Foreword

Foreword and Acknowledgments

Bernhard Serexhe

The question "Are you born digital?" may well soon become all-important with respect to conserving and thus preserving the art of our times for future generations. In the certainty that such conservation and accessibility is both necessary and reasonable, and in the uncertainty about whether, and how, this is best implemented, the research project *digital art conservation* was launched in 2010 at the ZKM | Center for Art and Media Karlsruhe. Three volumes in three different languages now seek to disseminate the results of the project to all those with an interest in the subject.[1] The primary task of this research project was to understand the conditions under which conservation of digital artworks in collections takes place or, alternatively, not. Further, the project's aim was to test and propose strategies for future conservation measures.

Because the apparently unlimited possibilities of the digital are frequently presented as aids and remedies to analog culture, it must be made clear from the outset that the project *digital art conservation* has nothing to do with the digital conservation of art in general, namely, with conservation by means of digitization, but with the conservation of digital artworks. In other words, the conservation of art which was subject to digital codification during its production process, or which is already tied to digital processes with its original presentation equipment. The general problem touched upon here, namely, the preservation and handing down of the genuine digital culture of our time to future generations, is destined to become a decisive question for all culture institutions in the twenty-first century, irrespective of whether they uphold the standards of traditional values, operationing structures, and objectives, or themselves seek to be part of the avant-garde of technological progress.

The project *digital art conservation* was initiated at the ZKM | Karlsruhe in response to the urgency of this issue, so fundamental to digital art, and it was carried out in collaboration with five other regional partners. In keeping with its objective to develop conservation strategies and, within the context of international exchange to test these for meaningfulness and feasibility with curators and conservators, public museums and private collections, the value categories of the traditional ethics of conservation should be measured against the actual possibilities of digital art conservation. In the evaluation

1 ***Digital art conservation*** **was chosen as the short, internationally understandable title. The project's official title is *Digital Media Art in the Upper Rhine Valley. Conservation – Restoration – Sustainability*, and in French it is *L'Art numérique du Rhin supérieur. Conservation – Restauration – Pérennisation*.**

of various strategies, the much-vaunted "authenticity" of the digital work should not be hastily sacrificed to the existing or apparent pressure of technical innovation, nor should the legitimate desire for the preservation of this "authenticity" lead to the work's disintegration as a result of technical failure. The generally acknowledged insight that digital media art frequently has a performative and thus ephemeral character, and that the conservation of its technical functionality, in other words, its behavior, can best be guaranteed by the constant adaptation of its technology to respective "performance situations," should in no way lead to abandoning the recognizable historical origins and classification of the work. And neither should the works be "improved" technically or aesthetically. They should retain their original work character, behavior, and aesthetics for as long and as faithfully as possible, and in doing so be testimony to the epoch and the conditions in which they were created.

Recognizing that up to now theory and practice are inadequately developed, from the outset the project *digital art conservation* consciously rejected any development and euphemistic announcement of guidelines and ideal solutions – in view of the fact that time is now running out for conserving many works of digital art. All the contributing partner institutions were, and are aware that the theoretical and practical groundwork must be established on which future teaching and practice in conservation is structured.

With these considerations in mind, the following objectives and sections of the project were identified; the details are elaborated in the reports in individual chapters of the publication: identification of digital works in the collections in the Upper Rhine region; completion of ten case studies on the works selected; interviews with the artists; organization of two international symposia of experts; integration of the project's objectives into courses at two art academies (Strasbourg and Bern); development, production, and organization of the touring exhibition *Digital Art Works. The Challenges of Conservation*[2] at four locations within the area covered by the project.

The compilation of digital artworks held in collections within the Upper Rhine region was carried out by the partners in the respective areas, and the two symposia provided the opportunity for critical expert and interdisciplinary investigation and exchange between the partner institutions. At the symposium *The Digital Oblivion. Substance and Ethics in the Conservation of Computer-based Art* (Karlsruhe, November 4–5, 2010) theorists and curators discussed

