

Null By Morse: Historical Optical Communication to Smartphones

Tom Schofield

Culture Lab
Newcastle University
King's Walk
Newcastle upon Tyne NE1 7RU
United Kingdom
tomschofieldart@gmail.com

Tom Schofield

ABSTRACT

***Null By Morse* is an installation artwork that incorporates a military signaling lamp and smartphones. A series of Morse messages is transmitted automatically by the signal lamp. The messages are drawn from the history of Morse and telegraphy. A custom app for iPhone and Android uses the phone's camera to identify the changing light levels of the lamp and the associated timings. The app then decodes the Morse and displays the message on the screen on top of the camera image. This paper discusses the artwork in relation to the following theoretical aspects: It contextualizes the position of smartphones in the history of optical communication. It proposes an approach to smartphones in media art that moves away from futurist perspectives whose fundamental approach is to seek to creatively exploit the latest features. Lastly, it discusses the interaction with the phone in the exhibition context in terms of slow technology.**

Introduction

Null By Morse (NBM) is an installation artwork that explores optical communication on smartphones with a media archaeological approach. Media archaeology is a loose term employed to cover recent scholarship that seeks to re-examine the material history of technology to better, or at least differently, inform our evaluations of the present.

Alternate histories of suppressed, neglected, and forgotten media that do not point teleologically to the present media-cultural condition as their “perfection.” Dead ends, losers, and inventions that never made it into a material product have important stories to tell [1].

Recent work in this field has examined Japanese gramophone toys [2], shadow plays and Phantasmagoria [3], or whole histories of forgotten artefacts [4] to provoke new perspectives on Japanese family life in the interwar period, screen technologies, and a wide range of modern media, respectively.

Approaches from slow technology [5] have also pointed to our quickly disinterested attitude to many day-to-day technologies and the consequences for both user experience and the environment. *NBM* re-codes modern technology to enact and perform historical media and combines this with a slow-paced interaction. The effect is calibrated to result in a slow and contemplative experience. This experience is built on and through the material presence of historical and contemporary artefacts.

With *NBM*, I employ juxtaposition of two anachronistic pieces of technology (a vintage lamp and a high-tech smartphone and their associated modes of communication) to evoke a rich and fascinating series of historical events. By literally spelling out this history in its own visual language—the dots and dashes of flashing lights—*NBM* aims to underscore the influence of technological media on the way that humans are able to imagine new forms of communication.

This short paper represents three main contributions: (i) to re-evaluate smartphones as part of the same “discourse network” [13] as early forms of optical communication, such as the Chappe Telegraph; (ii) to propose an alternative artistic approach to phone-based art that accepts failure as a part of innovation rather than focusing simply on ever-expanding technological affordances; and (iii) lastly, to consider the interaction with the installation phone in terms of theories of slow technology.



Figure 1. *CPH Signals*, installation view. © 2012 M. Schmeiduch, A. C. Marques, K. Frantzis.

Related Work

The following three examples demonstrate the effectiveness of Morse code in both evoking histories of communication and provoking interactions within the public realm. *NBM* exploits these facets to draw attention to the rich material history of optical communication and the debt that contemporary technologies owe to early pioneers.

Morse code has been employed in a number of art projects over the last 10 years. Klara Hobza’s *Morse Code Communication* [6] began with 12 light bulbs, which she manually switched on and off in Morse code. Over a three-year period, she increased the number of bulbs and their visibility until, with 1,200 bulbs and a prominent position over the city, she began to receive messages back from residents.

In 2004, Germaine Koh’s *Relay* [7] caused room lights in Newcastle upon Tyne’s Baltic art gallery to flash in Morse. The gallery’s position next to a river with a rich industrial history supported Koh’s statement that:

the beacon merges early technologies for communication and navigation with some of the more contemporary methods by which information and desire flow [8].

Koh’s work also caused local residents to believe that someone was trapped inside the building, and they called the police [9].

More recently, *#CPHsignals* [10] used a twitter-controlled signal lamp to communicate across



Figure 2. *Null By Morse*, installation view. © 2012 Tom Schofield.

