

## CROSSWORLDS

OLGA KISSELEVA

Products of the theory of error correcting codes, electronic tags correct transmission errors, exploit informational redundancy, flirt with order, disorder, and the entropy of information: in *CrossWorlds*, the artistic proposal integrates the concepts of a scientific corpus born post-war under the impetus of Claude Shannon. A true dialogue between art and science is presented here.

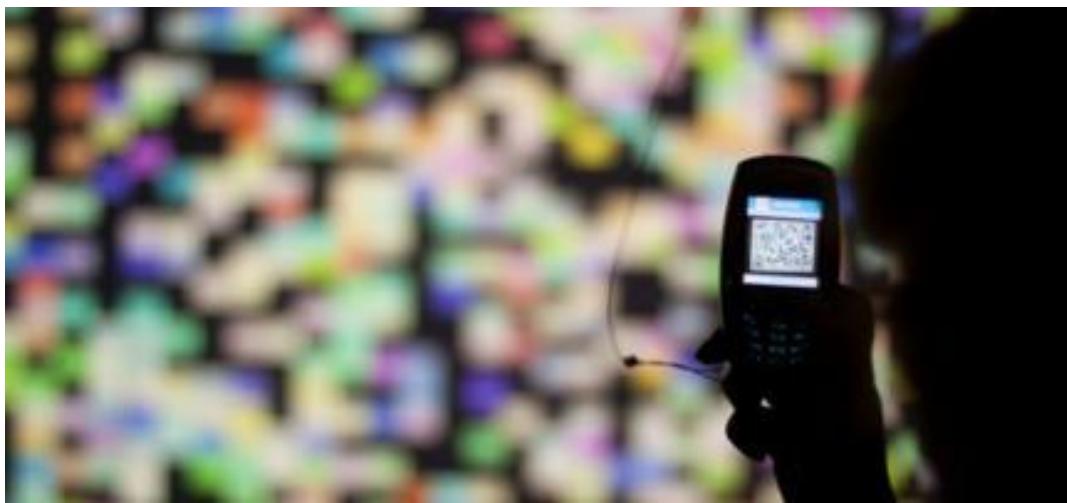
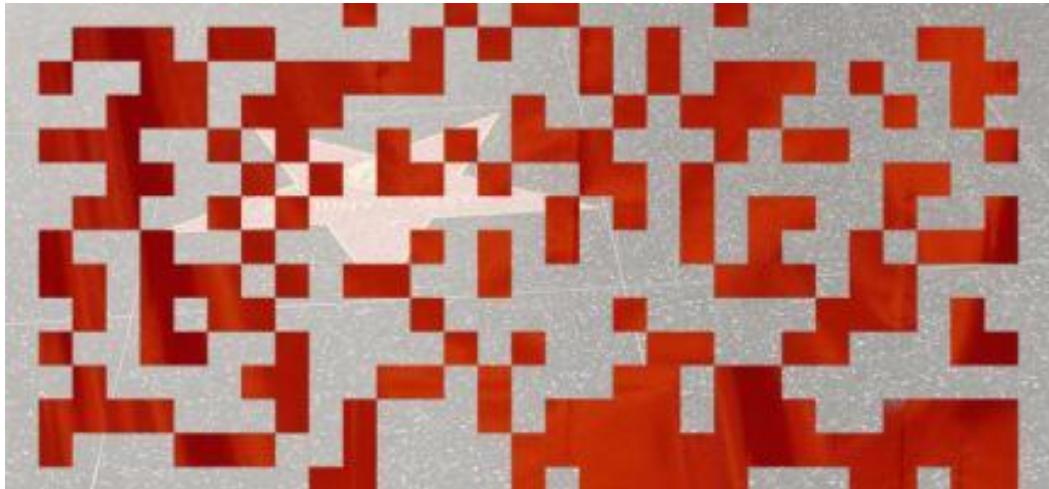


Fig 1. Olga Kisseeleva decoding a 'CrossWorld' with a mobile phone, 2010



Fig 2. "Olga Kisseeleva 'Have you enrolled as a volunteer?' from the CrossWorlds series, 2008



*Fig 3. Olga Kisileva 'Towards the collective' from the CrossWorlds series, 2008*

The advent of the digital communication systems at the end of the '90s generated a major change in society. It is undeniable that this technological revolution profoundly modified the structuring of relationships between individuals on the one hand, and between the individual and the collective (e.g., governments, large companies,...) on the other. Using this fact as a kind of anchorage point, I have implemented an original collaboration between art and science, proposing an innovative development as regards a collaboration between artists and scientific laboratory.

