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Practical Ethics v3.0: Version Control

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A note on the title

The title of this article *Practical Ethics v3.0: Version Control* can be broken into three parts.

The first part refers to Peter Singer's 1979 book, *Practical Ethics*, in which a system of preferential ethics is generated from the properties of a class of beings that 'furthers the interests of those affected' (Singer, 1979, p14). Rather than from some abstract framework of concepts and values such as 'truth' and 'morality' – or here 'authenticity' – Singer points out that how people make ethical choices is usually based on something concrete that has the best consequences for all involved. The second part, 'v3.0' – as in 'version 3' – is central to the third part of the title, 'Version Control' and indicates that this text is a third version of ideas the author has around ethics, art, labour, authenticity and the conservation of cultural heritage.[1]

It is the third part of the title, 'Version Control', that is the focus here. As many readers will know, Version Control is a model of production coming from both engineering and software development and it is a model that I will use to diffract the divisions of labour and agency involved in art and its preservation.

Some preliminaries

There exist many cultures of care for historic and important cultural items across the globe and many of them have hugely distinct cosmological, technological and societal structures that condition their execution. While it is beyond the aims and scope of this paper to discuss any particular cosmotechnics in detail,[2] what can be said is that:

Firstly, the preservation of any form of cultural heritage is a discipline borne from a cosmotechnics that consists of three registers of cognitive praxis:

a) from a world view situated in a particular history of ideas, relationships and forces as well as objects made to constitute that world; this is its *ontology*

b) from the application of particular forms of technology and technological know-how that help frame and articulate and reinforce that world view; this is its *technology*

c) and from its execution within a variety of organisational structures, from social to physical, that guide how those involved in the care of culture operate; this is its *infrastructure*.

Secondly, that whatever the form of cultural care executed it is nonetheless true to say all are collective endeavours that are determined in some way by the knowledge and influence of these three registers, modulated by forms of cultural understanding, spatial organisation, technology and protocols.[3]

If we look at the practice of western-trained conservators, we can see how it is born out of a history of rationalism and empirical science, whose authority and power have been aided and effected by the use of certain technologies, analytical practices and organisational structures to build models of reality from ontogenic axioms that produce, sustain and expand a certain vision of the cosmos. However, where its infrastructure habituates certain behaviours it seems ill conceived to apply it to things that modulate resolutely non-material concepts and traditions, whether as items from other cultures or, as the focus here, contemporary art. Arguably, it is these evocations of other cosmotechnics that provoke irreconcilable tensions between the ontology, technology and infrastructure that underwrite much of western conservation practice.

For example, since the early 1990s understanding a range of diverse values and collective desires has been recognised as being important to inform treatment decisions, while adapting theory and practice to address notions of intangible heritage has been invaluable in increasing understanding about how to work with things like so-called ethnographic and contemporary art. The upsurge in collecting forms of de-materialised art – time-based media, installation, performance and software art – has led to realignments in understanding how this art is always dynamic and in process, which supports a changing world view in conservation that sits at odds with any science-based positivism that privileges only the material. One unexpected consequence is

that this new ontology makes conservators more unsettled around declarative exercises in authority and power.

More importantly for my purposes is that such tensions suggest that those involved in the care of cultural heritage constitute a *recursive public*:

> A recursive public is a public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public; it is a collective independent of other forms of constituted power and is capable of speaking to existing forms of power through the production of actually existing alternatives.[4]

Conservation is recursive in this sense because since the 'values-turn' in the 1990s its practitioners have been constantly reviewing the terms of their own legitimacy, widening the means of its inclusiveness and of giving voice, and increasingly scaling down any definitive rubrics, including codes of ethics, while expanding their collaborative practices. And it is this real-world activity that makes the field inherently modifiable and recursive as conservators execute innumerable cycles of practice that drive theory such that it is never conceived of in any settled form of authority.

Given these preliminaries, I want to now turn to the notion that mobilising the descriptive power of Version Control can help redraw understanding of the practice of conservation and how this impacts the production of art and culture.

Version Control

Version Control (VC) is the management of multiple revisions of some specific piece of information. It is most commonly used in engineering and software development, as well as in other fields where information content is worked on by a team of people, such as in architecture and electronics.

In software development VC is used to keep track of changes and enable remote programmers to work simultaneously on the same project files, automatically recording the time and date of any changes made as well as the person making them, while preserving all past changes across multiple servers for later recall.

