In the last few decades the art world has been flooded with a number of terms invented to define the developing artforms employing the so-called ‘new’ technologies; for example, electronic arts, digital arts, media arts, new media and most recently, cyberarts. While all these terms have been variously useful in defining historically specific developments in contemporary artistic practice, term cyberarts has emerged as the most useful and inclusive. For example, the term Electronic Arts is historically-specific to some art practices from the sixties till the early eighties which were based on and operated via electronic systems. The term ‘digital arts’ is also historically-specific to the digitisation technologies brought about by developments in computer graphics. These technologies have themselves been superceded by the so-called ‘cybertechnologies’ of which digitization is merely one aspect. Moreover, the term digital arts in also limited by the type of authoring techniques used and images / sounds thus generated. However, it is noteworthy that the term ‘digital arts’ enjoys and may continue to have currency in the contemporary art world. The term, ‘cyberarts’ proposed here seeks to ultimately replace ‘digital arts’ by providing a more comprehensive term to embrace artworks and practices that already go beyond ‘digital media’.

The most recent term that has been invoked to refer to these technologically driven developments in contemporary art is ‘new media’. Lev Manovich, the media theorist, has in his recent book, The Language of New Media, identified five characteristics that conceptually distinguish ‘new media’ from previous art forms. These are namely, numerical coding that facilitates the programmability of the media; modularity that creates a structural discreteness of its parts; automation of its production and access; variability, meaning that the media can continue to be presented in variable formats and versions well after its ‘completion’; and finally, transcoding, insofar as its codes operate between and are therefore transferable across different systems. While, Manovich’s conceptual clarification of what constitutes ‘new media’ is incisive and useful for our understanding of many of the contemporary developments in art and technology, there is no reason why the term ‘new media’ is most appropriate. The term ‘new’ in new media, is conceptually empty insofar as what constitutes the ‘new’ at any point in time is so variable as to impossible to identify. The use of the word ‘new’ also does not facilitate a better theoretical framing or understanding of the peculiar artistic and/or technological developments of these emerging art works. However, given the theoretical value of the abovementioned characteristics to illuminate our understanding of the ongoing developments in the cyberarts, it would be useful to coopt them into our understanding of the cyberarts.

The term ‘cyber’ derives from the Greek root, kubernare that refers to the “act of controlling a ship” where the ‘pilot’ was referred to as kubernetes. Kubernare is also the root of the word, ‘government’ which refers to the composite acts of control as well as the organization / entity that is charged with that task. The mathematician Norbert Weiner defined cybernetics as the study and strategic deployment of communicative control processes within complex systems constituted by hierarchically ordered entities. And by this he initiated a revolutionary development in the way we
have come to think about information and control. Cybernetic systems are thus conceived to be made up of information flows between differently constituted entities like humans, computers, animals and even environments. The flow of information was conceived as a principle explaining how organization occurs across and within multiple hierarchical levels. This meant that seemingly bounded entities could be translated / codified into information thereby enabling interfaces and easy interactions between them. It is in fact arguable that in the last two decades a large amount of technological innovation has been towards greater, for want of a better word, cyberneticization. This means that in addition to innovations that allow existing technologies to become integrated with each other through cross-platform operability, the ‘new’ in many ‘new technologies’ have been exactly their ability to hybridise previously separate functionalities, e.g. web-integrated mobile phones, biochips, artificial life, etc. It is this translatability, more accurately desire to translate, different physical entities and processes into information as well as the programmability and control afforded thereby that distinctly characterize and enable what have come to be called cybertechnologies.

Thus, one can sum up that the term cyberarts refers to all those art forms, practices and processes that are produced and mediated by the continuing developments in cybertechnologies, specifically in information, communication, imaging, experiential, interface and bio-technologies. The cyberarts as defined by contemporary art practice include the following: digital imaging (whether as digital painting, digital photography and digital video); computer animation; holographic art; virtual reality environments, including gaming; robotic arts; net-art, including works in hypertext and telematics; human-machine interfaces (e.g. cyborg technologies); bio-arts that employ biotechnologies (e.g. DNA music, transgenic art, artificial life); computer music & sound arts; and hybrid art works involving interaction with other art forms (e.g. theatre, dance, installations, etc.).

