An architecture of dissemination?

Gehry Technologies versus open source and copy left intellectual property practice in digital architectural production

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Recent formal curiosities in the architectural profession have resulted in the expansion of the discipline to include the field of information technology. No longer outsourced or simply bought off the shelf, information technology is now a tool that architects shape through customization and collaboration. Gehry Technologies, founded in 2002, is leading the way with its attempts to digitally reshape the design, manufacturing, and construction process. This expansion of the boundaries of architecture is not without proprietary controversy though. In addition to the critics who denounce contemporary architectural practice’s technological and business focus as a threat to the “art” of building, others are concerned that the increased development of highly-specialized and protected brands of expertise inhibit the technological “promise of democracy” and public nature inherent to the built environment.

The majority of architects in the field, however, are disengaged from intellectual property issues. Since it is significantly difficult to copy a building, not to mention obvious, the pervasive attitude, despite the 1992 Architectural Copyright Act is that intellectual property policy is irrelevant to the design and construction of buildings.¹ However, with contemporary architecture’s reliance on

digital technologies for *methods* of drawing, modeling and fabrication, the proprietary attitude emerges. The following text will consider Gehry Technologies in light of the opposing proprietary ethic of the idea of an “open source” architectural profession, namely the work of the Dutch multidisciplinary firm ONL, led by Kas Oosterhuis. Part one will compare Gehry Technologies’ protectionist standpoint to the business-method-patent case of a similar company, CTI, *Construction Technology Inc., v Cybermation* in order to better understand the issues at hand. Part 2, OSI, will compare the opposing position of ONL and other breeds of “open source” architecture to the Open Source Initiative and Copyleft intellectual property policies. And part three, will compare the opposing attitudes as a way of gauging whether a more nuanced mixture of proprietary policy is necessary.

I: Gehry Technologies, CTI and business method patents

Gehry Technologies was started by James Glymph as a splinter venture of Gehry Partners, LLP, the firm of world-renowned architect Frank Gehry. As founder James Glymph says, "GT is a natural extension of the work we've been doing with project teams for the past 14 years. Current industry practices are still largely based on two-dimensional, paper-based process, while the manufacturing industries have completely changed the way their products are designed, built,
and delivered.” Gehry Technologies marks the entrance of the architectural profession into the explicit realm of business, “what we're doing is packaging our process and offering it for use by the industry as a whole”. While there is no way of knowing whether Gehry Technologies has patent applications in progress for their various modeling and project management and fabrication software their previous patent history and the general air of anonymity their corporate image presented on their website suggests that such suppositions would not be out of line. One would also be remiss in not noting that IBM, who is a full partner in the Gehry Technologies venture, obtained the first ever business method patent for an automated calculation process in 1889. With the protectionist stance in mind, an initial review of the key issues of the CTI business-method-patent case will bring forth issues for comparison.

CTI, Construction Technologies Inc. is responsible for revolutionizing the HVAC industry by automating the method of patterning and cutting custom ductwork. Before CTI’s invention, “the drafting of designs for duct work of HVAC systems required numerous labor intensive steps. Much of the work had to be performed manually, including mathematical calculations, drawing plans, and

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2 James Glymph in “Gehry’s New Venture,” IOMA Principal’s Report (November 2002), http://web.lexis-nexis.com/universe/document?_m=3c558da541560e2a477d8b491d0bc838&_docnum=1&wchp=dGLbVlbzSkVb&md5=32f94738416
3 Frank Gehry in “Gehry’s New Venture,” IOMA Principal’s Report (November 2002), http://web.lexis-nexis.com/universe/document?_m=3c558da541560e2a477d8b491d0bc838&_docnum=1&wchp=dGLbVlbzSkVb&md5=32f94738416
4 Gehry has 13 design patents filed between 1978 and 2000 for his furniture projects.
scratching the outline of each piece to be produced on a rectangular piece of sheet metal or ‘blank.’” Richard Levine, who founded CTI in 1970 was a union sheet metal worker who had a history in working with HVAC systems. His interest in computers led him to become a computer programmer (self-taught) and he began to conceive of ways of automating the complicated ductwork planning process. This investigation resulted in his “Compuduct” program which “would determine the number of two-dimensional blank pieces required to make the specific HVAC fitting and calculate the minimum dimensions of the rectangular blank required for each pattern piece. The layout of the actual patterns of the fitting was thereafter done manually on the rectangular blanks.”