2 **ZKM | Center for Art and Media Karlsruhe (Germany), October 29, 2011–February 12, 2012; Espace multimédia gantner Bourogne (France), February 25, 2012–April 28, 2012, CEAAC (Centre Européen d'Actions Artistiques Contemporaines), Strasbourg (France), and École supérieure des arts décoratifs (ESADS), Strasbourg (France), June 16, 2012–September, 23, 2012; House of Electronic Arts Basel (Switzerland), January 18, 2013–March 31, 2013.**

the impact of the current systemic change in cultural memory on temporal and historical consciousness, and on the image of self and world in the digital age. Questions relating to the transformed temporality and materiality, the reevaluation of documentation and archiving, as well as the development of methodology were discussed in connection with the conservation of digital art. At the symposium entitled *Digital Art Conservation. Practical Approaches: Artists, Programmers, Theorists* (Strasbourg, November 24–26, 2011) artists, programmers, and theorists engaged with issues relating to conservation practice encountered both in their own experience as professionals as well as in the project's case studies. The discussions and formation of opinions at both symposia were not confined to a treatment from strictly scholarly perspectives, but also incorporated interdisciplinary approaches ranging from ethical, artistic, and curatorial to practice-related issues. In their approach and diction, the essays included in the publication mirror the variety of expert backgrounds of the speakers.

To guarantee compliance with existing laws when applying conservation measures, at the beginning it was important to deal with the legal questions pertaining to conserving genuine works of digital art. For this we owe a special debt of thanks to the project partners at the Center for Applied Legal Studies (ZAR) and Institute for Information and Business Law (IIWR) at the Karlsruhe Institute of Technology (KIT) under the direction of Professor Thomas Dreier.

For the organization of the exhibition *Digital Art Works. The Challenges of Conservation* (see pp. 520–563), the project partners would like to thank Espace multimédia gantner Bourogne (France) under the direction of Valérie Perrin, and Vidéo Les Beaux Jours under the direction of Marie-Michèle Cattelain and project management of Catherine Mueller, as well as the CEAAC (Centre Européen d'Actions Artistiques Contemporaines), Strasbourg (France), under the direction of Evelyne Loux and, finally, the House of Electronic Arts Basel (Switzerland) under the direction of Sabine Himmelsbach.

All project partners would also like to express their thanks to the employees of the INTERREG administration in Strasbourg, as well as to all members of staff at the respective partner institutions. The project partners thank the lecturers at both symposia, and the authors of the present publication for their contributions, as well as the ZKM | Karlsruhe publications department for the editing, coordination, and successful completion of this publication.

We are particularly grateful to Arnaud Obermann, who, as an outstanding conservation manager himself was responsible for directing the project's conservation enterprises, including the implementation and coordination of the case studies. Great thanks are owed to Chiara Marchini Camia, who assumed

responsibility for the weighty task of coordinating this research project, and who mastered it with utmost dedication. Arnaud Obermann and Chiara Marchini Camia also collaborated as cocurators in developing the exhibition *Digital Art Works. The Challenges of Conservation*.

The research project *digital art conservation* is a joint venture of the following institutions:

