

the comprehension of the whole process you needed the correspondent knowledge in physics and chemistry. So principally the process still could be managed.[3]

Finally the computer marks the end of a holistic understanding of the imaging process by a single person.[4] So creating images implicates the participation of a complex system of interaction between experts and machines. It has to be taken into account that a steady staff of at least 50 specialists is needed to run an observatory like Paranal (ESO/Chile). This is not only a quantitative but also a qualitative change of complexity. Referring more to military techniques Paul Virilio talks about a change from passive to active optics.[5]

So imaging became a system of machine and man. To stress this interplay of human imagination and machine I use the notion of "imachination". The point of the imachination is not to oppose man and machine but to see them related in a steady exchange.

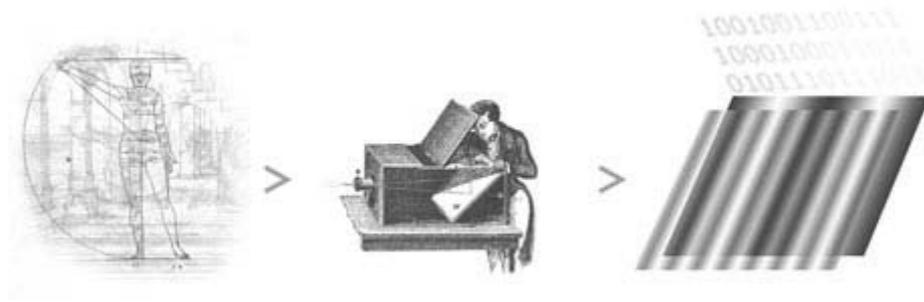


Fig. 1. history of imachination: a history of rising interplay of human imagination and machine

The history of imachination is not only a development of interplay between man and machine but implicates also a rise of formalization and mathematization of space. This process began with the application of the central perspective in the middle ages. This tradition of formalization of space was continued and automatized by photography. The completion of this process is the computed image pixel or vector, just mathematical coordinates with colour values, a pure *res cogitans* without extension.

Vilém Flusser [6] draw the conclusion that the power of the images belongs now to them sitting at beginning of the imaging chain. It is evident to say that informatics play a decisive role how an image output results, because they know how to treat the codes of formalized images. Nevertheless I can't follow Flusser who says that therefore the information sciences have taken over the power. This still reflects the classical monopolistic view in imaging politics of a Renaissance artist, which assumes that the image monopolist overlooks the whole process. But this is definitely not the case in the imachination. Imachination finally means a network like [7] imaging with doesn't know anymore a king discipline in imaging!

The concept of imachination has severe consequences for the conception of the work in sciences. E.g. following this concept of imachination it is no accident but just a necessity that a new kind of communication, the World Wide Web, was invented at a physical mega institution like the CERN. [8]

So imachination means a complete new kind of image and the understanding of its creation.[9] Imachinations are no inventions by a single congenial subject but a collective pictorial product joining machine interaction and a broad spectrum of transdisciplinary knowledge. "The experimenter is not one person, but a composite." [10]

CHALLENGES AND CHANCES OF IMACHINATION

Challenges

In fact the imachination jeopardize the image competence of the arts (and the humanities as well). The arts have to become aware of not being anymore the king discipline in imaging. It implicates to rethink notions like imagination, creativity etc. which is a challenge for the traditional self comprehension of each artist.

There are several strategies for the arts how to react. One is to avoid the implications of imachination for example by:

- narrowing the pictorial concept that excludes the imachination (e.g. modernism)
- relativating the pictorial content (e.g. pop art)

The second strategy is to accept the challenge. A guideline how to face the new technologies is given by the text about the objectives of this workshop:

Artists, wanting to explore space on their own artistic terms, often must become very knowledgeable about the utilization of space technologies, materials, mechanisms and procedures in order to develop feasible art works and

projects as such projects are subject to the same conditions and regulations governing scientific experiments designed for space.

Following this objectives the knowledge is a categorical must for the arts and humanities working with new scientific technologies. Knowledge is the base to approach the complexity of imachination. Above all communication is an essential part of sciences. Without a minimal understanding of the scientific issues a dialogue between artist and scientist is just impossible. The attempt of understanding is also question of respect: The artist has to keep in mind that working with scientists means to work with a collective of highly intelligent people.

Chances

Working in a scientific context not implicates a complete capitulation of the arts. There are also a lot of chances and possibilities for artistic approaches. In the context of imachination art may play a role as:

- research in images: An artist still is an expert for a long pictorial tradition which can be compared with new technologies and methods.
- reflection of sciences: The arts may sensitize the sciences for this long pictorial tradition which may help to reflect the scientific approach to images. Furthermore the arts can show that the imachination not freed sciences from subjective aesthetical criteria.
- mediation in a pictorial dialogue: The high division of labour results in a fragmentation of different pictorial concepts. Art can ask if the different disciplines still talk about the same thing if they speak about images. As a medial decathlete art can mediate and create common platform to discuss this question.

PART II-

TWO APPROACHES

In the second part I will show two approaches to the imachinative aspects of the sciences. The first project presents a simplified model to discuss the nature of digital images. The webbased projected is also an attempt to discuss the concept of imachination with the different members of the imaging chain.