Copenhagen's harbor in Morse (Figure 1). The project aimed to:

connect the two sides of the harbour, that are geographically close but still feel disconnected. Furthermore, it [showcased] how communication between remote locations was achieved in the past, in the context of Copenhagen's maritime culture [11].

NBM diverges from the above works by explicitly drawing upon the language of telecommunication's history and juxtaposing it with a contemporary and high-tech medium.

Technical and Installation Description

NBM consists of two main parts: (i) an automatically controlled military signaling lamp, and (ii) a smartphone installed on a plinth (Figure 2). The phone's camera points toward the lamp. A QR code printed on the plinth provides a link for Android phone users to download a version of the app that is running on the installation phone. The lamp has been retrofitted; its original incandescent bulb has been replaced by an LED bulb designed for car sidelights, which was chosen to allow for faster transmission. The bulb's flashing is controlled with an arduino microcontroller [12]. A simple circuit uses a transistor to switch current on and off to the bulb.

On the installation phone, an app that I developed uses the phone's camera to take measurements of pixel brightness. The area in which the brightness level is taken is defined by the user, who taps on the camera image over the lamp. The software uses the differing brightness levels to infer whether the lamp is on or off. The timing interval defines a dot, dash, inter-character or inter-word space. The app displays the messages it has received on the screen. Users can also download the app and use it in the gallery space on their own Android phones.

Communication in Military History: Technologies of Optical Telegraphs and Telegraphy

The use of signaling lamps marks only one installment in the varied material history of optical communication. Starting with signal fires and beacons, through the optical telegraph, including

the Chappe model and maritime telegraphy, the history is tightly bound with the development of strategic military coordination. The Chappe telegraph used a series of wooden arm positions to relay encoded letters to the next telegraph, within sight of the first. The development of this optical telegraph eventually allowed Napoleon's army to manage logistical resources across the expanding French military conquests [13].

Fast forward 40 years or so, and the patchwork genesis of Morse code became imbricated with both art history and American civil conflict. Samuel Morse's failed ambitions as a salon painter diverted his career into that of an inventor at a time when the rumblings of war—first between Mexico and the United States and subsequently between the North and South—proved to be a financial stimulus for his new communication medium [14]. With *NBM*, I propose the smartphone as just one more development in this lineage. I further suggest that the very possibility of imagining smartphones, as well as many of the technical developments that make them possible, began in the early 19th century.

Given Samuel Morse's artistic ambitions, it is perhaps fitting that Morse code should acquire a second life in artworks as well as the military, maritime, and transport industries, all of which exploit its simple encoding system across different media. Kittler [15] maintained that epistemes (roughly defined as historically or culturally coherent areas of knowledge) are delineated technologically. By his thesis, we conceive of the continuity or congruence of objects, not simply because of the relationships between different discourses about them, but because they afford particular circumstances dependent on their materiality. Starting with the technological specificities of devices, such as the gramophone for instance, he discusses the effect on our capacity to hear and remember. In Kittler's epistemic terms, we belong to a "discourse network" made possible only because we can envision communication in ways that are indebted to pioneering early technologies. *NBM* reduces the smartphones' capacity to receive messages to the purely optical, to visually make the point that they exist in this continuity of such proto-technologies.

Trans-Media and Time

Perhaps the defining factor of Morse code and the reason for its continued presence in the imaginations of artists and the hearts of hobbyists is its capacity to be easily and sometimes manually expressed in a variety of media. It has been documented [16] how the transition of Morse from markings on tape (dots and dashes in the visual realm) to audio (dits and dahs) was a side effect of the noisy workings of mechanical relays, which caused operators to hear messages before they read them. As marks on tape, the transmissions were not necessarily dependent on time; they could be received and read later. As audio signals, the transmission necessitates a live conversation, which effectively ties the receiver to the spot. This static modality was formative in conceiving the core interaction of *NBM*.