Fig. 1 Diagram used to explain versioning in the 'source code control system', first released in 1972

The core features of VC for software development include a networked repository of all previous versions; a current working copy – the working directory – for changes to the current version to be made on; and a system of *commits* where the new changes are committed to so that the working copy becomes the new version and enters the repository along with all relevant data including documentation and commentary on the changes committed to. Copies can be cloned and *branched* off to be manipulated in different ways for either merging back into the current version or *forked* into a new project.

One other thing to note is that there is generally a hierarchy of labour representing different areas and levels of expertise so that, for example, a contributor might have their code rejected by a more senior developer. VC also enables each phase of the project to be accessible to project members and any changes can be cross-checked against any other version over time, allowing collaborative groups of people to work on a project without losing sight of any modifications and commits. This makes a project both ontologically open-ended and its authorship distributed.

VC can be applied to all kinds of files in development, such as in the example in Fig 2. of a wiki used to plan a real-time event, where changes are identified by timestamping and identifying contributors as the 'version of record'.

Conservation and the archive

Recent ideas from within conservation have focussed on documentation and archiving as one way to manage change in order to preserve forms of contemporary art – such as installation, performance and media art – understood to be essentially open-ended and changeable.

Projects such as Hanna Hölling's treatise on the challenges in preserving Nam June Paik's media art suggest that the continuing identity of a mul-
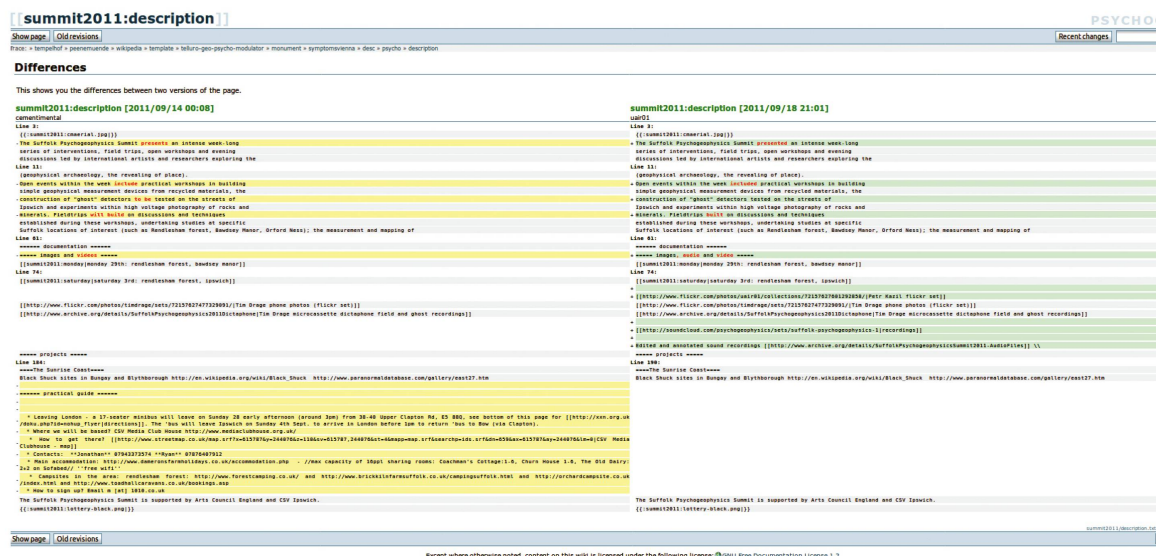
Fig. 2 Screenshot from a project wiki showing differences between two versions of a text page

timedia artwork throughout its different redisplays and activations can be achieved through correlation with its archive.[5] It is important to understand that the archive is understood in its widest sense to include not only documents, plans and images and so on, but also access to living artists, assistants and fabricators and all those in the wider network of people involved in the work at various stages of its iteration.

