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The Return of the Art and Technology Lab

John Beck and Ryan Bishop

Abstract

In North America, there are currently over 100 programs and labs committed to collaborative experimentation in art and technology. This article examines the current prominence of art and technology labs in the context of the resurgence of collaborative practice in the arts, not only between artists, but also among a wide range of cross-disciplinary groupings of designers, scientists, engineers, scholars and others. The push for collaboration in the arts is part of a recalibration of the meaning of 'research' as it is understood by arts practitioners, and among the legacies of institutional critique has been the expanded engagement of artists in a range of contexts that moves beyond galleries and museums and into, among other places, universities, businesses, science and tech labs and facilities. At the same time, the massive growth of the tech sector has given rise to a new generation of speculative research enterprise, from Google to SpaceX, which shares, to some degree, the expansive research and development (R&D) horizons of advanced art. Some of the most prominent current art and tech projects explicitly draw on the legacy of precursor programs from the 1960s to establish a lineage and to confer art historical legitimacy upon the new versions. This article examines two current art and tech projects, at MIT and the Los Angeles County Museum of Art (LACMA), and their strategic deployment of their 1960s antecedents: respectively, Gyorgy Kepes' Center for Advanced Visual Studies (CAVS) at MIT, and Maurice Tuchman's Art & Technology program (A&T) at LACMA. This examination argues the loss of a radical vision that preceded the 1960s labs that rendered them untenable while exploring how the art and technology labs furthered a larger shift from progressive

liberalism to neoliberalism. While these earlier projects were short-lived and the targets of considerable criticism, not least due to their connections with military and corporate clients, in the twenty-first century the legacies of CAVS and A&T have been unproblematically reclaimed. Contemporary art and tech projects, we argue, are in danger of succumbing to the same techno-utopianism as their 1960s iterations, as the same military-industrial allegiances that tainted the earlier projects continue to underpin twenty-first century collaborations.

Keywords Keywords: Art and Technology Labs, US Avant-Garde, Cold War, MIT, LACMA, Experiments in Art and Technology

In October 1966, a series of performances titled *9 Evenings: Theatre and Engineering* was held at the 69th Regiment Armory in New York City. The performances, which included the innovative deployment of closed-circuit television, fiber-optics and infra red cameras, sonar and wireless FM transmitters, involved ten artists and around thirty engineers. The project was led by Bell Labs scientist Billy Klüver and artist Robert Rauschenberg, and included contributions from John Cage, Yvonne Rainer, Robert Whitman, Steve Paxton, and others. Despite a mixed critical response, the collaboration prompted Klüver, Rauschenberg and Whitman, along with Klüver's Bell Labs colleague Fred Waldhauer, to launch Experiments in Art and Technology (E.A.T.) in 1967, an organization intended to facilitate further collaborative projects among artists and engineers. At MIT in the same year, Bauhaus alumnus Gyorgy Kepes became the founding director of the Center for Advanced Visual Studies (CAVS), intended to hook artistic exploration into the massive scientific and technological resources of one of the country's leading research universities through a program of fellowships and exhibitions. Also in 1967, Los Angeles Museum of Modern Art curator Maurice Tuchman launched Art and Technology (A&T), a project designed to place artists with industrial partners in order to explore the possibilities for collaborative work, a

selection of which would be shown in a final exhibition at the museum. While these initiatives are representative of the widespread US techno-utopianism of the mid-1960s, where a powerful faith that the problems of society could be addressed by the proper deployment of expert intervention was backed up by unprecedented prosperity and the political will to build a Great Society, they also mark a turning point.¹ Klüver's ambitions for E.A.T. were not enough to encourage sponsors to adequately fund his plans; CAVS and A&T came increasingly under fire for their complicity with the defense establishment as resistance to the Vietnam War intensified (see, for example, Blakinger 2016; Goodyear 2004). By the early 1970s, technology was more often perceived as the enemy of democracy than the lever of emancipation and the oft-stated virtues of collaboration between art and technology had shaded into the more sinister implications of collaborationism.²

Beyond their significance to the history of mid-twentieth century American art, what makes these projects compelling to consider now is that they have become touchstones in a revived interest in interdisciplinary art and technology collaboration. E.A.T. and A&T have recently been rebooted for the digital age, while CAVS is celebrated by MIT as the progenitor of its contemporary successes in media and technology research. Technology, once again, we are told, will relieve us from drudgery, accelerate the

¹ Early discussions of art and science in the 1960s include, for example, Benthall 1972 and David 1973. For more recent assessments, see Goodyear 2004. On CAVS, see Wisnioski 2013; Fred Turner tracks Rauschenberg and Cage from Black Mountain to EAT (Turner 2008); Kepes, CAVS and EAT are also explored in Halpern 2015, Chapter Two.

² Matthew Wisnioski argues that US techno-optimism crested somewhere around 1964: "To be an American engineer in the aftermath of World War II had been to look upon a seemingly limitless future. While the idea that material progress inherently brings social progress always has had challengers, in the United States, the period from 1945 to 1964 was one of near-utopian belief in technology's beneficence. Few denied that the nation was undergoing a scientific revolution, as popular imagery portrayed a futurist world of flying cars and plastic houses. In democracy's name, engineers found government patronage on the frontiers of electronics, aeronautics, and nuclear power that swelled the profession's ranks" (Wisnioski 2012: 3).

realization of our desires and deliver us from dangers formed out of ignorance and outmoded precedent. From a twenty-first century vantage point, the many-acronymed 1960s art and tech initiatives provide a rich prehistory that conforms to and supports current notions of project-led, interdisciplinary, practice-led research and enterprise as the means through which a creative deployment of science and technology will innovate new social forms and new modes of understanding. While the earlier art and tech projects provides a ready model — and valuable archival resources — for their contemporary iterations, the political challenges faced by the 1960s projects, not to mention the politics that drove their original formation (albeit often largely implicitly), remains under explored, especially in relation to the current surge of interest in art and tech research.