Not long after Compuduct’s initial success Levine began working on a new computer program that would plot the resultant patterns directly on the sheet metal. This development, termed “autoplot” eliminated the entire manual layout process, and with Levine’s 1.2 million dollar contract with a plotting manufacturer soon revolutionized the HVAC industry. After successfully implementing Autoplot Levine went on to design Autocut, and Autoplan, who’s merely add to the already substantial system.

Although several interesting issues are brought up in the 1997 CTI case by the opposing counsel (such as whether pressing a button constitutes operator interactivity and whether simulations that are used in gaining sales constitute

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7 Ibid. (Tr. at 75-76, 82-83 [Levine]).

8 Ibid, 3.
public use of sale that would invalidate a patent) the court ruled in favor of CTI, finding that Cybermation should pay damages of $11,320,000, then doubled the damages (at the discretion of the court) and added attorney’s fees.\(^9\)

The deciding factors within the case as to whether Cybermation infringed revolved around the doctrine of equivalents. The court determined that, “The information representative of pattern types stored need not be physical drawings of the pattern types stored. Rather, this information can be algorithms in the form of computer instructions which define the pattern shapes.”\(^10\) The systems of cutting and plotting used in the computer-aided-manufacturing of the ductwork were determined as equivalent and all apparatus claims invalid within the bounds of the method case. Despite Cybermation’s obvious willful infringement (almost all other competitors to CTI took licenses under their patent) of the claims the ruling points to the controversial nature of business method patents in providing overly ambiguous scope of protection. The doctrine of equivalents is a key factor in the potential cases of patent misuse in that it allows for subtle differences of method, such as the distinction between plotting and cutting, to be overlooked in favor of a broad definition of the larger method at work.

What seems blatantly apparent in the text of the CTI case is the high regard in which Richard Levine, the inventor is held. As a self-taught computer programmer who spent years developing, testing, and investing money in order to revolutionize the industry the court has previously upheld 3 attempts by

\(^9\) Ibid, 15.
\(^10\) Ibid, 10.
alleged infringers to invalidate the patent. The court also states that “CTI’s patents enjoy an even stronger presumption of validity because each of CTI’s patents has been twice reexamined and certified by the Patent Office as valid....Moreover, each of these patents has been found valid during prior litigation.” The unofficial “sweat-of-the-brow” claim appears to be in full effect.

How then does the automated ductwork method of the CTI case relate to Gehry Technologies? At first glance they both share the implementation of CAD/CAM technology for the use of building components. The Gehry fabrication and construction process began as an effort to realize non-standard curvilinear forms, each as unique as custom ductwork configurations. Just as Levine was credited with revolutionizing the ductwork process, so is James Glymph for his efforts in revolutionizing the building industry. While some critics argue that this is not a revolution but a mere method of solving the problems of the architect’s formal infatuation with blobs and crumpled paper others claim that the effects of the new forms and digital and collaborative practice are here to stay.

The most interesting comparisons between CTI and Gehry Technologies’ can be made in regard to the notion of the “sweat-of-the-brow” of the inventor since Gehry Technologies success lies entirely in the research & development, trade and modulation of highly specialized knowledge. GT’s expertise necessitates a certain highly active R&D program. As a collaborative venture, Gehry Technologies relies not only on corporate partnership with IBM, France’s

11 Ibid, 14.
12 Ibid, 14.
Dassault Systemes and the computer industry’s bullying of congress, but on carefully negotiated affiliations with cutting edge research centers that ensure GT a perpetual, yet modulated information-feed. GT’s connections with MIT’s Media Lab, CIFE – Stanford University’s Center for Integrated Facility Engineering, SIAL – RMIT’s Spatial Information Architecture Laboratory, Melbourne, CERF – Civil Engineering Research Foundation in Washington D. C., and CERL – Construction Engineering Research Laboratory, of the US Army Corps of Engineers, plot a network of expertise.