My way of working follows an experimental approach: a discrepancy, detected during a process or in the operation of a structure, leads her to formulate a hypothesis, explaining the observation in question, and as far as possible, to propose a solution to the problem. To do so, she identifies the skills required to carry out the studies and pilots the research. I call upon the exact sciences, on genetic biology, geophysics, or political and social science. I carry out the experiments, calculations and analyses, strictly respecting the methods of the scientific discipline concerned. My artistic hypothesis is thus checked and approved with a strictly scientific method.

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#### CROSSWORLDS: CONCEPT AND OPERATION

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CrossWorlds is presented in the form of a series of electronic tags printed on formica.

This artwork was produced in the context of Transmediale, the theme of which for 2008 was "Conspire": hidden intentions, hidden messages, hidden things... The piece was created in situ at HKW, Berlin (Das Haus der Kulturen der Welt - the House World Cultures).

When entering this place for the first time, one can feel an atmosphere similar to that of the Soviet culture palaces of the Seventies (time when I, then a schoolgirl and member of the Communist youth, had piano and ballet lessons in this type of institution). However, the HKW is not a product of East Berlin. This famous building was offered by the Americans to the town of Berlin as a sign of friendship in the

Fifties, "to mark", to some extent, their territory. As such, slogans of American propaganda were engraved on the walls of the building - in the figurative sense - as testimony of United States supremacy. What is surprising is that this building is similar to those which the Soviets were simultaneously building on the other side of the Berlin Wall.

I was particularly interested in this point, which led me to explore questions related to the similarity between the cultures of the Eastern and Western Blocs at that time.

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#### ELECTRONIC TAGS: FROM FUNDAMENTAL PHYSICS TO THE TECHNOLOGICAL OBJECT

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The electronic tags I use are semacodes, the two-dimensional modern version of the barcodes of the Eighties. Barcodes are omnipresent in the labeling of products or objects (hypermarkets, libraries,...), and are primarily used to ensure the traceability of goods. They are made up of a succession of black bars, the variable thickness of which represents respectively an 0 or a 1. They are, however, more than just a simple technique for the storage of digital information. Barcodes (like the majority of visual codes) are robust in relation to error: they contain informational redundancy, i.e., they contain more information than necessary in order to be able to correct possible misreadings thanks to this additional information (for example, if a bar is not easily readable, with weak contrast, and its thickness is consequently difficult to estimate). Each code has its own performance, which makes it possible to recover original information more or less effectively according to the level of error present.

A datamatrix is a two-dimensional version of a barcode. It's a square of a few square centimetres, made up of juxtaposed black or white pixels (or squares), respectively coding a 0 and a 1. They first appeared in Japan in the Nineties, and were rapidly adopted by the Japanese industry due to their high storage capacity on a very small surface (in particular their capacity to code the kanji of the Japanese language). They are also error correctors: if a zone of the square is blurred, or the level of contrast is weak, and the reading of certain pixels is therefore difficult, the informational redundancy is sufficient to recover the original information as long as the blurred zone is not too large.

The choice of the semacodes (a variant of the datamatrix) for the fundamental base of the work is also an aesthetic choice. The pictogram, which can contain up to 4000 characters, offers a sybilian, cryptic aspect to the eye, which also intrigues one because it is omnipresent in contemporary society, and yet indecipherable without the help of an electronic machine.