The idea is that conservators' decisions about what changes are needed for the artwork to persist – such as replacing monitors, migrating the video, or removing and adding elements – can be grounded by their connection to the artwork's archive and thus ensure that, in a case like *Arche Noah* by Nam June Paik (Fig. 3), the continued identity of the artwork can be maintained through the different versions of its display over many years. Where the conservation narrative actuates the present iteration, in turn it becomes a story to be inscribed back into the archive. This recursive process of inscription is tethered to the identity of a media artwork by its capacity to embody any change in its materiality analogous to self-archiving.[6]

The flipside of this is that when all connections of a media work to its archive are broken and the artwork is completely detached from its origins, with the loss of the last autographic element, the archive destroyed and all the artist's 'transmitters' having passed on such that, as Hölling suggests, 'their forgetfulness would result in a new identity for the artwork' – only then, she continues, do we face the death of the artwork.

Such ideas around the archive and continuity of the artwork are heavily situated in the hegemony of autographic art, and one of the reasons why *Arche Noah* is still considered 'authentic' is because it retains Paik's painted daubs and signature (Fig. 4).

In contrast to this analysis, my argument is that conservation actions can be considered akin to the *commits* made in VC. Once this is understood, we can begin to recharacterise authorship as layered, distributed and *allographic*, and then see that all forms of cultural heritage are ontologically open-ended and in process. So where others see the archive as a heterogeneous repository from which the next display of a contemporary work can be engineered, while in practice this is useful, I think it misses a more radical point, that conservators are not conserving but developing the item in their care.

Most people agree that conservators are managing change when they conserve works of contemporary art by, for example, renewing or repairing elements for the next display and clearly documenting their decisions and choices.[7] Such interventions are often made possible by a series of negotiated and collaborative agreements between artists, curators, conservators and other relevant agencies about what changes are legitimate while maintaining the meaning and autographic identity of the work. Conservators try these changes on or around the work – like a developer testing things in VC's working directory – before committing to them in what becomes the new 'version of record' on display.

Versions of Version Control

But if we go back and look at VC again we find that it generally operates under two different regimes in software development, one a proprietary client-server model, exemplified by companies such as Microsoft, and the other a distributed model typified by the Free, Libre and Open Source Software (FLOSS) communities. It is worth noting here my assumption that cultural institutions as organisations operate in ways closer to proprietary models, but it is the more radical FLOSS approaches to the production of intellectual property (IP) that I'm interested in mobilising to recharacterise what conservators are actually doing in their work. And if this characterisation can be substantiated, it radically contests some of the current assumptions around agency, labour and authorship in the production and representation of art.

Fig. 3 Nam June Paik, *Arche Noah* [Noah's Ark], 1989,
two-channel video installation: 29 monitors, 2 laserdiscs,
2 laserdisc players, wood construction, 9 papier-mâché
animals, 400 × 560 × 260 cm, installation view at Weisses
Haus, Hamburg, 1989, photograph: Helge Mundt

Fig. 4 Nam June Paik, *Arche Noah* [Noah's Ark], 1989,
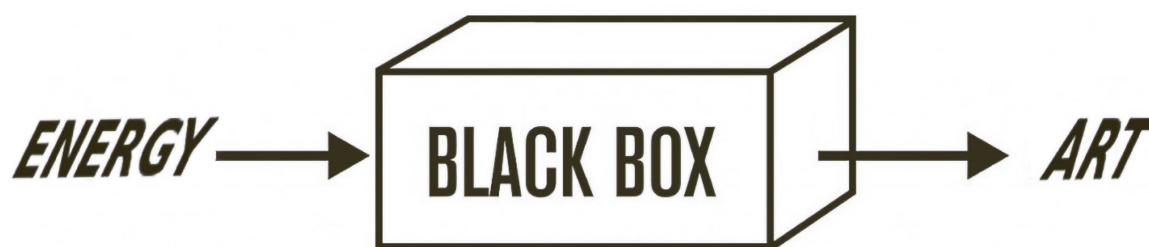ZKM | Center for Art and Media, date taken 2008

Fig. 5 Blackboxing art's production

Proprietary software is created by software engineers who write, debug and develop each program's source code. Source code is the detailed set of instructions, akin to a recipe, that specifies how the software in question works. In the proprietary model the source code is blackboxed, that is, closed to anyone outside the company. In contrast, FLOSS produces open software packages that include the source code so people may use, distribute and modify it without restriction, provided they pass on the same freedoms to others and acknowledge the contribution of those before them. So free software is free in the sense that it is free to acquire; and it is free to modify, as the user has the freedom to change the software to suit her needs. This FLOSS model of production provides publicly accessible records of authorship that give key information about each software project, such as the division of work, its collaborators (both old and new) and a contributors' experience (from novice to expert), whilst retaining all versions from the first and its authorship to the most recent version, including the relations of all those involved in producing it.