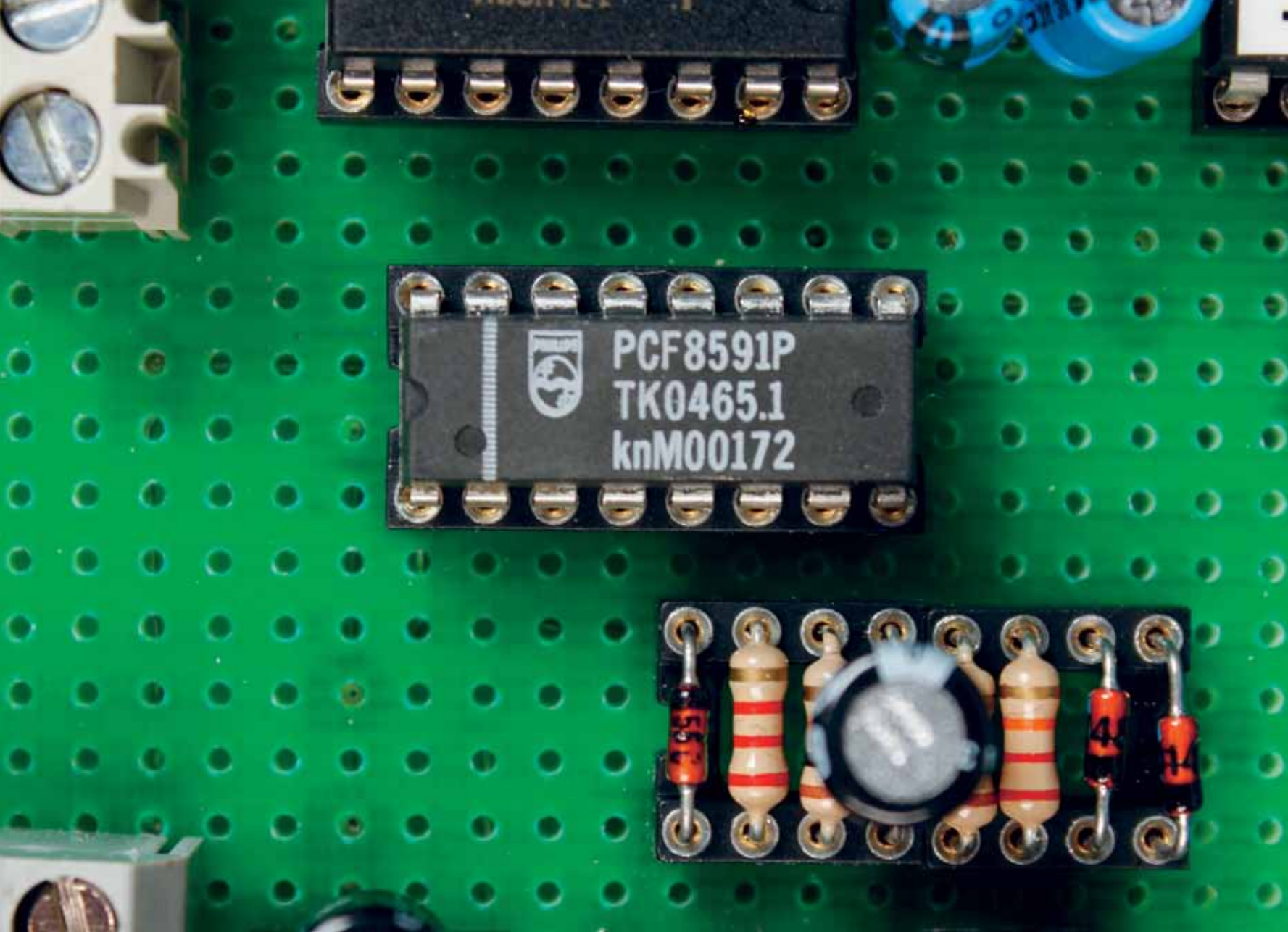
Project Direction
ZKM | Center for Art and Media Karlsruhe (Germany)

Project partners
École supérieure des arts décoratifs (ESADS), Strasbourg (France)
Espace multimédia gantner, Bourogne (France)
Vidéo Les Beaux Jours, Strasbourg (France)
Bern University of the Arts (BUA) (Switzerland)
House of Electronic Arts Basel (Switzerland)

Associated Partners
La Laiterie, Le Festival des Artefacts, Les nuits électroniques de l'Ososphère; all located in Strasbourg (France)

The project was cofinanced as part of the funding program INTERREG IV Upper Rhine by the European Union – European Regional Development Fund (ERDF). The project running time was 36 months, from January 1, 2010 to December 31, 2012.

Translated from the German by Justin Morris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knM00172

Case Studies

Herbert W. Franke
Hervé Graumann
JODI
Marc Lee
Nicolas Moulin
Michael Naimark
Nam June Paik
Samuel Rousseau
Antoine Schmitt
Jeffrey Shaw

Michael Naimark
Karlsruhe Moviemap
1991
Interactive installation
Installation view
***Digital Art Works. The Challenges of Conservation*,**
ZKM | Media Museum
Photo © ZKM | Karlsruhe
Photo: ONUK

Michael Naimark (*1952, Detroit, USA)
Karlsruhe Moviemap
1991, 2009

ZKM_Collection, Karlsruhe

Hardware:

Version 1991 (original)
- **Apple Macintosh IIsi (Mac OS)**
- **Apple Macintosh Portrait Display**
- **Laser disc player Pioneer LD-V8000**
- **Video projector**

Version 1991 (condition 2006)
- **Apple Power Mac G5 (Mac OS)**
- **TFT monitor**
- **Video projector**

Version 2009 (reinterpretation)
- **PC (Linux)**
- **Touch screen**
- **2 video projectors**
- **Silver screen**
- **Polarized 3-D glasses**

Software:

Version 1991 (original)
- **In-house development (Christoph Dohrmann)**

Version 1991 (condition 2006)
- **Development environment Max/MSP (Matthew Biederman)**