The institutions out of which E.A.T., CAVS and A&T emerged were deeply embedded in the fabric of Cold War liberalism, from the corporate power of Bell Labs and the military-industrial research university prowess of MIT to the ascendant defense and aerospace economies that supported the rise of LACMA as a powerhouse of Southern California high culture. Yet the social and political ambitions Klüver, Kepes and Tuchman had for their art and tech projects derive from an older version of liberalism that is grounded in Progressivism's faith in the capacity of scientific expertise, broadly conceived, to ameliorate the corrosive social and economic effects of corporate capitalism. The collaborative interdisciplinary spirit animating 1960s art and tech certainly borrowed something from the shared project that galvanized American science and industry during World War II and which was formalized and generously funded during the Cold War, but this security-driven model was itself an adaptation of the collective creative spirit that characterized the New Deal, on one hand, and, on the other, the utopianism of experiments in progressive education developed at institutions like Black Mountain College in North Carolina from the 1930s to the 1950s. Black Mountain, under Bauhaus veteran Josef Albers, fused the social utopianism of the German design school with the progressive liberalism of American philosopher John Dewey and became a crucial node in an emerging network of sites, such as Rutgers University, situated in New Brunswick, New Jersey, a few miles from the Bell

Labs campus and a hotbed of Fluxus activity, through which artists committed to collaborative experiment, such as Cage and Rauschenberg, circulated. It is through émigrés like Albers, Kepes, and Fluxus guru George Macunias that the European historical avant-garde combined with US technophilia and progressive politics. The process-oriented, collective, socially utopian reading of modernity shared by these two strains provided the platform upon which the 1960s art and tech projects built.³

The capacious reading of science and democracy offered by liberals like Dewey and by the Bauhaus, whereby science stood for a generalized stance of unbiased, egalitarian engagement with the world, however, was severely curtailed following World War II as the managerial imperatives of Cold War security policy sought to protect its elite scientists and persuade the general population that the rising standard of living was the yield delivered by increasingly obtruse, and expensive, scientific specialization. By the time E.A.T., CAVS and A&T emerged as the institutionalized realization of the Bauhaus-progressivist stance, the structures and values necessary for the construction of a civic modernity based on the realization of human creativity through technology were already unsupportable in the US.

The fact that E.A.T., A&T and CAVS have found a new significance in the twenty-first century is not because the collectivist techno-utopia promised by the Bauhaus or Black Mountain has somehow, finally, become the goal of American cultural and corporate institutions; it is because the collaborative, project-based, time-limited interdisciplinary activity advanced by those progressive organizations has been thoroughly integrated into the corporate

³ Kepes worked at Moholy-Nagy's New Bauhaus in Chicago before moving to MIT in 1946; Josef Albers taught at Black Mountain College from 1933 to 1949, where his students included Rauschenberg, among others; Buckminster Fuller taught at both the Chicago Bauhaus and Black Mountain. On the importance of the Bauhaus in the US, see Achim Borchardt-Hume 2006; Grawe 2000; Kentgens-Craig 1999; Vallye 2011. On Black Mountain, see Duberman 1974; Díaz 2015. For a sense of Dewey's position, see, for example, Dewey 1916; Dewey 1938. For an overview of Dewey's significance to US political and intellectual life, see Westbrook 1991.

world. Indeed, the virtues of innovation, creativity, adaptability and collaboration are so widely promoted in the twenty-first century that they no longer refer to the capabilities of scientific or artistic elites but serve as the guiding imperatives of everyday social and economic life under neoliberal capital. The story of the ambitions of E.A.T., A&T and CAVS, their limitations, and their resuscitation in the present moment, is one that provides an outline of the way the collectivist techno-utopianism of the early twentieth century has been restructured as neoliberal orthodoxy. The 1960s art and tech labs mark a turning point — the point at which Cold War corporate liberalism provides the medium for the conversion of the collectivist avant-garde into the precarious labor of the twenty-first century creative class.

Looking Backward

In 2013, LACMA launched the Art + Technology Lab (a plus sign has been substituted for the old media "and" of the 1960s version), intended to provide, as the Museum website explains, "grants, in-kind support, and facilities at the museum to develop prototype projects." Sponsored by Hyundai, the program benefits from the staff and facilities of big tech companies Accenture, Daqri, Nvidia, Gensler, Google, and SpaceX. Artists are promised "access to robotics, EEG, sensors, big data-crunching machines, and even SpaceX flight information." In 2015, MIT's Center for Art, Science and Technology (CAST) received a \$1.5 million Mellon Foundation grant to further promote and enable the center's mission to inspire teaching, research and programming that operate at the experimental intersections of art, science and engineering. In the official MIT news article about the grant, the Institute stressed its fifty years of pioneering work integrating the arts into its engineering and science programs. The news release explicitly links the CAST project of "arts on a civic scale" back to Gyorgy Kepes' CAVS, which it identifies as the progenitor of CAST's studio/lab ambitions. In 2016, Nokia Bell Labs marked the fifty-year anniversary of Billy Klüver's art and technology collaboration by introducing the E.A.T. Salon, bringing together a wide range of artists and Bell Labs researchers. E.A.T., according to Marcus Weldon, President of Nokia Bell Labs and CTO of Nokia, in his welcoming address, "has been a little dormant

for past decades, because in many ways the ideas were so 'avant-garde' that they were ahead of their time." Now, however, with the "rise of smartphones and their canonical apps, cloud based creative software platforms, sophisticated digital image capture devices, and immersive, large scale digital displays or head-mounted VR goggles, art and technology are becoming truly coupled, or perhaps even symbiotic." The "time to EAT," writes Weldon, "has come" (Weldon: online).