Because of conservation's concern with the decision-making that determines any treatment made to a work, the profession has similarly subscribed to forms of disclosure centred around clearly authored and timestamped documentation, where the immediate factors relevant to the object's conservation are recorded. As I suggested earlier, conservation's own world view is one of increased inclusion and discussions have focussed on furthering the sharing and interoperability of this kind of information in knowledge-exchanges between conservators and beyond to include the possibility of wider public access. However, the horizontality this suggests is challenging at the infrastructural level, with the institutional caveat applied that there are too many sensitivities regarding treatment policies and histories that need to be gatekeepered, even for conservation's own recursive public.

But if we transpose the generous FLOSS-like VC model to conservation, we can begin to see that 'authorship' becomes more a matter of declaring the conditions and means of an artwork's current iteration rather than any declarative determination of this or that 'original truth' about the work. Questions of authenticity and authorship then become confluent with the efficacy and accessibility of its VC system, which becomes the means of practical and ethical notation around the continued (and future) production of the artwork. Conservators might then be made more visible as collaborators, developers and co-authors. The argument here is more radical than only encouraging better documentation, and its scope goes beyond making the archive the foundation for the continuity and identity of any work of cultural heritage. Instead, it suggests that the tracking of how conservation is mobilised by an institution provides a potentially powerful analytical tool for exploring what conservators actually do and how this can be set against how an organisation 'scripts' their activities to align with any institutional configuration heavily invested in the maintenance of predominantly autographic cultures.

Conservation's versioning

To exemplify the kinds of versioning that conservators effect, three case studies are presented below to develop this component of the argument. Other examples can be easily substituted from the many forms of contemporary art; however, we should bear in mind that similar examples are readily found in the more traditional arts.[8]

1. Eduardo Kac's *Videotexto* Poems

Minitel was a 1980 French invention of a passive computer terminal consisting of a 9-inch screen, a keyboard, and a modem – but no microprocessor. Instead of computing on its own, *Minitel* connected to remote services via a phone line. Terminals were given out for free to every French telephone subscriber by the state and people could connect to more than 25,000 online services nearly 10 years before the world wide web. The concept was commercialised in other countries, including Brazil, where it was known as *Videotexto*.

From 1985 to 1986, the Brazilian artist Eduardo Kac created four animated poems in the alpha-mosaic videotext format which were made available on the public terminals of Brazil's *Videotexto* network. The only extant
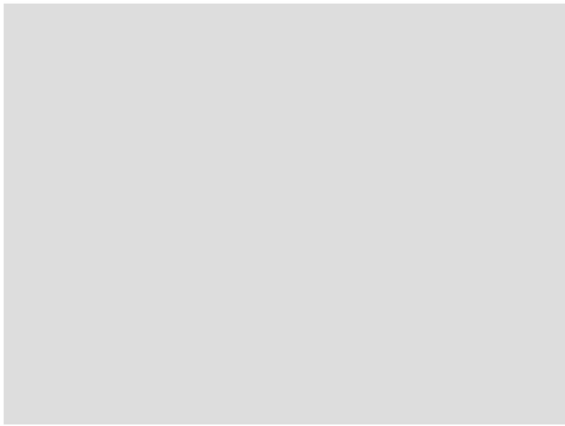
Fig. 6 Eduardo Kac's Quicktime version of
Reabracadabra, 1985, photograph: Agaton Strom
Reproduction of Strom's image objected to by
Eduardo Kac

Fig. 7 PAMAL's version from 2015

remains of the poems are slides made during the *Brazil High-Tech* exhibition of 1986, from which Kac made a much later *Quicktime* animation of the work (Fig. 6). The *Quicktime* contains several inconsistencies with the original, such as colours that did not exist in *Videotexto* and impossible character angles. Presented in *Minitel 2* casings, these versions have been used by Kac for exhibition and were acquired by Tate Modern in 2018.