In as much as they are error correctors, the barcodes are de facto products of an obsession with security (food or medical safety,...) which increased throughout the Eighties and Nineties and was nourished by our society's growing intolerance of error, and somewhat ambiguous conception of risk (rendered positive when it's associated to innovation and the entrepreneurial, and deplored when it flirts with death - aeroplane accidents, medical errors,...).

The principle of error correcting by redundancy was formalised by Claude Shannon at the end of the Forties in his article "A Mathematical Theory of Communication". Humans have their own mechanism of redundancy which enables them to communicate even under difficult conditions of transmission (ambient noise,...) for a long time: either quite simply by repeating the same sentence several times (collation mechanism), or by adding information another way (gestural), or finally by using contextualisation to decode the information (a word's missing in a sentence, but the context enables us to guess what it is).

In this last case, it's our culture, and our language, which enables us to recover information by contextualisation.

Semacodes are displayable as a two-dimensional matrix of black or white pixels. The visual analogy between semacodes and spins (models from quantum physics, like the Potts or Ising model, and intended in particular for magnetic materials) led me to explore the conceptual similarities between the physical model of spin networks (which has been studied for several decades, and which constitutes the paradigm of statistical physics) and the eminently contemporary technological object that is the semacode, further.

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#### ELECTRONIC TAGS: THE ARTISTIC APPROACH AND THE TECHNOLOGICAL OBJECT

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As an artist, I became interested in electronic tags for two reasons. The first approach was formal: she found this geometric form composed of small squares, enthralling from an aesthetic and a semiological point of view. The duality is present in each tag: black/white, dark/light, zero/one. Each time, the tag is like a path to be found in a maze, an enigma to be solved, a truth to be defined. I was seduced above all by the positive Cartesian side of these objects.

But, if the tags have a tempting appearance, from a social or political point of view they also have an alarming dimension. Often invisible, due to their small size, they are omnipresent in the urban landscape, public and private spaces, in the underground, on advertising posters, magazine covers... They differ from the barcodes that one finds on products for sale in supermarkets, in that semacodes are decipherable with a simple mobile phone equipped with a camera and necessary decoding programme (rather than a sweeping laser scanner). Once decoded, the message "enters" the telephone.

All kinds of messages can be adapted to tag technology: simple texts, or more complicated informational structures, such as an Internet address (URL), a hypermessage (sound, image or video), even an order which the telephone will carry out. In practice, when one goes past an advertising poster in the underground with one's telephone on and directed towards the poster, a message "jumps" automatically into one's telephone, inviting one to connect onto the site of the mark in question and buy the latest promotions or the latest models of the range. All one has to do is click on "OK".

We are, in fact, becoming increasingly manipulated by this technology. We have less and less choice: it's binary, between clicking on "OK", and not clicking. All the rest has already been prepared, the path has been paved.

I first came across electronic tags in 2006 during my exhibition at the Guggenheim museum in Bilbao. The project introduced the urban signalling used by people with a minor mental handicap to move around the city, into the museum territory. In several parts of the town of Bilbao where difficulties of displacement or orientation could arise (bus, street, crossing, etc...), electronic tags were present to help them by bringing them the necessary information. The handicapped were to some extent radio-controlled through the city by such tags. It was surprising to note how the handicapped people recovered the faculties of "normal" people thanks to this technology. And in fact, the non-handicapped people became almost handicapped by being inordinately assisted by this multi-media technology.

Obviously, it echoed Soviet propaganda technology used in the USSR, which hammered slogans from dawn to dusk, in nurseries, factories, and at home, that one should adhere to, such as: "do not stray

from the collective”, “love your fatherland”, “every day the lives of the Soviet people are increasingly happy.” One realised in the USSR that another kind of propaganda was being hammered on the other side of the iron curtain, but with a different set of values. When one looks more closely at the slogans of American propaganda, one realises to what extent they are close to Soviet propaganda (in particular when translating Soviet slogans into English, one can see how the same words are used). For example the very Soviet “the dreams of the people come true” is astonishingly close to the American “what the people believe is true”.

