even mirrored these objects of study, looking like a "meteorological research center, or even more, like a stranded space station" (Holmes 2007) amid Lutterberg Hill's

open wilderness. Instead of looking down on Earth from above though, this futuristic apparatus gazed upwards to observe the constellations of wireless devices hoisted to the heavens for telecommunications.

Over the next decade, updated versions of this iconic structure insulated and isolated crews around the world as *Makrolab* migrated to Rottnest Island, Australia (2000); Blair Atholl, Scotland (2002); and Isola di Campalto, Italy (2003-2004). Plans to end this journey with a permanent installation in Antarctica underwent revision after trips to the Northern and Southern circumpolar regions (2006-2007) revealed multiple challenges. In a sense, *Makrolab* continued to live on though, through the Arctic Perspective Initiative (API), a transnational working group founded by Peljhan and former Makronaut Matthew Biederman in 2009. This non-governmental organization applied lessons from *Makrolab* to promote "sustainable empowerment of the local citizens of the North via new communications, sensing, aggregation, transmission, and information sharing" technologies (Arns et al. 2010: 11).

Interventions and Possibilities of Wireless Territories

During *Makrolab's* debut on Lutterberg Hill in the summer of 1997, crews amassed an archive of wireless transnational interceptions by tuning into frequencies throughout the radio band of the electromagnetic spectrum and recording what they encountered. A group of participants working under the moniker Signal Territory used this material to create an experimental composition called Signal Territory I for German public broadcasting. They developed this hour-long sonic collage by sampling, processing, and remixing *Makrolab's* archive of interceptions at the Hessischer Rundfunk's *Hörspiel* Studios in Frankfurt for a series featuring documenta X artists. Projekt ATOL's record label, rx:tx, re-issued Signal Territory I as a CD in 2002. The CD's final track included raw samples and some of the interceptions heard throughout the composition under a General Public License, which encouraged practitioners to continue engaging with transnational radio by repurposing intercepted material in future work as well. Signal Territory's artistic reconfiguration and public redistribution of *Makrolab* interceptions politically and poetically intervened upon global systems of wireless telecommunications by giving the public a chance to perceive and evaluate its interactions with radio – transnational and otherwise.

Signal Territory's creative redistribution of *Makrolab's* interceptions politically intervened upon wireless global systems by demonstrating how audiences could appreciate and interact with seemingly forbidden networks of transnational radio communication. The composition began with a voice reading sections of Khlebnikov's "The Radio of the Future" in German before introducing

listeners to frequencies throughout the radio spectrum. Audiences heard transmissions from rarely encountered sources like the satellite telephone network INMARSAT, which provided worldwide coverage to militaries, media outlets, corporations, non-governmental organizations, and other political entities. In 1997 portions of the INMARSAT network made long-distance telephone conversations possible in remote locations by transmitting voices up to a satellite and back down to Earth using analog radio technology. According to media artist Brian Springer, this meant that *Makrolab's* inaugural crew could simply tune into frequencies around 1.5 Gigahertz to hear and more importantly understand INMARSAT calls taking place "across five countries or more" without the aid of software to decipher digitally encoded audio (Lovink 1997). This was a moment of transition in the history of telecommunications though, as analog platforms were being "supplanted by the growing spread of digitized data" (Birringer 2000: 154), making this technique of interception more difficult by transforming intelligible voices into unrecognizable streams of digital prattle. When Signal Territory redistributed *Makrolab's* interceptions as sonic artwork, they encouraged listeners to appreciate analog radio's characteristic sounds before they became an aural relic of the past. Their composition also introduced audiences to the transnational radio activity occurring on seemingly inaccessible networks like INMARSAT, which gave the public a chance to consider the implications of such global systems of wireless telecommunication as they entered the new millennium.