In 2015 PAMAL, a creative group composed of artists, media theorists, restorers and engineers based in France undertook a treatment of Kac's videotext poems as a media archaeological project. As no example of the Brazilian *Videotexto* terminal was available, they decided to restore the poems on a contemporaneous *Minitel* terminal to recreate the experience of viewing the animations in an ecology similar to the original, with all the characteristics and aesthetic constraints that this implies (Fig. 7). They hand-coded the animations from scratch using hexadecimal code which was transmitted to the *Minitel* via an Arduino microcontroller using *Processing* free software and activated over a network on micro-servers for exhibition of their 'second original' of Kac's poems.[9]

So now there are two newer versions of the work in the world, both credited as Kac's, but both bootstrapped in very different ways by different people from an archive of a few relics and poorly recalled memories (Kac could not remember what programs he had used). PAMAL's aim of creating a second original was not born out of the necessity to maintain the artwork as being authentic, but rather out of preserving it as a different iteration, as

a *branch* or a *fork*. Although their media-archaeological reconstruction contains simulated elements, these are never hidden and, arguably, the second original leads us to experience the artwork through its wider ecology in a much fuller way than Kac's own *Quicktime* version.

2. Dieter Roth's *Gartenskulptur*

Gartenskulptur began in 1968 as a garden sculpture when German-born Swiss artist Dieter Roth (1930–1998) placed an example of one of his best-known works, *Portrait of the Artist as a Bird Feed Bust*, cast from a mix of bird feed and chocolate, outside to feed the birds. He soon began to construct other things around it (Fig. 8), and since then it has been developed over some 50 years to reflect Roth's belief that art is not a finite product but in a constant state of flux.

Now in the collection of the Hamburger Bahnhof – Museum für Gegenwart, Berlin, when assembled the latest version of *Gartenskulptur* is just under 40m long and consists of a diverse array of materials including sawn-up furniture, plants, liquid-filled jars, and monitors (Fig. 9). Integral to each iteration of the work is the area used to construct it, and the installation is always adapted to fit the space in which it is shown. Each construction is videoed and the videos become part of the next version as well as an aid to constructing it.

Gartenskulptur is a piece of generative art with each version being arranged or overseen by Roth's surviving family and maintained afterwards by conservators who follow the artist's instructions. In interpreting and executing these instructions conservators refer to the extended archive – including the family and archival biography of the work – to ensure the agreement of all concerned at the start-up of each new version of the work. However, 'there is always a risk with regard to the interpretation of specific points not covered by artists', such that the conservators involved make many decisions on the fly – like what junk TVs to buy – and have reported that they feel as if they were simultaneously technicians, collaborators and curators.[10]

When conservators make changes, they do so according to their understanding of those constant elements imperative to the work. While the continuity of authorship is maintained through artists' certificates, Carolin Bohlmann, senior conservator at Hamburger Bahnhof, suggests that because the essential nature of *Gartenskulptur* is process, conservators are inevitably becoming more and more co-creators with every version.

If we think of the future of *Gartenskulptur* it has several possible endgames:

Fig. 8 Dieter Roth, *Gartenskulptur*, c. 1968, installation at Rudolf Rieser's, Köln
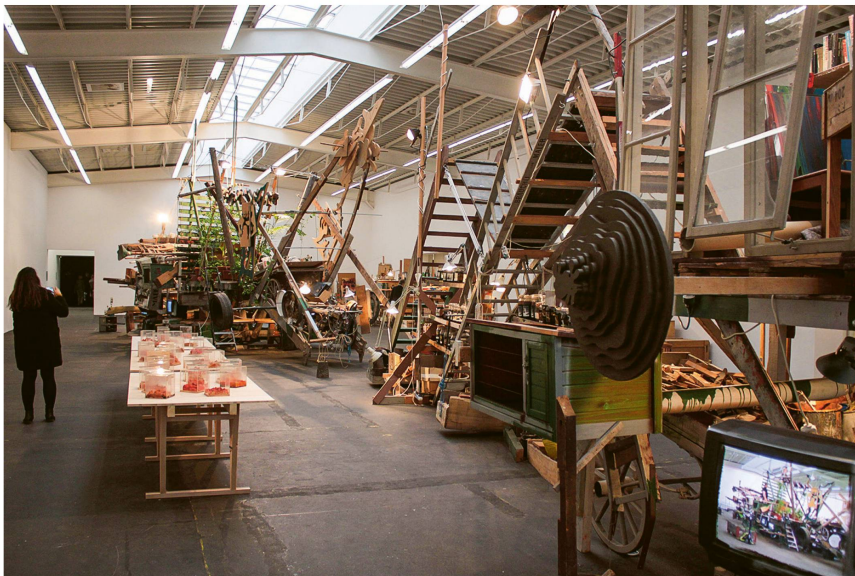