Interest in collaborative arts-and-technology research has never been higher, and the LACMA initiative, along with the CAST grant and the E.A.T. Salon, are among many indicators of the trend in the arts toward interdisciplinary collaboration and the notion of art as research.⁴ Indeed, there are over 100 such programs and sites in the US alone at the time of writing (see Shanken 2005; Wisnioski & Zacharias 2014). Reawakened interest in art and tech labs is a consequence, on one hand, of the enlargement of art's field of operations post-conceptual art, and on the other, of the restructuring of the technology sector in the wake of the digital revolution. For art historian John Roberts, since conceptual art, or what he calls, following Rosalind Krauss, "art after art in the expanded field," the collective, reflexive strategies of the avant-garde have become "the grammar of a viable and active art production." Art, he goes on, "is now represented by an unprecedented range of material, immaterial and temporal activities," ranging from the purely ideational and theoretical, through performative, virtual, participatory, and environmental engagements that are often "far removed from official institutional approbation -- even if many public institutions are obliged to draw on these changes in order to make sense of artistic change and stay in the game" (Roberts 2015:21).⁵

⁴ On collaboration, see Green 2001; Kester 2011; Kester 2013.

⁵ The propensity among artists and curators during the 1990s to describe the museum or gallery as a laboratory is discussed in Bishop 2004.

This expansive plurality of forms has emerged as the official art world of global stars, blockbuster exhibits, elite institutions and dealerships has increasingly rendered itself irrelevant to the concerns and interests of a critical art practice, even though, as Roberts suggests, there is no clear-cut or complete separation between the art world and the enlarged sector of art workers he designates art's "second economy" (23). The vigorous growth since the 1990s of participatory and other discursive and pedagogic practice cannot be separated, then, from the deregulated labour market under neoliberalism that has demanded increased worker flexibility, adaptability and entrepreneurialism. The model here is, of course, the tech sector, its countercultural bona fides undergirded by the deregulated market and its capacity to create new modes of cultural production and exchange.⁶

The explicit positioning of initiatives like CAVS, A&T and E.A.T. as the germinal ground for twenty-first century projects marks, then, not only a recognition of the ways the histories of art and technology share a common, if not untroubled, recent history, but it is also an indication of the ways in which the repositioning of historical legacies can legitimate current practice. The revived projects spend little time reflecting on the limitations and failures of their predecessors, which instead appear rejuvenated after a long

⁶ The key figure here is Stewart Brand. The fluid transition from social to market emancipation is deftly explored in Turner 2006. The relationship between participatory, pedagogic, and other discursive modes of art and new technologies is clear in Nicolas Bourriaud's influential notion of "relational aesthetics," where the DIY, interactive promise of the internet is transferred to the production and reception of art: "Nowadays, modernity extends into the practices of cultural do-it-yourself and recycling, into the invention of the everyday and the development of time lived, which are not objects less deserving of attention and examination than Messianistic utopias and the forma 'novelties' that typified modernity yesterday." (Bourriaud 2002: 14). For the critical response to Bourriaud, see, for example, Bishop 2004; Martin, 2007.

period of benign dormancy and ready to provide a retro-futurist underpinning to initiatives now able to claim themselves as part of a half century tradition.

This historicizing move is one of the ways that current art and tech labs significantly differ from their precursors, where the retrospective shoring up of the archive as evidence of a legitimating precedent is markedly absent. In the Cold War moment of the 1960s art and tech labs, the temporal perspective was that of the New Frontier, a world of the future that left behind the traumas of the recent past (the Depression, World War II) and cast an unblinking eye on the horizon ahead. The current retrospective move, of course, is entirely consistent with the retemporalized history of the avant-garde, where each iteration must reflexively include knowledge of its precursors. What is downplayed in the foregrounding of the 1960s art and tech legacy, though, is precisely the extent to which, and the reasons why, those projects were unable to deliver on their utopian collaborative promise. In other words, the claims made now by, respectively, MIT, LACMA, and Nokia for CAVS, A&T, and E.A.T. at once retrieve and construct a prehistory of the art and tech lab that resists a full investigation of the complex interplay among art, technology, institutions and business that shaped and troubled the Cold War-era labs and continues to determine, despite their depoliticized self-presentation, their contemporary descendents. This is akin to a neo-constructivist avant-garde addressing the history of the Russian avant-garde without accounting for Stalin.

While the A&T program, for example, successfully attracted high profile artists and paired them with the industrial giants of the SoCal tech sector, many of the collaborations choked or fizzled out and the resulting exhibition was poorly received and drew heavy fire. The current A+T initiative is shrewd enough to establish some

distance from the original model, claiming it is "inspired by the spirit" of A&T but is much less wedded to the reliance on art stars and the climactic exhibit and more committed to facilitating open-ended exploration conducted by artists recruited through competitive open calls. What A+T has preserved of the original project, aside from hooking up with major tech players, is the stress on documentation. It is largely through the publication that resulted from Tuchman's initiative (and which served as the catalogue for the 1971 LACMA show), knowingly given the flat bureaucratic title *A Report on the Art & Technology Program of the Los Angeles County Museum of Art, 1967-1971*, that the original program has gained art historical traction and from which the current A+T project derives much of its inspiration (Tuchman 1971). The new lab, the LACMA website explains, is "inspired by the transparency" of the original program and offers full digital disclosure of all the lab's work, "including code and data, essays, event and lecture transcripts, images and video, legal documents, project websites, proposals, reports and more." Included in this archive, of course, is a PDF version of the 1971 *Report*.

The appeal to transparency is an oddly preemptive move, as if the museum anticipates accountability to be an issue it must address from the outset. As will become clear, among the problems encountered by the 1960s labs was growing suspicion of the projects as a means of softening the public face of corporate military-industrial enterprise, especially as opposition to the Vietnam War intensified and become more widespread toward the end of the decade.⁷ By flagging "transparency," A+T forecloses on any charge that its intentions might be anything other than in the spirit of open exploration and knowledge exchange. Yet the very

⁷ On the impact of the Vietnam War on the US art world, see Frascina 1999. For a discussion of LACMA and Vietnam, see Goodyear 2008; Kahn 2012; Lee 2004: 9-25.

claim to transparency calls up questions of opacity and concealment and draws attention to the regulation of the archive as a primary means through which legitimacy can be instantiated and sustained.