Version 2009 (Reinterpretation)
- **In-house development (Martin Schmidt)**

Conservation Strategies:
- **Migration**
- **Reinterpretation**

Documentation:
- **Esther Neumann**
- **Arnaud Obermann**
- **Claudia Röck**

Conservation Concept and Conservation Measures:
- **Mirco Fraß**
- **Daniel Heiss**
- **Christian Nainggolan**
- **Arnaud Obermann**

Text:
- **Chiara Marchini Camia**
- **Esther Neumann**
- **Arnaud Obermann**

The interactive installation *Karlsruhe Moviemap* (1991, 2009) simulates a street-car ride through the city of Karlsruhe. This work had already been the object of different conservational measures prior to the beginning of the *digital art conservation* project. The objective of the first series of measures, which can be termed the strategy of migration, was to preserve the original work of 1991. The result of the second conservational intervention, which involved a reinterpretation, was completely new and, with respect to appearance and functionality, a version of the work which differed significantly from the original. Over the course of the case study, earlier conservational measures were documented and further steps for the work's conservation initiated.

Work Description

The original version of the *Karlsruhe Moviemap* was produced in 1991. In 2009, a reinterpretation (see glossary, p. 601) of the work was completed on the initiative of ZKM | Center for Art and Media Karlsruhe, which was realized on the basis of the original concept, but represented as a more up-to-date and modified version of the installation.

In the first version of the work, the viewer operates a control switch mounted on a base in a dark room to control the sequence of images projected, which reproduce the view from a streetcar driver's cab. Throughout this virtual journey through Karlsruhe, the streetcar can be steered forwards or backwards, and at junctions to the left, to the right, or straight ahead. On a small CRT monitor (see glossary, p. 599) next to the control switch on the imitation control panel, viewers can see their position on the streetcar network.

For the original version of the *Karlsruhe Moviemap* the recordings for the projection were produced using a 16 mm stop frame camera, which was mounted on a special streetcar that drove up and down the entire network in both directions. The camera was connected to the streetcar's hubodometer and, depending on the location, it took a photograph every two, four, or eight meters. Although the projected pictures appear to be in time with the driving speed as controlled by the viewer, their sequence is fixed. Only one picture exists for each point of the streetcar network, and this same image is

Michael Naimark
Karlsruhe Moviemap
(reinterpretation)
2009
Interactive installation
Installation view *Digital Art Works. The Challenges of Conservation*,
ZKM | Media Museum
Photo © ZKM | Karlsruhe
Photo: ONUK

displayed each time the viewer passes this point during the virtual journey. Thus, the surroundings, passers-by, car drivers, and light conditions are always the same. The journey around the streetcar network shown does not occur in real time, as might be the case in a computer game, even though the controllability of the filmed images seem to suggest this.[1] The *Karlsruhe Moviemap* is actually a film where the sequences can be called up by a viewer in the selected direction (forward, backward) and speed, but only within the given route of the streetcar.

The second version of the work, which was realized in 2009 by the ZKM | Institute for Visual Media is stereoscopic. For this reinterpretation of the installation, the streetcar network of the Karlsruhe transport system (KVV) was completely reshot, this time with two digital cameras. By means of a dual projection and the use of polarized 3D glasses, a stereoscopic perspective of each view of the streets of Karlsruhe emerges. This effect is ideally experienced directly at the driver control panel from a central position in front of the projection screen. Also due to the high-resolution digital recordings, the experience is much more immersive than in the first version of the work. Apart from the new HD recordings and the stereoscopic projection technology, the new version also distinguishes itself from the old one because an original driving switch from a streetcar now serves as the user interface, and a given position of the streetcar within the network is represented by means of an interactive city map on a touchscreen. From the point of view of conservation this version of the work is a reinterpretation, which is based on the concept of the 1991 version but with respect to content – the original footage – and the general appearance of the work, clearly deviates from the original.