Gehry Technologies’ most apparent global R&D connection is with MIT’s Media Lab. Gehry Technologies reason for affiliating with the Media Lab is at the outset, not evident, but their involvement with the lab is undeniable. GT is connected in two ways to the work of the Media Lab – first through their full partnership with IBM, who has held the position as the largest corporate sponsor within the lab for years\(^ {13}\) and secondly through their collaborative research ventures with professor, William Mitchell in the research group entitled “Smart Cities”. Currently both Frank Gehry and James Glymph are leading a project entitled “Gehry Car”, a project, “which re-invents the car as a designed object, and redefines the user’s relationship to the car and to the city”.\(^ {14}\)

While the formal properties of the Gehry concept car may resemble Gehry architecture, other research, more directly related to architecture, is being

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\(^{13}\) Samsung is rumored to have replaced IBM as top sponsor this year according to: Leonardo Amerigo Bonanni, student researcher interviewed in the “Context-Aware Computing” group (Cambridge, MA: MIT Media Lab, April 10, 2004).

fostered within the Media Lab by a former graduate of the MIT architecture program, Axel Killian. Killian, a current PhD candidate in the Media Lab, leads research into materials fabrication using CATIA software as his base tool. Gehry Technologies, as a CATIA exclusive enterprise, is thus in an advantageous position and by IBM’s sponsorship, is granted intellectual property rights to any innovations of the lab.

Gehry Technologies is also connected with a similar institutional lab by the name of CIFE – the Center for Facility Engineering at Stanford University in California. With its research focus specifically centered on the AEC community, CIFE has attracted many architectural software developers for membership (CIFE’s term for monetary sponsorship) such as Autodesk, Inc., Bentley Systems, Inc., and Graphisoft US., Inc. (some of Gehry Technologies’ prime competitors of their CATIA based software development). CIFE’s focus on 4D, time based, modeling software has also attracted the membership of companies such as Walt Disney Imagineering, the AEC branch of the Disney empire.

Gehry Technologies affiliation to the CIFE lab, which they note on their website, is precisely through the Walt Disney Imagineering group, whom they collaborated with for the recent Disney Concert Hall project, a project which Frank Gehry served as architect. The Gehry team used, “prototype 4D modeling software developed as part of an ongoing collaboration between Walt Disney Imagineering Research and Development and Stanford associate professor

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Martin Fischer's team at CIFE”. The collaboration between, “Gehry's NURBs-powered CATIA model and the open architecture of the Imagineering 4D tool, which was developed to handle any kind of geometry, gave Haymaker [the primary project modeler] the opportunity to create an extremely robust 4D model”. Such collaborations give GT access to the ongoing 4D digital modeling research of CIFE, and in turn, CIFE, to the latest CATIA innovations.

In addition to the Media Lab and CIFE, Gehry Technologies is affiliated with RMIT’s Spatial Information Architecture Laboratory in Melbourne Australia. The Spatial Information Architecture Lab mines the global reputation of the university, the lab and its professors by attracting visiting scholars and practitioners for collaborative studio experiments.

Gehry Technologies connection to RMIT was established solely through such studio collaborations, rather than through direct, or secondary sponsorship (as with the Media Lab and CIFE). The Digital Mock-up project initiated by SIAL professor Mark Burry in spring 2002, included the active participation of James Glymph and Cristiano Ceccato, from Gehry Partners, and Bill Mitchell from MIT’s Media Lab. The studio, which was recorded as a great success for the university in its annual “snapshot of achievements”, was understood as a testing ground for, “innovative collaborative design methods in an international situation using technologies for remote learning …and new opportunities for practice”.

17 Ibid.
collaborative project, which took the form of a virtual studio, also included a field trip, for the students involved, from Australia, to the Gehry facilities and MIT campus. The RMIT annual report cites the project’s success by measure of professor Mark Burry being appointed a visiting professorship at MIT for 2003 and the acceptance of 2 of SIAL’s graduating students to MIT’s Media Lab program.\(^\text{19}\) Although the direct value of the project for the Gehry participants is not documented, one should note that it was only shortly after the SIAL project that Gehry Partners formed what we now know as Gehry Technologies, a company with remarkably similar goals to the SIAL project. One should note in particular though, that Cristiano Ceccato, also collaborator on the SIAL project is the active director of Gehry Technologies’ in house research and development.