What has become periodized in histories of the postwar period as the "paranoid" 1970s -- the widespread and broad-ranging suspicion of institutions crystallized by Watergate and articulated through a conflation of all unseen powers into the catch-all notion of the "system" -- is inevitably invoked through A+T's alignment with its precursor program, which to a large extent fell foul of the surging anti-technology, anti-institutional sensibility that accompanied resistance to Vietnam.⁸ While A+T does not address in detail the context of the original A&T Program, it does benefit from a prophylactic move that brackets off dissent in order to seal in the critical heat generated by the 1971 exhibit. In this way, LACMA's celebration of A&T's exemplary transparency operates as a firewall in at least two ways. First, it separates the earlier program from the "system" it was charged, at the time, with being part of and beholden to, making A&T safe as a precursor. Second, that original transparency can be presented as part of the legacy on which the new iteration builds, while filtering out the malware of history that might otherwise corrupt the archive.

This is not to say that CAVS, A&T or E.A.T. are somehow inappropriate models for collaborations in art and technology. What we are suggesting is that the recuperation of the 1960s labs that is being undertaken in order to situate contemporary projects as part of an ongoing history of collaborative practice does not tell the full

⁸ The *volte face* in US attitudes toward technology in the mid-1960s was sudden and widespread. See Wisnioski (2012: 4): "[the new critical consensus claimed that] as a result of technological imperatives -- not just the accretion of material inventions but the systematic interlocking of artifacts, organizations, and patterns of efficient behavior -- contemporary life was becoming more alienating, more destructive, more totalitarian, and less human."

story, since it avoids the broader context within which the utopian energies that fueled the original projects were already out of line with the emaciated public sphere of their managerial Cold War moment. Furthermore, a properly historicized understanding of art and tech labs must also account for the continuities, as well as the differences, between the earlier labs and their contemporary versions. The kind of accountability inadvertently flagged by LACMA's promise of transparency would do well to recognize the vexed relationship between the artistic and military-industrial avant-gardes that rendered the 1960s projects politically untenable despite their often radical underpinning in movements committed to a restructuring of the relation between art and life. Yet this enlarged consideration of what art and technology collaboration might look like outside its corporate managerial frame is hardly possible when the twenty-first century art and tech labs are as networked into the military-industrial-entertainment complex as their Cold War predecessors, this time without the residual, and to an extent redemptive, vanguardism.

It is true that the 1960s projects had different aims from the outset. CAVS was intended, to an extent, to redeem the research university through an injection of the arts into the heavily instrumentalized world of Cold War science and technology. In his CAVS pitch to the university, Kepes (though clearly writing to university administrators) suggested that art might heal what military-industrial applications of science had wrought asunder, arguing that "a place for the visual arts in a scientific university is imperative for a reunification of Man's outlook on life" (Kepes quoted in Ragain 2012). Klüver, more at home in the corporate world, imagined E.A.T. as an organization that, if successful, would dissolve along with the disciplinary distinctions it set out to challenge. The LACMA program, among the three projects considered here, was perhaps the most obviously interested in

courting business and integrating the museum into the broader Los Angeles enterprise zone.⁹ To varying degrees, though, each of the projects remained wedded to a notion of arts and technology collaboration that had little to say about politics and relied on a set of (already old-fashioned and often naive) working assumptions about objectivity and disinterested attention in research and artistic practice that left them unable to adequately confront the Cold War contradictions of their respective enterprises. Social constructionism came too late to help CAVS, E.A.T. and A&T.

In spite of Kepes' progressive ambitions for CAVS, however, from its inception the Center was beset by challenges. When Kepes was asked to curate the American pavilion at the 1969 Sao Paulo Biennale, he wanted the show, echoing pavilion work by the Eames Office and the State Department a decade earlier, to be half "information" and half "community."¹⁰ But whereas the previous

⁹ Many of the participating corporations for A&T were aerospace companies (Lockheed, Pan American, Jet Propulsion Laboratory), major players in computing (Hewlett-Packard, IBM), entertainment (Universal, 20th Century Fox) and electronics (Ampex, Philco-Ford), as well as construction (Kaiser Steel, American Cement) and think-tanks like RAND and Herman Kahn's Hudson Institute (perhaps the most geographically distant of the sponsors, since Kahn moved from RAND's Santa Monica base in the early 1960s to lead his own consultancy in upstate New York) -- the organizations that built Cold War America.

¹⁰ The California-based Eames Office, famous for its multimedia commissions for global fairs promoting US state and corporate interests, operated as a futurist humanities-IT-media-arts lab *avant la lettre*. Closely resembling CAVS (itself a precursor to the MIT Media Lab, founded by Kepes' student Nicholas Negroponte in 1985), the Eames Office fused fine art, design, information theory, media and technological experimentation to pedagogy, as if their synergistic relationship among lab, studio, state and corporation could serve as a model for America's Cold War vision of itself as agent of political and creative emancipation. Unlike CAVS, the Eames Office, served no single institution or constituency, but parallels between these two enterprises are nonetheless useful, not least in the ways they reveal how the dormant (or even

exhibitions were mostly feted for their combination of technological progress as indicative of social progress (actual or potential), Kepes' CAVS-generated exhibitions in Washington and elsewhere became targets of hostile criticism, including from artists invited by CAVS to participate.¹¹ The LACMA project experienced the same problem. By the time the concluding exhibition opened in 1971, what utopian spirit there might have been in the original ambitions for the project were unable to withstand the Vietnam War, Richard Nixon, the shooting of students at Kent State. The idea that US corporations could plausibly collaborate with artists to create new worlds of social progress was now evidence of complicity and corruption -- technology was the problem and not the solution. The LACMA exhibition was taken apart in the art press, notably by Jack Burnham (Kepes' inaugural research fellow at CAVS) and Max Kosloff in *Artforum* and by David Antin in *ARTnews* (Burnham 2015; Kozloff 1971; Antin 2011). The reviews by Burnham and Antin both flagged the "corporate" in their titles -- "Corporate Art" (Burnham 2015: 184); "Art and the Corporations" (Antin 2011:61) -- while Kozloff, in a review Burnham would later call "the most vicious, inflammatory, and irrational attack ever written on the art and technology phenomenon," (Burnham 1980: 210) called his response "The Multimillion Dollar Art Boondoggle" (Kozloff 1971:72).