Art Historical Context

Michael Naimark has worked at the interface of media-technology and artistic research since the 1970s. The main focus of his work is on the development of technology for spatial representation. He gained his BSc in 1974 in cybernetic systems at the University of Michigan and, in 1979, an MSc in Visual Studies and Environmental Art at the Massachusetts Institute of Technology (MIT). At MIT's Center for Advanced Visual Studies (CAVS), as a student of Otto Piene Naimark focused initially on developing rotating projectors which would imitate the movement of the film camera at the moment the image was recorded. Next, he joined the research group within the Architecture Machine Group, directed by Nicholas Negroponte, which was working on the *Aspen Moviemap* (1978–1980): Michael Naimark was primarily involved in capturing 54,000 photos of the city of Aspen, which were taken during innumerable car

1 During the guided tours through the ZKM | Media Museum it has often been observed that the installation arouses the expectation in visitors that the streetcar journey – much like a computer game – can be influenced in real time.

Open console of the installation *Karlsruhe Moviemap* (version 1991) The components originally used are easily identifiable: the Apple Macintosh Portrait Display (above), the Apple Macintosh IIsi and the Pioneer laser disc player LD-V8000 by (below). Photo © ZKM | Karlsruhe

of Matthew Biederman's work on it at the ZKM | Karlsruhe, from 2006 onwards the *Karlsruhe Moviemap* had changed considerably. After this intervention was completed (which will be described in more detail below) no further documentation was produced, in spite of the fact that the installation was constantly on show at the ZKM | Media Museum.

The state of the work when the research project began in 2010 was ruled as the starting point for further research. In spite of the existence of components of the original version of the work as well as information carriers, it was not possible to reconstruct the in-house history of the installation in its entirety. During compilation of the documentation for this project, all components of the installation (state in 2006) were inventoried. After creating a disk image (see glossary, p. 600), the files necessary to the integrity of the work, such as the embedded video file *VBKjpeg*, could be analyzed in QuickTime container format (MOV format), and added to the documentation.

In addition to recording media type, storage position, file size, and file extension, further information about files could be acquired via freeware (see glossary, p. 600) MPEG Streamclip[12], for example, the screen frame rate (29.97 fps; corresponding to the NTSC standard), the screen size (640 × 480 Pixel), and the Codec (SheerVideo) used to create the file.[13]

Conservation

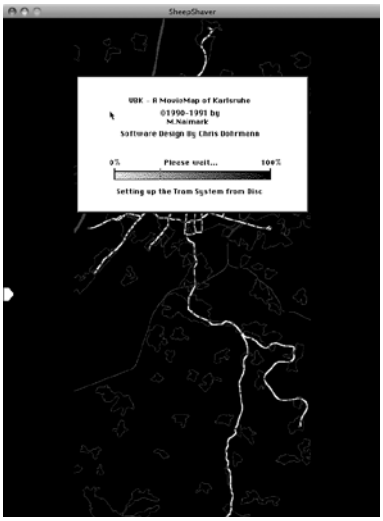
The original version of the *Karlsruhe Moviemap* (1991) is comprised, among others, of the following equipment:

- Apple Macintosh IIsi (produced from 1990 to 1993)
- Apple Macintosh Portrait Display (produced from 1989 to 1992; monochrome 15-inch CRT monitor)
- Laser disc player (see glossary, p. 600) Pioneer LD-V8000

Apart from the projector, all the components were housed in a console. On the console, only the lever, the control buttons, and the Portrait Display, showing the current position on a map of the rail network, are visible. Using software developed by Christoph Dohrmann and several work-specific hardware components, the installation was presented in this form until the end of 2005.

12 The software MPEG Streamclip enables the user to process and playback as well as convert video and audio material. See "Squared 5 – MPEG streamclip for Mac and Windows," available online at: www.squared5.com, accessed 05/22/2013.

13 The designation Codec is derived from the terms *compressor* and *decompressor*. A Codec facilitates the compression of audio and video data.



Screenshot of the original software (version 1991)

The artist used the computer as an intermediary in order to display the route selected by the viewer through the controller with the laser disc player. For this Michael Naimark used the advantages offered by a laser disc (see glossary, p. 600) in CAV format (constant angular velocity), for with appropriate utilization of the laser disc player, it was possible to locate individual frames on the laser disc and display them in high quality.[14]

Work on revising the original installation commenced in February 2006 and lasted for almost two years. The internal components of the *Karlsruhe Moviemap* were replaced – or, as Michael Naimark would describe it: "performing a brain transplant while leaving the body intact."[15] These measures were implemented by Matthew Biederman, who replaced vulnerable components, and finally ported the work concept by way of reengineering.[16] In place of the software programmed by Christoph Dohrmann, Biederman chose to use the proprietary (see glossary, p. 601) graphic development environment Max/MSP by the developers Cycling '74,[17] and their extension for video editing, Jitter. The video material available on a laser disc was digitized and embedded in the Max/MSP.[18] environment