In addition to the many academic affiliations that Gehry Technologies maintains, they also take advantage of the non-profit organization CERF – Civil Engineering Research Foundation, and CERL – Construction Engineering Research Laboratory, a project of the US Army Corps of Engineers. CERL, as a governmental project maintains anonymity concerning its mission and information exchange procedures but CERF, which is headquartered in Washington DC, sees its task, “to be recognized as the unifying force moving research and innovation into practice.”\(^\text{20}\) Affiliated with the American Society of Civil Engineers, CERF offers the members of its Corporate Advisory Board, which includes James Glymph of GT, what they term as “industry guided” and

\(^{19}\) Ibid.
\(^{20}\) “About CERF,” [http://www.cerf.org/about.htm](http://www.cerf.org/about.htm).
“industry directed” research for a small portion of the member company's worth.\textsuperscript{21} James Glymph, member since 2002, is consistently involved in CERF events, and a favorite speaker for their conventions.\textsuperscript{22}

As all of this description qualifies, Gehry Technologies is clearly in a position where it can claim a certain “sweat-of-the-brow” within the AEC (architectural, engineering, and construction) research and development arena - albeit a more collaborative kind. What is most relevant for the discussion of proprietary attitude, at hand, is that the active R&D of Gehry Technologies, despite all protectionist and corporate attitudes, initiates a reciprocal nature of exchange with students that stimulate inventiveness without the onus of immediate practical application. The issues brought up by both Gehry Technologies and the CTI case will be revisited after considering the opposing proprietary attitude of “open source” architectures.

II: Oosterhuis NL, OSI, and “open source”

The Dutch architecture firm, ONL, has modeled themselves as a multidisciplinary office. The firm’s organizational model allows us to question it parallel to the likes of Gehry and the R&D of Gehry Technologies. If ONL is projecting itself as networked, where does it stand in the information technology trade? For Kas

\textsuperscript{21} “CERF Corporate Advisory Board (CAB) Leveraged Resources,” CERF, \url{http://www.cerf.org/about/cab/aboutcab.htm}.
\textsuperscript{22} “CERF Press Releases,” CERF, \url{http://www.cerf.org}.  

Oosterhuis, founding architect of ONL, the idea of a shared open network is primarily political, “Open source architecture includes direct democracy in real time. The information flow includes and connects all stakeholders in the design process, and in the life-cycle of the realized building body.”23 For Oosterhuis the architect must recognize the embedded nature of their position in the field of information technology:

Consider the modern architect as an information architect. Trained to sculpt streaming data, trained to allow the intuition to have influence on the logic. Trained to build prototypes for testing them in the real world, trained to build interactive tools for direct democracy. Trained to act in the shared space of a group design room. Trained to construct an interactive e-motive architecture in real-time to adapt to the parallel worlds around and the worlds within. That architect is prepared to act in the networked information economy of the 21st century.24

Yet the difficulty of creating an open yet reliable network of sharing for architectural practice remains. While ONL has in-house computer programmers that work on the automated Autolisp [Autocad based custom scripting] procedures of information transfer and this involvement suggests their participation in the larger shared network of Autolisp source files, the feasibility of a truly “open source architecture” remains poor.25 Furthermore, ONL misreads the OSI as an openly political policy.

The misreading of the Open Source Initiative is actually quite common among young, liberal and eager architectural and artistic minds. Rather than understanding the OSI as an attempt to make the most efficient and quality information technology product, people (mainly young artistic people who cannot

24 Ibid.
25 Ibid.
afford to keep up with the exorbitant costs of off-the-shelf software products) are using the name and general familiarity of the practice of the idea to make a political statement about proprietary ethics in democratic culture. The title page from the website entitled “Open Source Architecture” demonstrates such ideological positions with the heading, “Open Source Architecture: Towards An Egoless, Cooperative, and Evolutionary Practice Of Architecture”.  

The moral overtones of such statements are not in keeping with the founding ambitions of the Open Source Initiative. As the initiative states on their website:

> The Open Source Initiative does not have a position on whether ideas can be owned, whether patents are good or bad, or any of the related controversies. We think the economic self-interest arguments for open source are strong enough that nobody needs to go on any moral crusades about it….The Open Source Initiative is a marketing program for free software. It's a pitch for "free software" on solid pragmatic grounds rather than ideological tub-thumping.

The simple pragmatics of the OSI economic argument are what liberal architectural forums such as Dennis Kaspori's “Open Source Architecture” refuse to acknowledge in favor of ideological and political innuendo.

Other similar projects such as, “Copyleft Architecture: an Experiment in Proprietary Works” properly attribute the ideological origins of their open source attitude to the Copyleft rather than OSI policies, “By applying the principles of open source software development in the context of architecture, the hope is to

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democratize architecture by liberating design schemes from the proprietary
ownership of a traditional copyright."28 Rather than simply a reactionary policy:

Copyleft contains the normal copyright statement that asserts ownership and
identification of the author, however it differs in that it the author gives the work away and
allows recipients the freedom to distribute and modify the work. It also adds the additional
condition in that any new creation based on the original must also be covered by the
same copyleft agreement.29

Copyleft practice is thus grounded in the heart of authorial debate of intellectual
property.