Burnham, for one, was clear that the problem with the Art and Technology show was timing:

If presented five years ago, A&T would have been difficult to refute as an important event, posing some hard questions

extinguished) energies of the pre-war European avant-gardes are rekindled in the Cold War US.

¹¹ Criticizing the proposed Brazilian exhibit, for example, Robert Smithson wrote Kepes that "The team spirit' of the exhibition could be seen as endorsement of NASA Operations Control Room with all its crew-cut teamwork [...]. If one wants teamwork he should join the army. A panel called 'What's Wrong with Technological Art?' might help" (Smithson 1996): 36.

about the future of art. Given the effects of a Republican recession, the role of large industry as an intransigent beneficiary of an even more intractable federal government, and the fatal environmental effects of most of our technologies, few people are going to be seduced by three months of industry-sponsored art -- no matter how laudable the initial motivation. (Burnham 2015: 67)

Recognizing an element of posturing in the outrage of artists working with industry, Burnham notes "it is permissible to have your fabrication done by a local sheet-metal shop, but not by Hewlett-Packard" (2015: 66-67). For Kozloff, it is precisely the easy seduction of money and power that is so contemptible about the project: even as the country is falling apart, he writes, "the American artists did not hesitate to freeload at the trough of that techno-fascism that had inspired them" (1971: 72). Even Burnham admits there was "something grossly immodest" about the amounts of money poured into the project and is also skeptical of the notion that corporations had any interest in genuine research symbiosis between art and industry -- at best, he thought, companies might get a bit of good publicity for appearing "forward looking."

The A&T Report refers to seventy-six participating artists. Most were well-known; more than half were based in New York; fifteen were European (or working in Europe); eighteen were local LA artists. All of the artists were men.¹² The fourteen who exhibited at LACMA in 1971 were largely high-profile stars, including R.B. Kitaj, Roy Lichtenstein, Claes Oldenburg, Robert Rauschenberg, Richard Serra, and Andy Warhol. Only twenty-eight out of the seventy-six were placed in residencies; those who did not make it into the show either were not finished in time, ran out of money,

¹² The lack of diversity among A&T artists and the prioritizing of New York art stars over local talent meant that the protests against A&T were not just about complicity with the military-industrial complex.

never planned to produce work to exhibit, or had fallen out with their sponsor.

Tuchman's report is perhaps the most interesting and enduring outcome of the LACMA project, a document Antin was already calling in his 1971 review a work of "conceptual art." The *Report* presents the business case, the contracts, the list of companies and their logos, the works completed and, more revealingly, the incomplete, the impossible, the miscommunication, and the breakdown of relations (most dramatically illustrated, perhaps, in John Chamberlain's bizarre dealings with RAND). This attempt at full disclosure presents as strange a view of the collision of the 1960s art world and the military-industrial corporate world as might be imagined. Like many botched experiments, missed opportunities, or heroic failures, it is probably more exciting and inspirational -- at least in retrospect -- than any achieved collaboration. The LACMA Report is like a bootleg of the Beach Boys' *Smile* sessions or the drawings for Jodorowsky's unmade film of Frank Herbert's *Dune* -- an unrealized dreamwork, forever incomplete but full of promise.

The revived A+T program is not unaware of this aura, which is why the website promises to collect the archive of the new project online, almost acknowledging the fact that the 1960s project presented itself best and most fulsomely through its documentation. It would not, indeed, be remarkable if it turned out that A+T is inspired more by the *Report* than by Tuchman's project itself. The *Report* has all the seductions of the archive and none of the messiness of the workshop, laboratory or boardroom. Certainly, no small part of the function of the revived lab is, as we have suggested, to promote and trade on the historical value now ascribed to the original. The new lab has a ready-made prehistory (or, at least, a prehistory in the process of ongoing curation by LACMA), a line-up of (now, if not already at the time) celebrated

past contributors, and an in-house archive to draw upon. Art and Technology '71 might have been a failure but that is now part of the story (though down-played, as are the politics that made it fail). In fact, even past failures can be absorbed into the narrative of Art and Technology as itself a process; 1971 might until recently have been considered a terminal point in a short-lived experiment but can now be reconfigured as an innovative test-run for a reinvigorated enterprise.

Moving Forward

The 2011 White Paper on the Arts at MIT and the 2015 celebration of CAST also make much of the institution's illustrious heritage. The White Paper cites a long, impressive (and exhausting) legacy of technological development from MIT that has shaped twentieth- and twenty-first century perception and aesthetics. The following list is no doubt intended to overwhelm any possible dissent:

strobe photography (1930s), the instant camera (1948), high-fidelity loudspeakers (1950s), the first interactive video game, "Spacewar" (1961), the first television image transmitted by communications satellite – the letters "MIT" (1962), sound synchronization for portable video cameras (1970s), the alcove hologram (1986). The spirit of improvisation and urgency at the "Rad Lab" (MIT Radiation Laboratory) during World War II and later incarnations of the "Magical Incubator" spread to many explorations of art, engineering, science and computation at MIT, notably in Berenice Abbott's scientific photographs for the Physical Science Study Committee beginning in 1958; Minor White's refinement of the Zone System for black-and-white photographic processing from 1965 on; the Film section (later Film and Video) formed by Richard ("Ricky") Leacock and Edward Pincus in the late 1960s; The Center for Advanced Visual Studies (CAVS), established by György Kepes in 1967;

the Architecture Machine group founded by Nicholas Negroponte in 1967; The Studio for Experimental Music, set up by Barry Vercoe in 1973; the Visible Language Workshop created by Muriel Cooper and Ron MacNeil in 1975; and of course the merging of many of these investigative streams in the Media Lab, opened in 1985. There the exploration of interactive systems for computational graphics, film, music, narrative, and performance flourished. (Arts at MIT 2011: 4)