The second project is a formal play with the edges of contemporary scientific vision machines.

100 DAYS – 100 IMACHINATIONS–

The first time the “100 Days – 100 Imachinations” took place for 100 nights parallel to documenta 11 on the campus of the University Kassel in the form of a digital projection. On the screen of 9 by 11 meters every evening a different image appeared, that a projector received by a special program via internet. Because of its immaterial home in the World Wide Web the image could appear also in other places but in different contexts and medial forms. So the Imachinations appeared at the same time in a gallery in Munich.



Fig. 1. daily changing, digital projection of 9 by 11 metres parallel to *documenta* at the University of Kassel/ Holländischer Platz 8 June - 15 September 2002

The Imachinations are not only a research for the location and immateriality of images, but they work also with the simplest form of complexity: the overlay of only two different structures, in this case two wavelike scaled patterns. The quality of the project is that it can't be subordinated by only one medium. It is an internet project, it is painting, it is light art and it is an exploration on the nature of the notion of image, imagination and imachination used in science and the arts.

The WWW is not only used to show an image simultaneously elsewhere, but as an interface it links relating to that common ground of imachination places - mainly institutions from the arts, science and information technology. In 2003 the Imachinations were presented for the first time in a scientific context on an arctic research station at Spitsbergen and during a large imaging symposium at the Institute for Simulation and Graphics at Magdeburg/Germany. In 2004 the Imachinations will be presented among others at the ZKM Karlsruhe (Center for Art and Media Technology) as a backprojection in a big glass cube architecture.

The Imachinations not only propose a model about the implications of contemporary imaging. They also do want to explore the experiences made by the imaging avant-gardes. The melting pot of those different experiences made with imachinations by the project partners is the "reactive zone". There the visitor of the project site can find growing interview collection with the imaging avant-gardes from different disciplines. The dialogue with the chain members wants to bring light in how the imaging chain is linked together.



Fig. 1. the "reactive zone" of www.imachination.net/next100

This kaleidoscope of different pictorial conceptions is the playfield of the Imachinations. They want to explore those various views. The dialogue with the chain members wants to bring light in how the imaging chain is linked together. E.g. a conversation with Andreas Glindemann, the head of the VLT Interferometry Group (ESO/Garching), revealed how different conceptions meet: "For me as a physicist the abstract raw images of the VLTI are a normal pictorial result. But the astronomers still have to get used to this kind of images. For them they are too much abstract. They don't want see scales which describe only a single pixel, they do want to watch pictures." [11]

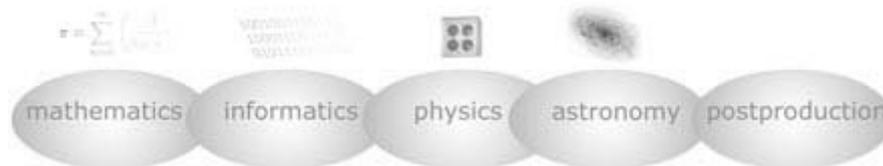


Fig. 1. scheme of the imaging chain in astronomy

I SEE WHAT I SEE NOT –
(plot of the DVD presentation, 6, 5 minutes)

Close to the Lenbachhaus at Munich the Communication Group Serviceplan has the world's first facade, which can be fashioned via internet. Using a specially designed software, the color of 76 light panels spread over 63 square meters can be changed from anywhere in the world.



Fig. 1. the Art Façade in Munich with detail from WMAP
76 light panels, 9 by 7 metres, 12 November 2003 – 31 March 04

For me, the art facade represented a formal challenge. The basic question was whether it would be possible to show something that still could be called a picture, on an area, which consists solely of 10*10 picture elements. I decided to explore the images of astronomy and elementary particle physics. In these advanced disciplines already few pixels detected by the image sensors can refer to an astronomical object or a subatomic particle.

So the the art facade changed into a cosmic matrix showing the most advanced results vision machines out of astronomy and elementary particle physics. This light game on the art facade becomes so a walk on the retinas of the extreme sciences, that investigate the most distant and next boundaries of the cosmos.

I go herewith on cloth contact with receptions out of the different spectral, of terrestrial super telescopes or satellite based detection devices. In the subatomic area I grasped on current pictures of the large particle accelerators. Zooming in the images on the pixel level the edges of visibility of the contemporary imaging apparatuses are revealed.

SN1997ff – The most distant supernova

This pixel trip becomes a double game between visibility and invisibility. The simple-minded eye sees in the picture like here in an image made by the Hubble Space Telescope of the most distant supernova except a couple of red and white pixels, nothing. Without the corresponding background knowledge, the phenomena remain invisible. For the scientist such a navigation always implements a boundary gear between machine produced visibility and invisibility of the phenomena.

WMAP- the echo of the big-bang

The images of the cosmic background radiation made by the Wilkinson Microwave Anisotropy throw a look back 379,000 years after the big bang. The different colors indicate minimal temperature variations. Behind the "light curtain" of the cosmic radiation shifted into the spectrum the microwave can't be looked.