Fig. 9 Dieter Roth, *Gartenskulptur*, Hamburger Bahnhof, Berlin, 2015, photograph: Thomas Bruns

1) as its archive becomes more detached and disrupted and the people around the artist die out, then, as Hanna Hölling implies, the artwork has reached the end of its life as no more 'genuine' reconfigurations of it can be generated;

2) the work continues becoming something versioned so many times that the contributions by its new makers outweigh that of the original author in a process of the ever-diminishing visibility of the autographic moment; or

3) it is monumentalised in the last version – à la Joseph Beuys with, for example, *Das Kapital Raum 1970–1977, 1980*[11] – when the archive is still sufficient to create a last officially sanctioned version. This contradicts Roth's idea of *Gartenskulptur* as process.

But given the exponential increase in autographic invisibility, there is a fourth possibility:

4) that the work is forked so that a new work(s) is created that acknowledges its genealogy but continues as a work by others, in this case the conservators, as both *art-developers* and *artist-collaborators*.

In the final example I will discuss where arguably this option has already happened.

3. *Centerbeam* 1977 – 2017

With the 2017 exhibition *Centerbeam. A Performative Sculpture by CAVS*, ZKM | Center for Art and Media Karlsruhe, Germany, marked the 40th anniversary of what has been called a legendary contribution by MIT's Center for Advanced Visual Studies (CAVS) to *documenta 6* in Kassel in 1977. CAVS was founded in 1967 by György Kepes, an artist and theoretician who encouraged experiments at MIT between artists, scientists and engineers at the interface of art and innovative technologies. As such CAVS was a model for ZKM's inception in the 1980s.

The installation, at 44m long, was a project by CAVS Fellows under the direction of Otto Piene and based on an idea by the artist Lowry Burgess. It was presented at *documenta 6* in front of the Orangerie in Kassel (Fig. 10) and one year later, in 1978, a second version was exhibited at the National Mall in Washington, DC. Using the (then new) technologies of lasers, holography, neon and video, as well as steam and inflatables, the CAVS group conceived Centerbeam as a multimedia 'art machine'. For Otto Piene it was 'a metaphor of the community of volunteers forming daily symbioses as the relationships of a democratic society … by day, the main character of the installation … was participative with prismatic reflections in the water and holographic effects; by night *Centerbeam* transformed into a "friendly inferno"'.

For the 2017 show at ZKM the core idea was to create *Centerbeam 3*, an updated version of the installation. Although there is an extended archive and some surviving parts of the original *Centerbeam*, the new exhibition was never going to be a reconstruction but, according to Morgane Stricot, head of digital art conservation at ZKM, the most significant task was to determine

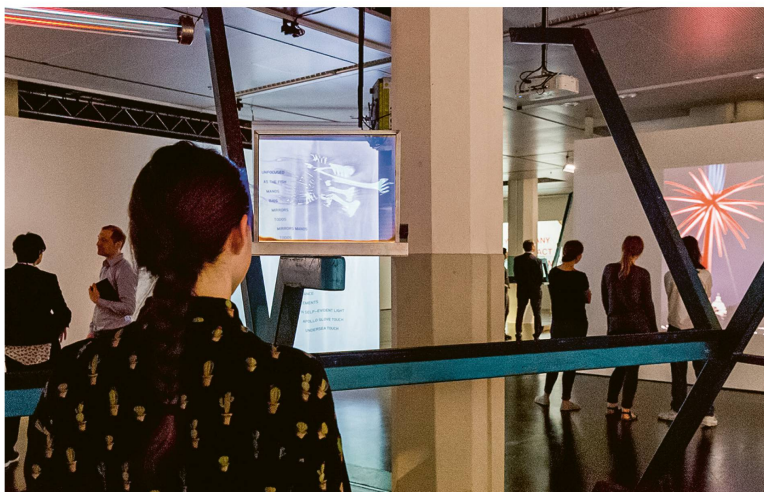Fig. 10 *Centerbeam* at *documenta 6*, Kassel, 1977, photograph:
Dietmar Löhrl

Fig. 11 View of the Exhibition "Centerbeam. A Performative
Sculpture by CAVS", May 24 – October 1, 2017, ZKM | Center for
Art and Media Karlsruhe, photograph: Felix Grünschloss

what form the new version should take in order to represent something of
the collaborative ecosystem at CAVS.[12] Several proposals were made, rang-
ing from physical reconstruction to a complete re-interpretation by younger
artists and engineers. The decision taken was to re-activate *Centerbeam* in an
expanded documentary form that reconfigured its technological vision and
memories of its social dynamics so as to make its 'techno-social moment'
alive again, even if in a somewhat depleted version (Fig. 11).