Each tag is composed of two images: one from Soviet propaganda, the other from American propaganda. Each time, one of the images plays on the black, the other on the white, and together they make up one of the slogans, Soviet or American. When looking at them, one can note a real similarity between the two images, for example between the faces of the Ukrainian dancers, and the faces of Hollywood actress, or more specifically, between Marilyn Monroe's face and that of Lubov Orlova (Russian actress who was the star in all Soviet films at the same time); one is under the impression that it's the same face. When one presents these two images to Western spectators, they think it's Marilyn Monroe's face shown twice. But it is not only a question of faces, but also of common symbols: in one of the tags one can see the red flag brush with a fragment of the floor in the Hall of Famed in Hollywood, with the same stars in the shape of a star personality.

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#### INTERACTIVE INSTALLATION

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An interactive CrossWorlds was produced in collaboration with quantum physics laboratory.

By inventing a computer programme which produces semacodes on the go when connected to the Internet, I wanted to divert the semacode from its primary technological function. The programme generates semacodes the original white and black electronic tag pixels of which change colour at regular intervals to ones which remind one of the “flashy” look related to the disco music period at the start of the '80s. This aesthetic choice is not random. The period also symbolizes the advent of perestroika and the East-West detente, and when the Berlin Wall were omnipresent in the political and artistic discourse in the West.

A true semacode does not fluctuate, the pixels do not change colour, the black/white opposition is thus disturbed here by an absurd colour setting, which doesn't contribute anything to the informational level, and even blurs the tag by reducing its contrast. The colour setting, in addition, is random; the choice of colour is produced randomly from a pallet of sixteen colours chosen for their saturated aspect. It is, in fact, a perfectly reproducible chance process, created by a computer program called “pseudo-random generator” which produces in a deterministic way, i.e., predictable and reproducible, a succession of numbers between 1 and 16 which have no apparent correlation between them. This absence of correlation is what makes the succession of numbers seemingly unpredictable, and therefore fittingly random. Following the example of radio operators used by the intelligence services of the former Eastern Bloc to jam and prevent the reception of television programmes produced by Western tv channels, these semacodes jam and thus access to the political message contained in the tag is more difficult. The exhibition visitor, provided with his or her mobile phone and an ad hoc decoding software, is therefore sometimes surprised that he or she cannot decode the message if chance happens to contribute to the situation by significantly modifying a majority of pixels.

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## CONCLUSION: ART&SCIENCE BASED WORK AS A NEW PERSPECTIVE OF CONTEMPORARY ART

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The last two centuries have shown how much researchers, engineers, and scientists have had the capacity to change in the society in which they live, and which they've exerted via a process generally consisting of creating a filament (a new theory, technological invention), or suspending themselves from an existing filament and creating more or less rebellious ramifications of it. The researcher cannot not be responsible. The desire to address such a responsibility becomes more and more pressing over the process of his or her process of maturity.

Art&Science approach concentrates on destabilizing, and taking a certain amount of distance from, the daily practice of research, while taking a fresh look at past work; at the sensitive, laughable or provocative dimensions of the work, which are also fundamental, in that they can constitute a catharsis.

By analysing scientific theories since the second world war, it appeared to me that the theory of information was probably the most disturbing, stimulating, shocking and destabilising to have appeared in the 20th century. In the ultradigitalised information and knowledge-based society, in which the desire for hypercommunication is the rule, it seemed essential to us to propose that one reflect on the significance of this communication and on the structuring of the information implied within it. For the researcher, there is, naturally, a quest for meaning related to the societal implications of his or her work.

Art&Science research upheld by CrossWorlds, and the firmly interdisciplinary character of this approach, has enabled me to provide a resonance to this work that is scientific, aesthetic and political. CrossWorlds has quite naturally given rise to the concept of informational resilience: resistance to censure, propaganda or truncated information, the fundamental role played by the redundancy in this resistance, multiplicity of channels of access to the information, intransigence to error or to jamming. Such key points will be refined, disclaimed, and put to the test, in future work.