The movement of the shown sequence is driven to a certain extent by the WMAP-picture itself. For the presentation at the art facade a cellular automata was simulated to define the movement of the image frame.

Goldcollision at the STAR collider

In the particle accelerators one takes to a certain extent the attempt to look behind the light curtain of the cosmic background radiation creating conditions that ruled solely fractions from seconds after the big bang. In this sequence, the spectator follows the flights paths of the particle shower of one the first full energy collision of gold ions, received through the STAR collider on Long Island.

The artistic intervention exists among other things therein that pictures from the opposed ending of the cosmic scale are presented together at the art facade. The spectators perception is challenged by a pixel shower, that can't be distinguished formally hardly in closely and distant

Redshift 6.4 Quasar – one of the oldest images

The images from the Sloan Digital Survey (SDS) show the presently most distant quasar that was discovered ever.

One can name this game even a metaphysical: with just a couple of colorful picture elements, the oldest pictures speak to the spectator. The eons that these pictures hiked through the universe refer not only to the infinity and eternity of the space, but rather also to the big nothing this distant light information has passed.

Achernar –sharpest look up to the sky

The "Very Large Telescope Interferometer" will be able in the future to superpose the pictures of up to 4 telescopes. This overlay of the light beams of several telescopes creates a type of virtual super telescope. The raw pictures shown at the art façade own a certain charm of concrete art. The final graphic results of the VLTI created by an overlay in the Fourier space oscillate between virtuality and hyperreality.

The portal

The project was accompanied of an abundant investigation and an intensive dialogue with researchers from astronomy and physics. A further result of the project is a portal explaining the approximately 20 shown images and providing a broad range of background information and linked pages.

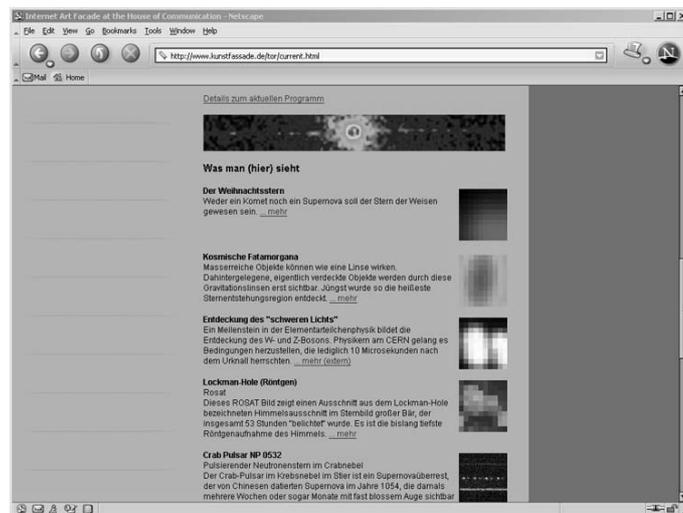


Fig. 2 the portal of www.kunstfassade.de

References

- [1] In this context the epigraph of "Image an Logic" is remarkable. Galison, Peter: Image and logic – a material culture of microphysics, Chicago 1997
- [2] Still 100 years ago there existed an imaging chain in astronomy. The author describes the aesthetical implications of the communication between the Lick observatory and the heliogravure studios, between production and postproduction. Soojung-Kim Pang, Alex: "'Stars Should Henceforth Register Themselves': The Rhetoric and Reality of Early Astrophotography." British Journal for the History of Science, 31 (1997), 177-201
- [3] Josef Maria Eder probably was the last person having a holistic understanding of imaging techniques at the outgoing 19th century. Eder, Josef Maria: Ausführliches Handbuch der Fotografie, 4 Teile (1891-96), Halle a. S. 1922
- [4] Demchak demonstrates the organizational problem of machination in military organizations. Demchak, Chris C.: The power of the Phenomen, in: C.D.: Military Organizations, Complex Machines, Itahaca, NY 1991.
- [5] Virilio, Paul: La machine de vision, Paris 1988
- [6] Flusser, Vilém: Für eine Philosophie der Fotografie, Göttingen 1983
- [7] Flusser, Vilém: Vom Subjekt zum Projekt. Menschwerdung, Frankfurt 1998
- [8] Gillies/Cailliau: How the Web Was Born. The Story of the World Wide Web, Oxford 2000; Berners-Lee, Tim; Fischetti, Mark (Contributor): Weaving the Web, the Original Design and Ultimate Destiny of the World Wide Web, San Francisco 1999
- [9] The naming of Chapter 6 is meaningful: "The Electronis Image: Iconoclasm and the New Icons". Galison, Peter: Image and logic – a material culture of microphysics, Chicago 1997, pp433-552
- [10] Thorndike, Alan M.: Summary and Future Outlook, in: Shut, R.P (editor) Bubble and Spark Chambers: Principles and Use, New York 1967, pp. 299-300; quoted from: Galison, Peter: Image and logic – a material culture of microphysics, Chicago 1997, pp. 431
- [11] Andreas Glindemann in a first unpublished interview with Tim Otto Roth (August 2003). A second interview from December 2003 is published online: www.imachination.net/next100/reactive/knowledge.html