All current thinking about arts-and-science labs, the White Paper suggests, essentially stems from CAVS, which codified and localized within an experimental space devoted to interdisciplinary exploration what had previously been disparate or *ad hoc*. The Rad Lab had its “urgency” due to the war effort that, under Vannevar Bush, aligned governmental, military, corporate and university resources and research. With the nation embroiled in an ongoing, though cold, conflict when Kepes started CAVS, the time for routinizing these sites of problem-solving and innovation seemed to have arrived. The same inference can be made from the White Paper in relation to the twenty-first century: another moment of human precarity needs experimental solutions that yoke art, science, and technology together. “Propelled by the founding of CAVS in 1967 and the opening of the Media Lab in 1985,” the paper argues, “universities, museums, and cultural organizations worldwide have sought to bring together the culture of the studio and the scientific research lab in various experimental settings. MIT is uniquely positioned to exercise leadership and sustain innovation in this area” (14). CAVS now serves as a model for art-science, studio-lab collaborations, according to the White Paper, which posits Kepes’ center as the ur-organization that establishes this formal arrangement (24-5).

The 2011 White Paper on the Arts at MIT also touts the CAST aspirational and institutional line of thinking, stating at the outset

that the university is committed to the “experimentation, risk-taking and imaginative problem-solving” that the aesthetic and social dimensions of the arts provides. Invoking the university’s motto “*mens et manus*” to justify support for the arts at a leading science and tech research institution, the position paper states that the arts are essential to the university’s “mission to build a better society” and meet “the challenges of the 21st Century” (iv). These sentiments clearly echo those espoused by Kepes, and the White Paper, in looking forward, looks to its past when it argues that all current and potential thinking about arts-and-science labs at the institute essentially stems from the Bauhaus-inflected CAVS (24-5). In spite of the rhetorical equivalence given to technological, scientific and artistic research, the university document explains “that MIT students want to create useful things that will make a difference in the world, but many of them want to make things that are beautiful, provocative and arresting too.” To clarify the point subtly made in the previous sentence, it states “such things also make a difference in the world” (v). The necessity to underscore that instrumental and aesthetic developments can both contribute to progress seems striking given the purpose of the White Paper. However, as with Kepes’ rather blatant appeal to set up CAVS that was published in the special issue of *Daedalus* some sixty years earlier than the White Paper, the audience for the art and technology alliance here is, once again, university trustees whose operating assumptions about the instrumental advantages of art versus technology certainly favor the latter. Now the trustees are also keeping an eye on a bottom line driven by market demands because the Cold War federal largesse is as much a thing of the past as is Kepes’ communal goals for the betterment of society as an end in itself. This decided distinction is articulated in the White Paper’s executive summary by linking the import of “research at the intersections of art, science and engineering” to MIT’s “competitive advantage” with such research that will “determine the artistic and

performative languages of the 21st century” (v). Such determination of these languages, one assumes, will translate into furthering the university’s “competitive advantage” as well as additional funds for CAST and its institutional host.

In arguing for more archival work to be done for CAVS-based research in the present, the White Paper argues the CAVS materials “document the process of collaboration itself, considered so crucial to breakthrough innovation today” (24). Linking CAVS to the wildly successful Media Lab, the White Paper positions each as a “*salon des refuses*” composed of those who fell between disciplines and even institutions (25). Supporting and bringing together otherwise anomalous individuals in this kind of experimental site, the White Paper implies, is how to cook up breakthrough innovation, thus advancing knowledge and society (as well as profit). What is effective about this sort of narrative is how it foregrounds the anomalous, creative, interdisciplinary types attracted to projects like CAVS even as it remains embedded within the normative organizational values of the neoliberal university.

The new A+T lab also seems comfortable enough reproducing the political blind spot that so antagonized critics in the 1970s. For example, discussing John Craig Freeman’s project “EEG AR: Things We Have Lost,” founder and CEO of DAQRI Brian Mullins enthuses about the ease of the collaboration because “the relationship between technologist and artist is extremely fluid as both are constantly pushing the limits of what’s possible in both of their mediums, which is pretty exciting. It opens up the possibilities for all kinds of interesting innovation.” Freeman follows up by stating such apparently easy collaborations are really a matter of sorting out transactional relations within the innovation economy when he claims that “although there is an inherent tension between the proprietary, often secret, profit motivation of successful technology

companies and the public service mission of large institutions like LACMA, the Art + Technology Lab seems committed to exploring and possibly overcoming this tension.” Freeman expresses his belief that the success or otherwise of art and technology collaborations hinges on “how fluid the roles between artists and technologist are, and on how willing each party is to freely share intellectual property” (“Art, Technology, and Collaboration” 2016: online). Despite Freeman’s blunt explanation of the real stumbling block in the current collaborative configuration, he brings the short interview around to his work and its content as well as its artistic lineage. The role that chance plays in the augmented reality work he produced with DAQRI, according to Freeman, connects to Duchamp’s “Three Standard Stoppages” and John Cage’s experiments with the *I Ching*, thus throwing down the project’s avant-garde bona fides while securing chance a spot in a world in which memories are materialized on screens through brain wave visualization technologies in both his specific piece and in the technologies DAQRI is pursuing generally. Mullins, for his part, speculates on the increased interest in the tools on display as potentially leading to cheaper and better quality machines and software. It is fitting that Freeman invokes the Duchamp work because the term *stoppage* refers to tailoring and a technique for invisible repair of a garment. As with the Cold War moment of the LACMA A&T program, the return to these sites as ones meant to generate something novel for the participants, the sponsors and society (or at least the economy) – to invisibly repair the tear in the larger social fabric.