This exhibition introduces the Singapore audience to the exciting art works that have resulted from the intersections of art with recent developments in technologies. The term, techn?, which forms the root of the word ‘technology’ in the classical Greek referred to the means and methods of creative making and as such was not different from the idea of art. However, historically technology has been relegated to refer to functional and pragmatic creation in contradistinction to art. The aim of this exhibition is to deliberate on the intersections and productive tensions between art and technology as exemplified in recent developments in the cyberarts. Given the serious lack of such artforms and practices in Singapore the exhibition had to jumpstart its systematic development by facilitating the local production of exemplary works in the field of cyberarts. Through an initial curatorial briefing and introduction to the cyberarts, proposals for projects dealing with intersections of art and technology were invited. Interested artists were advised to concentrate on the conceptualisation of their projects without being too concerned with the technological peculiarities and requirements of their proposed works. This was especially crucial as there was a paucity of artists working with cybertechnologies in Singapore and as such, the bulk of the proposals were anticipated to be from those who worked with other media. From a total of nearly thirty proposals, seven proposals were finally selected. The selection was based not simply on the artistic merits of the works but on the potential to exemplify and generate critical discussion on the intersections between art and technology. Selected artists were then matched with appropriate technological experts to consult and aid in the production of the final works. The
works in this exhibition have been curatorially drawn together on the basis of two central issues in
cyberculture: virtual actions and virtual spaces. All the works deliberate on how our conventional
notions of spaces and action are complicated by technologies of and encounters with the ‘virtual’.

En-countering the ‘virtual’
The genealogy of the mouse and joystick, according to Axel Roch, can be traced back to military
imperatives and technologies. Roch argues that early optical tracking and target selection systems,
developed for the automated operation of weapons during and after WWII, were crucial
technological precedents to the mouse. Bell Laboratories, just prior to the Korean war, developed
an automated radar tracking system for air defence that reduced the tasks of the soldier to merely
pointing at and selecting the targets. This meant that, “flying objects could be marked
electronically on the radar screen and then turned over to the system to be tracked and
subsequently shot down.” (Roch, 2000: 123) The electronic markings on these radar screens were,
in fact, the earliest versions of the cursor. Roch states that the “the structure of fire control -
tracking, computing / predicting and firing - framed future interaction with machines: input,
processing and output.” The push-button operation of the mouse, that facilitates easy selection of
options that are pre-scribed and displayed on the computer screens, is yet another invention
developed for the military imperatives of efficient transmission and execution of commands.

This historical association of the mouse with the systematic exercise of violence is, I suggest, not
accidental. The ways in which the screen interfaces it facilitates and are activated by are clearly
exploiting this potential. The most dramatic use of the mouse (and the joystick) with regard to
exercising targeted aggression must surely be in computer games - for here, the mouse (joystick or
keyboard) continuously reaffirms its identity with the always-already weapon it is. Two of the
works in the exhibition critically explore this potential of the mouse to initiate virtual violence.
The first, is a multiplayer gaming environment by Charles Lim. To the millions who watched the
numbingly repeated telecast of CNN’s Gulf War images of a guided missile that accurately hits an
Iraqi target, the distinctions between the ‘real war’ and the ‘simulations’ of it were confused to an
extent that problematized its ethical scrutiny. The hyperrealistic games where one shoots away
trigger-happy at on-rushing and hidden enemies do not constitute any readily-apparent and thus
ethically significant differences from the daily images of wars one watches on television. In fact,
the visual devices used by TV coverage of wars, specifically first-person perspectives, accentuated
by shaky cameras, jerky movements and tracking shots ‘as they happen’, have been carried over
without much changes into multiplayer first person shooter (FPS) computer games. The FPS
format of computer games like Counter Strike, Quake and Doom adopt the viewpoint of the player
aimed at providing the player with a greater sense of involvement and immersion in the action. In
a typical FPS, the tip of the player’s weapon juts out from the bottom end of the computer screen
as if the keyboard and/or joystick that control the weapon are continuous with it. The
trigger-happy TV camera has been replaced by the simulated weapon, both of them ‘shooting’
away at whatever appears within the visual field. The work by Charles Lim (a.k.a., deadfish) along
with a group of game mappers, is a ‘game patch’ that has cannibalized on an existing net game,
Counter Strike, by replacing the given environments with local spaces and characters for players
to interact and play within. The familiar spaces of a HDB estate and game characters speaking in
Hokkien (a local Chinese dialect), unsettle the experiences of the player by transforming the game environment from an abstract, nameless space, that it usually tends to be, into one charged with personal and cultural significance. It is problematic to read such gestures as simply localizing strategies on the part of gamers aimed at unsettling the cultural imperialism of those who produced the original versions. It is useful in addition to consider the work as an attempt to reveal the ethical ambiguities of virtual actions by complicating it with elements of lived and recognizable reality. By injecting hesitation into the trigger-happy environment of the game through its framing within recognizable contexts, allows for the critical and ethical evaluation of one’s complicity in seemingly trivial game actions.