Once exhibited, Stricot believes these documentary reworkings can en-
ter the collective memory of their audience, who become what she calls 'knowl-
edge transmitters' for the original creators of, in this case, CAVS's vibrant

'beast' (as Otto Piene once called it). If *Centerbeam 3* presented something born out of the archive, then it was *forked* into something hybrid: part document, archive, pedagogic tool and burial; moreover, as Stricot argues, it was carried out in the same spirit of research and experiment found in the artwork itself.

A constructivist culture

The constructivist-like versioning described in these examples is not only at the heart of contemporary art but is manifest in all forms of production and care of art, both new and old. Where the argument is made that versioning is ontologically inscribed in conservation, then concomitantly the FLOSS model of Version Control is offered as a powerful descriptive method to procedurally understand how every item of cultural heritage is constructed and (re)produced. Where Version Control helps reveal the confluences and fault lines between conservation and the social and technological infrastructures within which it operates, these can then be tied more closely to the prevailing ontology subscribed to by those who ensure an artwork's continued realisation.

Using Version Control in this way helps to better theorise the assets of art and culture as being (re)produced through fine-grained configurations of energies and labour; it has the added benefit of problematising dominant notions of authorship and the production of IP that underwrite the current mobilisation of culture under capital. If the chains of production around an artwork – whether old or new – are made more visible and are seen foremost as integral to – and not just as a service for – the cultural production of subjectivity, they also describe something about the real conditions in which art and culture exist and, importantly here, how they continue to persist. We can then produce more complex understandings around the production of art and culture and reconfigure our perceptual-conceptual engagements to confront those skewed autographic habituations effected by our current cultural infrastructures.

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Praktische Ethik v3.0: Versionskontrolle

Neuere Konzepte aus der Konservierung zeit-
genössischer Kunst – namentlich Performance,
Installations- und Medienkunst – haben den
Blick dafür geschärft, wie entscheidend Doku-
mentation und Archivierung für die Erhaltung
der Identität und für das Fortbestehen solcher
Kunstwerke sind. Indem sie Dokumentationen
(in weitgefasstem Sinn) von verschiedenen Ite-
rationen eines Werks vergleichen, treffen Konser-
vatorinnen und Konservatoren Entscheidungen
im Hinblick darauf, welche Veränderungen für
künftige Wiederaufführungen zulässig sind. Für
dieses «Decision-Making» wurden verschie-
dene Modelle vorgeschlagen, alle so angelegt,
dass sie berücksichtigen können, wie unabge-
schlossen und zugleich wandelbar solche Kunst-
werke notwendigerweise sind. Jedes dieser
Modelle geht davon aus, dass Fachleute aus der
Konservierung imstande sind, mit Veränderun-
gen umzugehen, und dass sie die Parameter ver-
stehen, deren es bedarf, um die Identität des
Kunstwerks auch im Veränderungsprozess zu
erhalten.

Während viele Ansätze in der Konservie-
rung von Kunst, ob zeitgenössisch oder nicht,
nach wie vor auf Begriffen wie Identität und in
der Regel Autografie – Eigenhändigkeit –
gründen, muss herausgestellt werden, dass die
Erhaltung von kulturellem Erbe letzten Endes
ein *allographischer* Prozess ist und dass jegliche
Iteration eines Werks eine spezifische und
zeitbedingte Version für die Dokumentation her-
vorbringt. Dementsprechend kann Konser-
vierung neu bestimmt werden als eine Disziplin,
deren grundlegende Praktiken mit Versions-
verwaltung verwandt sind. Normalerweise las-
sen Versionskontrollsysteme jede Phase einer
Softwareentwicklung für alle Beteiligten zugäng-
lich werden für den Abgleich mit jeglichen
anderen Versionen. Versionsverwaltung erlaubt
also ganzen Teams, an einem Projekt zu arbei-
ten, ohne Änderungen zu übersehen, und, ganz
wichtig, die Autorschaft am Projekt zu vertei-
len. Von daher kann jedes Software-Projekt ver-
standen werden als ontologisch unabgeschlos-
sen und entweder mit seiner Obsoleszenz oder
seiner Aufspaltung in voneinander abweichen-
de Programme durch das Versionskontroll-
managment erfasst werden.