As well as the difference between relying on time to differentiate one message symbol from the next compared to more complex single symbols sent one by one, there is a further technical possibility that was explored by early telegraph pioneers. The Cooke and Wheatstone telegraph [17] (Figure 3) made use of a parallel system of five wires which, in combination, caused a needle to point to the appropriate letter. These differing systems of communication strongly resemble current serial and parallel systems, and with similarly counter-intuitive efficiencies. Parallel systems that have the potential to transmit several (usually eight) signals at the same time often turn out to be less efficient than serial systems because the increased complexity causes unexpected effects (such as interference). Similarly, Morse's telegraph succeeded because its design, while inefficient, was simple and adaptable. Such similarities are more than simply

metaphors. *NBM* refers to these histories to demonstrate that the unbounded era of communication that has occurred since the internet and subsequent ubiquitous mobile connectivity exists through many continuities. Not only the notion of telepresence itself, but also the material circumstances that make it possible—encoding, transmission, and network topology—exist on a historical continuum marked by similarity more than dissonance.

Apps and Futurism, Hubris and Failure

if you succeed you will soon bask in glory [18]

we have struck an iceberg, sinking

Alongside the anachronistic coupling of the iPhone and vintage lamp, *NBM* exploits another dissonance—that of hubris and failure. The messages relayed by the lamp are chosen as some of the most famous in the history of Morse and optical communication. The first of the above two quotes is drawn from an early experiment by the Chappe brothers. The second is from the distress call of the Titanic. Other messages in the installation include the famous “What hath God Wrought” from Samuel Morse’s inauguration of the Washington to Baltimore telegraph line, and “Torture,” a message blinked by Commander Jeremiah Denton, who was shot down and held captive by the North Vietnamese in 1966 [19].

What is striking to even a casual observer of this history is the polarized nature of the messages between the hubristic declamations of the inventor and the terse and defeated tone of those using the code to announce defeat or plead for help. This opposition between hubris and failure is echoed in the tension between the use of an iPhone as the installation phone for the project and the history of technological failure attending media art [20]. Apple, which has a “rarefied brand status in which it is now almost synonymous with American virtue” [21], is almost a metonym for futurism. The company’s 2011 message, “It just works,” repeatedly emphasized the infallibility and seamlessness of their technology [22]. As such, iPhones seem an incongruous medium for media art, whose own history has been described as that of a “panacea that failed” [23]. Technical and sometimes critical failure has been a persistent theme of computer- and electronic-based art at least since Burnham’s 1970 exhibition *Software* at New York’s Jewish Museum. Burnham himself suggests how the most successful examples of such art are those that “deal with the absurdity and fallibility of the machine” [24].

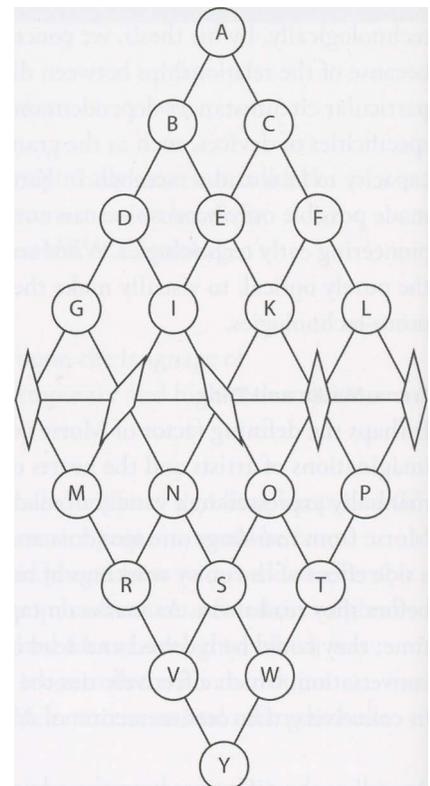


Figure 3. A Cook and Wheatstone telegraph. © 2012 Tom Schofield.

The experimental aspect of new-media art combined with the sometimes variable technical skills and training of its practitioners leads, regrettably, to artworks proving sometimes to be technically unreliable. This theme of failure finds celebration in the various glitch arts, such as Takeshi Murata’s data moshing [25], which have become popular over the last five or 10 years.