The shadow of the "system" that besmirched the 1971 A&T program is not so readily apparent in the 2013 reboot, but that is partly because military-industrial research and development is now more likely to buy in innovation from ambitious private sector firms than to rely on Cold War corporate giants like Lockheed or Boeing. A 2014 Reuters article, for example, reports that "the Pentagon has

switched from taking the lead in developing technologies like GPS satellites and now looks to commercial players for innovations like 3-D printing" (Shalal 2014). Former Raytheon chief engineer Andy Lowery explains in the article how defense suppliers are adopting virtual reality technologies to cut costs, and smaller, more commercially oriented firms are quicker to utilize such technologies. Lowery is president of DAQRI, a VR software company currently marketing the "Smart Helmet," promoted as the "World's First Wearable Human Machine Interface," and one of LACMA's Art + Technology sponsors. The example Lowery offers of a lithe new player in the defense business is Space Exploration Technologies, or SpaceX, Elon Musk's company that in 2015 beat Lockheed and Boeing to win its first defense contract (an Air Force GPS satellite) (Isadore 2015). SpaceX is another LACMA sponsor. Hyundai, the major sponsor of the Art + Technology program, includes the Hyundai WIA corporation which produces remote weapons systems for global markets (as part of its deal with LACMA, Hyundai funded the acquisition of works by Robert Irwin and James Turrell, both of whom featured in the original A&T) (Tewksbury 2015). Nvidia produces military-grade supercomputer chips; the architecture giant Gensler's client-base, needless to say, includes defense and aerospace interests.

None of this is a revelation, any more than it was news in 1971 that A&T's sponsors were in the defense business. LACMA's claim of "transparency," then and now, is not much of a claim (though there is often a certain luster to be attained through overt displays of integrity, as in Google's by-now notorious "don't be evil" pronouncement). The new LACMA project does not acknowledge the problems of the 1971 program, as if Burnham's "bad timing" assessment explains away the fate of the original A&T program. When, after all, would be the right time to launch an art and technology project underwritten by military-industrial companies?

There is little evidence now, or then, that modes of technology might be imagined that emerge in contexts that are not produced out of the capitalist marketplace. Indeed, now that companies know how to work with museums, the fit between museum and corporation is more seamless, fluid, and mutually supportive than it appeared in 1971, when the besuited, middle aged white executives looked so clearly misaligned with the hairy, young white male artists on the cover of Tuchman's *Report*. A+T is no boondoggle for Hyundai and the other sponsors but a means of aligning their brands with the entrepreneurialism and risk-taking that are now considered as desirable in artists as they are in start-up companies. In fact, in the new iterations of Cold War-era art and tech labs, there is no real friction at all -- technology and art are no longer the separate spheres there were once seen to be; indeed, the art and tech lab is increasingly part of the public face of "normal science," to borrow from Kuhn. Or, to shift register only slightly: business as usual. It may still be the case, as Burnham suggests, that industry has nothing much to learn from the "research" of artists that it cannot find out for itself, but unless the new art and tech labs can find ways of interrogating their institutional underpinning (not to mention their funding streams), the terms "art" and "technology" are likely to remain, in the end, normative.

Art and Technology Labs Past and Present

CAVS, E.A.T. and A&T all drew, in one form or another, on the accumulated history of the avant-garde and these projects mark some of the ways early twentieth century art took root in the US.¹³

¹³ Albers at Black Mountain and Kepes at MIT signal the transference of Bauhaus utopianism to an American context; Ray Eames studied abstract painting in New York City during the 1930s with German émigré Hans Hoffman; the teenage George Maciunas arrived from Lithuania in 1948; long-settled in the US, Duchamp became an American citizen in 1955; the first Duchamp retrospective was held

There was always more than one neo-avant-garde and the political and aesthetic commitments of the various branches and tributaries fragment and splinter accordingly. If there is a thread of continuity across these projects, though, it lies in the serious investigation of the prospects for art as a mode of practice directly engaged in the production of new forms of living. To this extent, the spark of the historical avant-garde keeps firing in studios, workshops, and laboratories across the US during the 1950s and 1960s. It is no surprise that the collectivist experimentalism of their European progenitors mutates under pressure from the managerial liberalism in ascendance in America during the first decades of the postwar period. World War II secured the belief that only through the mobilization of national resources and the renunciation of private interests could the threat of an equally collectivized and barbarous foe be resisted. The virtue of the free American individual may have been widely circulated at home and abroad through the loose encoding of abstract painting as individual expression, but avant-garde futurism is a collaborative beast and requires infrastructure and finance to give it momentum and leverage. This is where the interdisciplinarity of the think-tankers and systems theorists, progressive educationalists, inventors and tinkerers converge with the design scientists, performance artists and social engineers -- on the ground cleared by a commitment to the scientific method, broadly understood as the processual interrogation of the limits of the known world.

The 1960s art and tech labs make most sense when the commitment to collective enterprise is understood, not merely in its often-fearsome technocratic mode but in its recognition that complex societies require a degree of understanding that can only be collectively produced and maintained. This was the Progressive

at the Pasadena Art Museum in 1963, much-cited as a watershed moment for West Coast artists.

understanding of how science, as a stance toward the world and a method characterized by objectivity unslanted by class or ideology, might function for the public good. To be sure, what emerges with this conception of science with is the cult of the expert and of the bureaucrat, of conformity and the subordination of the individual to the demands of an often-reductive utilitarianism. But this assessment is too narrow and too beholden to the critique of the "man in the gray flannel suit" that grew out of the pinched instrumentalism of Cold War-era managerial culture, as if the answer to an overly regulated society is simply to release the individual from burdensome responsibilities. What was sometimes forgotten in the assaults on the "system" in the late 1960s and through the 1970s was the commitment to the possibility of an emancipatory technology, a collective imagination, and a belief in democratic government as the guarantor of prospective and redistributive forms of creativity. By locating the problems of democracy as systemic rather than political, the retreat from the notion of a collective, state-supported project of radical future-building descended into the free-for-all of the contemporary neoliberal polity.