Der vorliegende Beitrag skizziert Praktiken
der Versionskontrolle, die in der Technik zur
Anwendung kommen; anhand von Fallstudien
werden Verbindungen und Parallelen mit Vor-
gehensweisen aufgezeigt, die genuin in der Kon-
servierung und allgemeiner in der Pflege des
kulturellen Erbes festgeschrieben sind; schliess-
lich soll diskutiert werden, inwiefern die Neu-
definition von Konservierungspraktiken als
Akten der Versionskontrolle dazu verhelfen, den
Berufsstand zu stärken, indem seine Aktivitä-
ten in der Kulturproduktion in den Vordergrund
rücken.

1   *Practical Ethics* appeared in 2008 in the Victoria and Albert Museum's Conservation Journal http://www.vam.ac.uk/content/journals/conservation-journal/issue-56/practical-ethics/, and *Practical Ethics v2.0* is a chapter in a book from 2009 on conservation and ethics, *Conservation: Principles, Dilemmas and Uncomfortable Truths* https://www.routledge.com/Conservation-1st-Edition/Richmond-Bracker/p/book/9780750682015.

2   The concept 'cosmotechnics' – briefly defined as the unification of the cosmic and moral orders through technical activities – is borrowed and adapted from philosopher of technology Yuk Hui, Hui 2016.

3   Marian Kaminitz suggests that for western conservators 'connections between museum objects, people, place and environment – the intangible as well as tangible aspects of cultural objects – are realised more fully by learning and working in the communities that created them'. Kaminitz / Smith 2014, p. 8.

4   Kelty 2008, p. 3.

5   Hölling 2017.

6   In the case of Paik's *Arche Noah*, some people are ambivalent about the status of the current ZKM iteration as it has been transformed not only by the removal of the papier-mâché animals – said to be in a poor condition – but also, after spending 16 years in storage where it suffered damage, it was retrofitted in 2008 as a robust demountable structure fit for purpose in the museum, in contrast to the precarious and fragile structure it was when Paik and his assistants made it in 1989.

7   See, for example, Wharton 2018, in which Glenn Wharton details the different approaches to the conservation of the CRT monitors in three works by Paik held in three different institutions.

8   Sadly, this argument is beyond the scope of the contribution here, although the author first indicated this line of thinking in Healey-Dilkes / Kemp 2009. Cybele Tom also explores some ontological similarities between 'old' and 'new' art in her presentation *Why Old Art Matters to Contemporary Art Conservation* at the annual conference of the Maastricht Centre for Arts and Culture, Conservation and Heritage (MACCH), March 2019, https://www.maastrichtuniversity.nl/file/tomcybele-whyoldartmatterstocontemporaryartconservationpdf.

9   PAMAL (Preservation & Art Media Archaeology Lab) was a collective of 'artists, media theorists, curators-restorers and engineers' based at L'Ecole Supérieure d'Art d'Avignon, France. In 2019 they reformed as the independent PAMAL_Group (https://pamal.org) dedicated to conserving early or forgotten 'digital artworks' by reconstructing them as 'second originals' to be 'as close as possible to the original materialities, sometimes in a deficient way, [which are] treated as archives'. A detailed study of the work on the Kac videotext poems was published in 2017, Guez et al. 2017.

10   This notion was expressed in an interview with Carolin Bohlmann, senior conservator at Hamburger Bahnhof – Museum für Gegenwart, Berlin, in September 2019; the quotation is from a lecture by Carolin Bohlmann, *Certificates and Conservation Practice in Contemporary Art*, at the Internationales Kolleg für Kulturtechnikforschung und Medienphilosophie (IKKM) in Weimar on 16 January 2019.

11   See Riess / Bohlmann / Hausmann 2019.

12   See Stricot 2017.

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