Ironically, it is the more properly politically attributed “Copyleft Architecture”
project that begins to deal with the pragmatics that the “Open Source
Architecture” neglects. It seems that this occurs as a fundamental rift between
definitions of what “source” is in architectural practice. Whereas the “Open
Source Architecture” project refers to an egoless architecture, a statement that
refers to the sharing of design ideas, of creative knowledge as source, the
“Copyleft Architecture” project refers to the sharing and synching of pragmatic
ideas, of “data” as source.

The underlying pragmatic interest of the Copyleft Architecture project, while
shrouded in the rhetoric of democratic transparency, is apparent in the following
statement:

Embracing the copyleft agreement for architectural projects will promote the use of digital
file formats, standardizing interoperability between the numerous CAD/CAM/CAE data
formats, help increase awareness and availability of the works, and encourage anyone
with access and inclination to learn and get involved in the generative design process.30

So the Copyleft Architecture project, despite its liberal political rhetoric is actually

29 Ibid.
30 Ibid.
more explicitly in keeping with the founding pragmatic and economic ambitions of
the OSI, who state that, “the basic idea behind open source is very simple: When
programmers can read, redistribute, and modify the source code for a piece of
software, the software evolves. People improve it, people adapt it, people fix
bugs”.31

Part 3: Conclusions & Speculations

While this text admittedly attempts to compare apples to oranges (patent
policy to copyright policy & American architectural models to the liberal Dutch
models) the aim is to consider in a speculative manner the larger and perhaps
more global effect that varying proprietary attitudes towards information will have
for the definition of what it means to be an architect and how the profession is
defined.

The different notions of “source” point to the self-induced crisis within the
architectural profession concerning “authorship”. As the Copyleft Architecture
project defines it, the source is simply digital data, not big ideas, “the source code
for a project is now stored in digital format — the CAD/CAM/CAE file. Like any
piece of digital media, these files can be transferred, emailed, modified, and
deleted with a simple click of a mouse.”32 While this “click of the mouse”
mentioned by both the Copyleft Architecture project and the CTI case is

31 OSI, op.cit.
32 Copyleft, op.cit.
understood as a threat to the creativity and individuality of the very definition of
the architect by some, it is an opportunity for others to redefine the architecture
field as a collaborative practice, “Open source is a process of growing
awareness, a turn-around in thinking about the fundamental organizational
principles of architectural practice. It is important to depict architecture not only
as an aesthetic object or showpiece, but also as a learning process and a subject
for discussion”.

The issue then, is not the actual clicking of the mouse but the
distinctions between source as: scientific code of invention, as Gehry
Technologies portrays; artistic creativity of authorship as Open Source
Architecture defines; or as data transfer in communication as Copyleft
Architecture suggests. Each of these distinctions renders the future character of
the profession in a different light.

If the architecture profession wishes to consider the real (meaning realizable)
value of an architecture of dissemination, however, it will need to abandon the
ideological premises that claim a strict label of “open source architecture”. This
includes recognizing the potential that the simple pragmatics that digital
networking provides – such as CAD/CAM/CAE synching – and entails less talk,
more action. Furthermore, such realizations entail the recognition of the value of
the proprietary drive of the corporate model of information technology. By testing
information technology ideas in academic and other R&D centers around the
world, Gehry Technologies not only provides a model for a more active method

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33 Dennis Kaspori, “A communism of ideas: towards an open-source architecture,” Archis
of development but also ensures an evolution of digital technology that does confine itself to the pragmatics of problem solving.

In conclusion, the misreading of the OSI is an important reminder to the architecture profession that politic rhetoric only goes as far as is economically viable. As OSI has stated, the “Open Source Initiative exists to make [its] case to the commercial world”.\textsuperscript{34} With the recognition that the commercial world benefits in different, but essential ways from both the top-down hierarchical R&D drive of firms such as Gehry Technologies, and the bottom-up self-organizing force of dissemination that the OSI generates, architecture can redirect its task from rhetoric and ideological discourse surrounding information technologies to the practice of making intelligent and thoughtful interventions in the built (not virtual) world.

\textsuperscript{34} OSI, op.cit.