Such practices are, of course, pre-figured by early pioneers such as Nam June Paik [26], whose experimental work with broadcast technologies explored their technical limits with occasionally expensive consequences.

Against a background of innovation and failure, *NBM* uses the iPhone as a rhetorical device to critique innovation for innovation's sake. The phone's reliability and associations with high tech are overturned as its technical complexity is reduced to a camera and a simple program. By recognizing failure and limitation as an integral part of innovation, we shift focus away from the notional and on to existing devices as we examine the technology we have for lessons to learn.



Figure 4. *Null By Morse*, audience view. © 2012 Tom Schofield.

Static Interaction and Slow Technology

In the *NBM* installation, users approach the iPhone on the plinth. They pause and watch as the message is spelled out, letter by letter (Figures 4 and 5). This takes time and sometimes fails as other visitors pass between the phone and the lamp. If they choose to download the app and try it for themselves, they must hold the phone pointing at the light source and stay reasonably still. This interaction requires concentration, and the slow speed of transmission gives users considerable time for reflection. Hallnäs and Redström state that

all design with deep roots in art is concerned with amplifying the presence of things to make them into something more than efficient tools for specific, well-defined tasks [27].

NBM is concerned with embodying evocative statements about media history, not with efficiently communicating information. Hallnäs and Redström further describe how slow technology

is design concerned with how we relate to the expression of technology itself as we use it to do certain things [28].