The ways in which explorative art and tech labs repurposed the avant-garde may indeed have facilitated their conscription into the service of corporate think tanks and a degraded popular culture, but to dismiss such projects merely as corporate art is to miss the broader engineering of consent taking place through the repurposing of "individual freedom" as the wrench that uncouples what used to be called the citizen from what is still, disparagingly, called the state. In the end, what mode of art best serves an acquisitive, amoral, post-national capitalism? An art of investigation conducted through process-oriented collaboration and committed to invention and experimentation? Or an art of competing signature styles hoarded by a global elite, circulated for public display in a

series of gilded palaces, and traded on the open market in displays of grotesque ostentation? If the contemporary art and tech labs are to be more than institutionally-supported start-ups for the next generation of Elon Musks, populated by ambitious interns and short-term fellows, the radical roots of their 1960s precursors must be attended to as well as the understanding of science, democracy and the public that supported them. It is not enough to dismiss their "failure" as a mistaken dalliance with "the system" without an assessment of how the disrupted legacies of the historical and neo-avant-gardes have, often simultaneously, replenished and undermined institutional experiments in art and tech knowledge exchange. Beyond questions of funding and complicity, though, what remains apparent is that the new labs continue to incubate, unreflectively, the contradictory nature of the enterprise. Without a politically utopian driver, it is hard to see what innovation in art and technology collaborations can be other than more product and more spectacle. The belief in experimenting a way out of any problem was both the best and worst aspect of 1960s labs and a fantasy that remains in the twenty-first century.

What is at stake in these art and technology labs reclaiming the proper names of their progenitors that we have examined in this article? A proper name indicates proprietary control, legal or otherwise. It invokes a singular. The "proper" of a proper name properly removes it from conflation with others while depending on those others for its ability to differentiate itself. This performance of a traveling shot of the history the art and technology labs through the reinscription of proper names simultaneously lays claim to the earlier instantiation's aura of authenticity and draws attention to the proprietary claims being affected solely through quotation. That is, in seeking identification and continuity, the proper name reused (perhaps improperly) merely underscores the lab's differences from its earlier self and reveals the name's proprietary power manifested

as property: creative and intellectual property. The act of appropriation metastasizes into the appropriate: confronting contemporary conditions in a register worthy of them. The utopian desires of the neo-avant-gardes of the 1960s experimentations, for which Kepes and CAVS and many others serve as metonyms, might well be lurking in the current instantiations but the difficulties in detecting them result from their very strategically self-reflexive rhetorical moves that proffer a reactive gesture to a moment in which people were creative to remind us that such might be possible for us. They also offer us institutional instantiations of how the Cold War art and technology labs (as well as labs writ large) helped facilitate a shift from progressive liberalism to neoliberalism in the US.

Writing in the 1980s, Lyotard argues there is “a kind of collusion between capital and the avant-garde” due to the dependency of both on “the force of scepticism,” a mistrust of rules (and materials) and destruction of the status quo. (104-5). Capitalist economy relies on and is regulated by “an Idea,” that of pure wealth or power for which it offers no example from reality as proof. The Idea is merely posited. Indeed, through the operations of technologies that have made “science subordinate to itself,” he claims that reality has become “increasingly ungraspable, subject to doubt, unsteady” and thus aligned with avant-garde principles. (105) The artwork is no longer dependent on the state or a clearly delineated socio-cultural set of parameters but can emerge directly out of market economics. With the art and technology labs of the mid-century, and fundamentally the experiments at and that were Black Mountain, the artworks addressed the state and its aesthetic allowance. But as we have noted, the capacity of late capitalism and its market economics have sublimated this address and appropriated it for other ends, and not just those of the art market per se. Similarly it is worth considering to whom the current art and

technology labs address their works/experiments. Further if, they are directed towards consumer markets that largely elide the art market and that are bereft of state-directed demands other than that of innovation, where can that avant-garde position itself other than as a sign for appropriation? And, more to the point, how can an art and technology lab with a radical agenda succeed if it is underwritten by Bell Labs or SpaceX?

Adding experimentation (as rationale for the lab and the primary function of the lab) to a covert collusion between capitalism and the avant-garde further elaborates the shifts we have tried to trace here. Experimentation is a cultural technique that dominates the 19th and 20th centuries in ways that cannot be delinked from technology, the various measuring and tracing apparatuses that allowed for significantly altered ways of understanding the senses and their operation as well as the detection and measurement of natural phenomena far beyond what our corporeal senses can register. The site of experimentation (the lab) and its unquestionable connection to social progress meant that art and the lab were bound to find formal links, as Edison's Menlo Park proleptically indicated. Experimentation in the 20th century maintains the experimental subject as passive agent under the control of formal scientific processes (e.g. hypothesis, controlled environments, standardized tools, measurable outcomes and academic scrutiny) but it also was seen as liberating the subject from the rules that bind its constitution and operation. This is the avant-garde, which asks what can we remove from 19th century aesthetics that claim and exemplify the autonomy of artistic production and still be able to call it art: medium, colors, mimesis, subject matter, mode of production, site of exhibition – all were removed or reconstituted as if in a kind of phenomenological reduction to art's essence. Thus the lab as a site for both passive and active experimentation makes perfect sense both in the Cold

War and contemporary moments. But doing so within capital's destructive impulses and then merely codifying experimentation as being suspicious of the rules marks it as cultural technique and a site of liberation that no longer is meant to further science or art or social progress but merely to generate enough innovation (enough difference) to convert appropriation once again into property.

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