In order to access single images, which was previously guaranteed through using the laser disc in CAV format, digitization was done using the proprietary I-Frame-only-Codec[19] SheerVideo.[20] With this form of compression (see glossary, p. 600), the frames are "coded as independent single images."[21] Further, particular emphasis was placed on a smaller file size of the video files, to facilitate unproblematic replay with Max/MSP or Jitter. The loss that inevitably results from compression, which the artist accepted in the interest of trouble-free functionality, explains the lower quality of the projected image. Compression artifacts (see glossary, p. 599) such as block artifacts, are even recognizable to the untrained eye.

14 In the present case, the projected image was decisively influenced by the range of functions of the selected CAV format. This should also be taken into account with regard to the digitization of the laser disc. See also: "5.7 What is the qualitative difference between CAV and CLV?," in: *The Laserdisc FAQ*, available online at: www.blamld.com/Laserdisc/FAQ, accessed 05/22/2013.

15 Biederman 2006.

16 Ibid.

17 See Cycling '74, available online at: http://cycling74.com, accessed 05/22/2013.

18 The digitization was not carried out at the ZKM | Karlsruhe nor by Matthew Biederman himself. Biederman confirmed this in an e-mail of January 2012.

19 See Toni Steller and Uwe Fleischer, "Grundbegriffe der Film- und Videotechnik," in: Andreas Vogel (ed.), *Digitalisierungsfibel: Leitfaden für audiovisuelle Archive*, transfer media, Potsdam, 2011, p. 56.

20 See BitJazz Inc., "SheerVideo," available online at: www.bitjazz.com/en/products/sheervideo, accessed 05/22/2013.

21 Keith Jack, *Video Demystified. A Handbook for the Digital Engineer*, Newnes, Burlington, 2007, p. 585.

Karlsruhe Moviemap
An Interview with Michael Naimark, part I

Rebecca Picht

Excerpt from the interview conducted on May 29, 1997, at ZKM|Karlsruhe

Do you consider *Karlsruhe Moviemap* as a completed artwork? Would you mind if in the future someone else were to develop the project further?

Michael Naimark: You may know with that when we initially began this project, we talked a great deal about adding interviews. We had a lot of different ideas. And there was a certain belief that some of us had, that this would be the skeleton on which to add things. This is like painting a moustache on the Mona Lisa. You know, I guess I have two schools of thought about it. There are certain properties that it has, which are very important to me, like the feeling of tight linkage between what you do and what you get. And being able to move at much faster than human speeds. And having a projection that is to scale so that you get this eerie sense of presence. Those are very important to me. If somebody used it as the basis for something else, I suppose I'd be flattered. You know, I can't think of any reason why not.

The city changes constantly. Will the perception of the work change, too?

Yeah, I mean I thought about that a little. And it's funny because in twenty or fifty years from now, it's not going to be of Karlsruhe; then it will be of Karlsruhe as it used to be. And I don't know – I mean that people, children will look at it and parents will say "This is the old building that's now gone," I suppose. And again I haven't; we can only speculate.

Does that mean that in time the documentary character of the work will increase?

The *Karlsruhe Moviemap*? I think it will become more and more archive material. People like the Paris RATP wanted the movie map as a functional thing. It was actually a funny overlap between supporting an artist, because this was part of an arts commission with several artists, and having something usable. The usability of the *Karlsruhe Moviemap* goes down every day because they add things and buildings change. So yes, the context will change to be one of an old dusty antique, you know, showing these old images.

Exhibition view
Digital Art Works. The Challenges of Conservation
ZKM | Media Museum
Photo © ZKM | Karlsruhe
Photo: ONUK


Digital Art Works.
The Challenges of Conservation
29.10.2011--12.02.2012

Exhibition view
Digital Art Works. The Challenges of Conservation
ZKM | Media Museum
In the foreground:
Michael Naimark
Karlsruhe Moviemap
(reinterpretation)
2009
Photo © ZKM | Karlsruhe
Photo: ONUK

View of the documentation room in the exhibition *Digital Art Works. The Challenges of Conservation*, ZKM | Media Museum
Photo © ZKM | Karlsruhe
Photo: ONUK