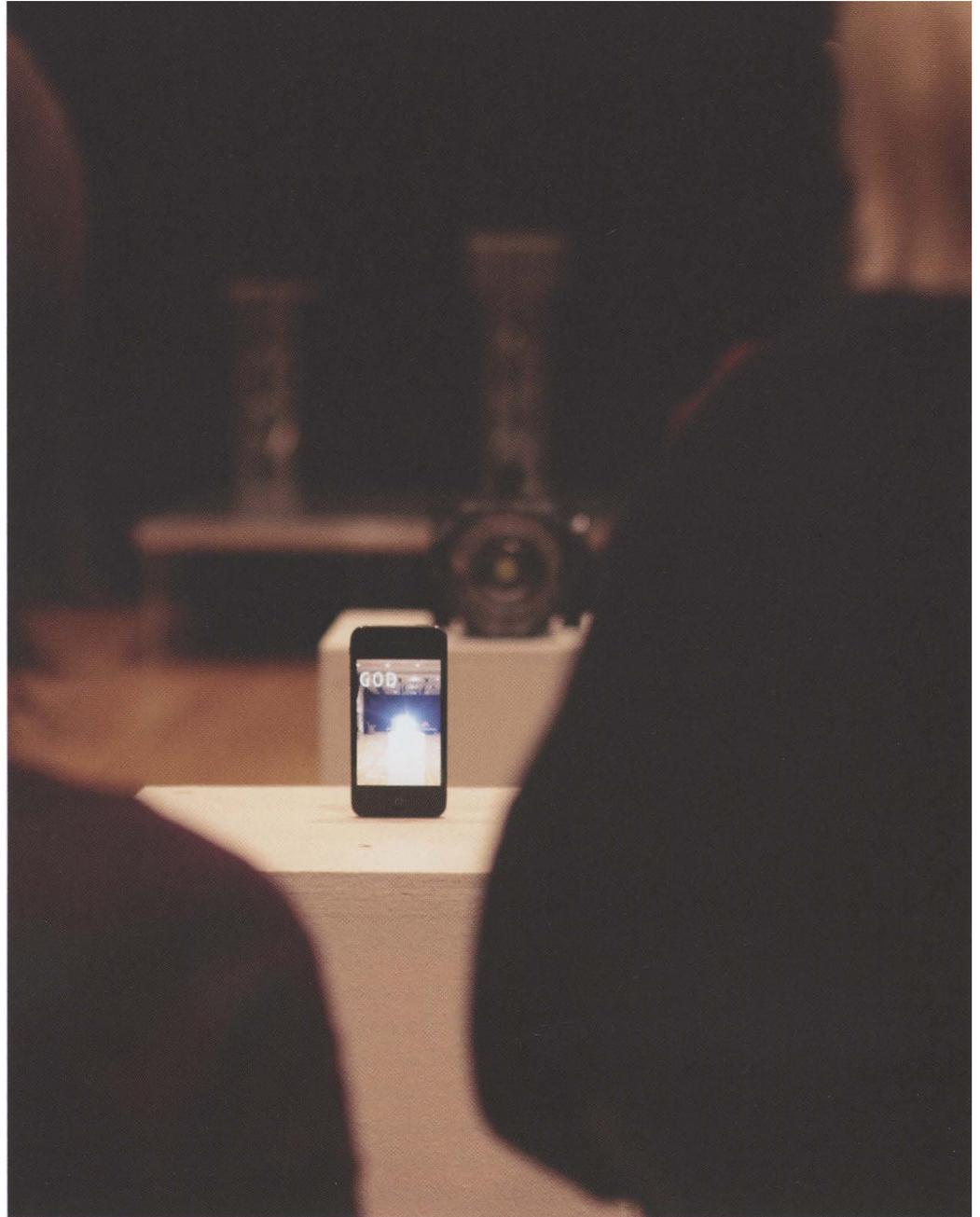


Figure 5. *Null By Morse*, audience view. © 2012 Tom Schofield.

In *NBM*, what was previously seamlessly part of our environment is recoded to reveal the techno-historical conditions of the technology and its antecedents, as well as its implication in man-made disaster. Technology is “expressing itself” to reveal a sense of continuity in function and experience.

Commentators in HCI and design have pointed out the “Platonic” tendency of modern design to think of ideas separately from objects, “considering objects to be only derivative ‘copies’ of primordial ideas” [29]. *NBM* articulates a history that is based on the experiments of those who thought with their hands as well as their heads. The use of physical devices to demonstrate and enact this history recognizes the agency of those materials in a way that written discourse simply cannot.

Conclusions and Future Work

I have introduced *Null By Morse*, an artwork based on Morse signaling and smartphone technology, and described how smartphones fit into a continuum of networks that began with optical communication and continued through telegraphy into the 20th century. I have found similarities both in the systems of time-based serial or parallel communication and in the versatility of Morse as a protocol and smartphones as a medium. I have also discussed the creative and practical value in recognizing the tension between innovation and failure, suggesting this both as an avenue for artists to explore and as a realignment of our relationship to technology. Finally, I have described the capacity of slow technology to manifest these facets in experience. This last point I consider to be the metaphorical glue that holds the experience together for audiences in the exhibition space. The slow pace of *NBM* provides a degree of “breathing room” for audiences to reflect on both the evocative nature of the quotes being relayed and the communication process unfolding before them.

The history of Morse and telegraphy in general has proved a rich and productive one for artists and historians. In other work in progress, I am exploring other aspects of this history in ways that I hope will be productive in generating new experiences for audiences and suggestions for interaction design. One particular avenue I am keen to exploit is the physical relationship in which humans, such as telegraph operators, mediated between the domains of human and machine communication, position themselves as a type of secondary interface through which one accesses the connected world.