The simple act of publicly rebroadcasting *Makrolab's* interceptions even flipped narratives of security, surveillance, and control implied by such high-tech global wireless communication networks. A clip included as bonus material on the Signal Territory I CD demonstrates that users of this service clearly expected privacy:

> Omar: Mark this line is not secure […] Do you think I should stay on the line? Or if you're discussing something –
> Mark: That's a really good question Omar. Probably, we ought not to continue this conversation since you're on landline [...] Is there a possibility of you getting to a satellite? (Signal Territory 2002)

As Inke Arns explained, *Makrolab's* eavesdropping on supposedly secure wireless lines helped audiences "develop their own understanding of surveillance and control methods" by demonstrating that global telecommunications technologies were not only reserved for major political entities (Arns 2004: 67). *Makrolab's* successful intervention into these communication channels illustrated that anyone with the right receiver could interact with networks like INMARSAT. It also made the case that the public should have the right to interact with such systems because they rely upon radio waves – a common global re-

source – to function. By remixing and publicly redistributing the interceptions from Lutterberg Hill in an artistic context, Signal Territory I presented these messages from *Makrolab* to a wider audience in a manner that inspired further reflection on radio's public potential.

This composition also poetically intervened upon global systems of wireless telecommunication by re-presenting them as transnational constellations of material elements prone to public intervention and reconfiguration any time. As Douglas Kahn explained, "the global breadth of any single transmission" results from wireless technology's dependence upon complex amalgamations of human, technological, infrastructural, and environmental interactions to facilitate communication on a planetary scale (2013: 19). You hear the side effects of these frequently precarious technological arrangements whenever electronic stutters, hisses, or dropped calls interrupt your wireless experience. We generally perceive such interferences as malfunction and aim to eradicate them by repairing the individual components within large-scale wireless constellations, including things like poorly tuned resistors, corroded circuits, misaligned satellite dishes, unfavorable atmospheric conditions, and even user error.

However, Signal Territory took a different approach. Instead of trying to fix the so-called disturbances collected by *Makrolab,* Signal Territory incorporated these noises into their composition. Their inclusion of generally unwelcome sonic intruders became a constant reminder of the entanglement of radio waves with material objects and circumstances throughout Signal Territory I. It revealed both the delicacy and relative openness of the global constellations created by individual material components – a constellation which *Makrolab* became a part of during its installation on Lutterberg Hill. Giving audiences a chance to appreciate the materiality of global wireless configurations in the present helped the public envision new constellations of wireless technology for the future by illustrating just how easily their material elements could be reconfigured. When, for example, Signal Territory heard a *Makrolab* interception capturing the final words of a dropped INMARSAT call, they sonically enhanced the disconnected voice in the *Hörspiel* studio at Hessischer Rundfunk to transform the lines of the following soliloquy:

> I'm losing you Jane, so I think we must be, um, going – I'm losing the satellite link, so, um, [...] I don't know if you can hear me anymore, but, um, I'll see you when you get back from holiday and sort things out then, and, um, all the best, enjoy. Cheers then, um, bye! (Signal Territory 2002)

Anyone who has ever experienced a wireless configuration gone out-of-whack can recognize these words, which seemed almost poetic after Signal Territory's in-studio processing added reverb and delay to make them sound especially distant and isolated. The voice's juxtaposition against an insistent hiss of radio

static invited listeners to attend to the chaotic energy of these electromagnetic waves in a deeper, more contemplative manner. As poet Sean Street explained, when we hear a voice that calls "out to a universe that doesn't answer," we listen carefully for a response in the silence that follows (2016). He compared this experience to a composition called "Sound Fishes" by Pauline Oliveros, which instructs participants to listen "for what has not yet sounded – like a fisherman waiting for a nibble or a bite" (2005: 50). Signal Territory borrowed this expectant trope when it layered the disconnected INMARSAT caller's soliloquy over an unresponsive bed of radio static. Their artistic gesture seemed to summon participation in *Makrolab's* exploration of Earth's invisible telecommunications systems by inviting the public to carefully attend to a sea of radio energy in order to catch a glimpse of the possibilities flittering just below the surface of its electromagnetic waves.

Signal Territory I provided listeners with an opportunity to observe and reflect upon the political and aesthetic possibilities of transnational radio through a sonic composition that remixed, processed, and redistributed interceptions from *Makrolab's* installation on Lutterberg Hill in 1997. The composition's broadcast and subsequent release as a CD allowed the public to experience portions of the radio band of the electromagnetic spectrum that they rarely encountered and illustrated what audiences could learn from creative engagements with transnational radio like those that took place aboard *Makrolab*. This particular project revealed how artistic intervention into global systems of wireless telecommunication can inspire audiences to better understand and imagine new possibilities for public interaction with Earth's radio waves across the planet.

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