References

1. Kittler, Friedrich, *Discourse Networks 1800/1900* (Palo Alto, CA: Stanford Univ Press, 1992).
2. Kusahara, Machiko, “The ‘Baby Talkie,’ Domestic Media and the Japanese Modern,” *Media Archaeology: Approaches, Applications, and Implications*, ed. Erkki Huhtamo and Jussi Parikka (Berkeley, CA: Univ of California Press, 2011) 123–147.
3. Huhtamo, Erkki, “Elements of Screenology,” <wroo1.wrocenter.pl/erkki/html/erkki_en.html>, accessed 10 March, 2013.
4. Zielinski, Siegfried, *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means* (Cambridge, MA: MIT Press, 2006).
5. Standage, Tom, *The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century’s On-line Pioneers* (London: Wiedenfeld & Nicolson, 1998).
6. Hobza, Klara, “Morse Code Communication,” <klarahobza.com/work/morse_code/>, accessed 19 January, 2013.
7. Koh, Germaine, “Relay,” <www.germainekoh.com/ma/projects_detail.cfm?pg=projects&projectID=21>, accessed 19 January, 2013.
8. Ibid.
9. Evening Chronicle, “Faint Hearted Art or a Flash of Genius?” <www.chroniclelive.co.uk/north-east-news/evening-chronicle-news/2005/07/14/faint-hearted-art-or-a-flash-of-genius-72703-15736001/>, accessed 19 January 2013.
10. Schmeiduch, Markus et al., “#CPHsignals,” <ciid.dk/education/portfolio/idp12/courses/systems-layers/projects/cphsignals/>, accessed 19 January, 2013.
11. Schmeiduch, Markus, et al., “#CPHsignals,” <ciid.dk/education/portfolio/idp12/courses/systems-layers/projects/cphsignals/>, accessed 19 January, 2013.
12. Arduino, <www.arduino.cc>, accessed 19 January, 2013.
13. Standage, Tom, *The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century’s On-line Pioneers* (London: Wiedenfeld & Nicolson, 1998).
14. Gere, Charlie, *Art, Time and Technology* (New York: Berg, 2006).
15. Kittler, Friedrich, *Discourse Networks 1800/1900* (Palo Alto, CA: Stanford Univ Press, 1992).

16. National Association for Amateur Radio, "Learning Morse Code," <www.arrl.org/learning-morse-code>, accessed 19 January 2013.
17. Standage, Tom, *The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers* (London: Wiedenfeld & Nicolson, 1998).
18. Ibid.
19. "Eye Witness, American Originals from the National Archives," <www.archives.gov/exhibits/eyewitness/flash.php>, accessed 19 January, 2013.
20. Burnham, Jack, "Art and Technology: The Panacea That Failed," *Video Culture: A Critical Investigation*, ed. John G. Hanhardt (Layton, UT: Peregrine Smith Books, 1986) 232–248.
21. Wolff, Michael, "Apple's Rot Starts with its Samsung Lawsuit Win," <www.guardian.co.uk/commentisfree/2012/aug/28/apple-rot-starts-with-samsung-lawsuit-win>, accessed 19 January, 2013.
22. Siegler, MG, "It Just Works," <<http://techcrunch.com/2011/06/08/apple-icloud-google-cloud/>>, accessed 19 January, 2013.
23. Burnham, Jack, "Art and Technology: The Panacea That Failed," *Video Culture: A Critical Investigation*, ed. John G. Hanhardt (Layton, UT: Peregrine Smith Books, 1986) 232–248.
24. Ibid.
25. Murata, Takeshi, <www.takeshimurata.com>, accessed 19 January, 2013.
26. Menkman, Rosa, "Glitch Studies Manifesto," <www.haraldpeterstrom.com/content/5.pdf/Rosa%20Menkman%20-%20Glitch%20Studies%20Manifesto%20rewrite%20for%20Video%20Vortex%202%20reader.pdf>, accessed 19 January 2013.
27. Hallnäs, Lars and Johan Redström, "Slow Technology—Designing for Reflection," *Personal and Ubiquitous Computing*, Vol. 5, No. 3 (2001) 201–212.
28. Ibid.
29. Verbeek, Peter-Paul and Petran Kockelkoren, "The Things That Matter," *Design Issues*, Vol. 14, No. 3, 28–42 (Autumn, 1998).

Bibliography

- Huhtamo, Erkki, and Jussi Parikka (eds.), *Media Archaeology: Approaches, Applications, and Implications* (Berkeley, CA: Univ of California Press, 2011).
- OpenFrameworks, <www.openframeworks.cc>, accessed 19 January, 2013.
- Evening Chronicle, "Faint Hearted Art or a Flash of Genius?" <www.chroniclelive.co.uk/north-east/news/evening-chronicle-news/2005/07/14/faint-hearted-art-or-a-flash-of-genius-7270315736001/#ixzz2I91APiLS>, accessed 19 January, 2013.
- Parikka, Jussi, *What Is Media Archaeology?* (Cambridge, UK: Polity, 2012).