Another work that unravels the violent complicity of the mouse is the work by Margaret Tan that brilliantly explores the ethical implications of our actions on virtual objects. Her work involves the use of the male and female virtual bodies of the Visible Human Project. The Visible Human Project was initiated by the National Library of Medicine in the US in 1986, with the successful creation of two virtual anatomical models, a male and a female, by 1995. A male convict named Joseph Jernigan, sentenced to death for his crimes and an anonymous woman, whose bodies had been donated for scientific research were systematically sliced by a cryomacrotome and then imaged by Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) technologies. These images were then converted into computer data files which were subsequently reconstituted piece by piece to form the two ‘virtual’ bodies. “The entire Visible Male Archice consisting of 1,874 24-bit digitized images of slices, and occupies 15 gigabytes of computer storage space, the equivalent of 23 CD-ROMs. The Visible Woman... was planed into much finer cross-sections (5189 sections) which produced higher resolution in the resulting images and a much larger data file.” (Waldby, 2000: 15) Margaret Tan attained the rights to use the Visible Human Project data for her work. In her work, she has made these figures available for visitors to interact with in certain predefined ways. Once the visitors have registered their name, age and sex they would be able to use the mouse to select a spot on either one of these virtual bodies and either afflict a bruise on them or ‘heal’ the wounds. The work seeks to create an interactive context within which one’s ethical stance towards violence becomes problematized by eliciting responses towards seemingly ‘virtual bodies’ of ‘real people’.

In his fascinating study, *Obedience to Authority*, Stanley Milgram found that students who volunteered as test-subjects in an experiment on memory and learning, where they were cast as ‘teachers’ continued to deliver massive doses of electric shock as learning reinforcers to other students who role-played ‘learners’. The ‘teachers’ insisted that they continued delivering these extreme punishments to the test subjects without regard to the apparent effects on the latter because they were repeatedly ordered to do so by ‘an experimental scientist’. The Milgram experiment concluded that acts of cruelty do not require or issue from some radical departure from normal conduct (e.g. sadistic personality) but rather are in perfect consonance with the banality of everyday experiences. In fact, it is this very banality of these actions that subverts the possibility of their ethical deliberation. Milgram reflected on his findings thus: “ordinary people, simply doing their jobs, and without any particular hostility on their part, can become agents in a terrible
destructive process. Moreover, even when the destructive effects of their work become patently clear, and they are asked to carry out actions incompatible with fundamental standards of morality, relatively few people have the resources needed to resist authority. The issue however does not seem to depend on the specific nature of authority structures or persons that call upon one to act in an ethically questionable manner. Authority seems to function most effectively when it presents itself in the guise of the banal and even the trivial, where one's complicity is not marked out as ethically significant. Margaret Tan's work purposefully attains the visitors' complicity by the very structure of the registration process that mediates their interaction with the virtual figures. The visitor registers with their name, age and sex to initiate an interactive relationship with the work; surely a re-enactment for many of them of an everyday ritual of registration that allows them to be recognized and dealt with by cash-teller and government official alike. The selection of a 'hit' or 'heal' and of the male or female figures as targets for that action simply follow from the initial registration, or at least, it seems so for the one within the interactive context. The final targeted use of the mouse to hit or heal the figure seems to become almost inconsequential insofar as it is perceived (or not 'perceived' as such) to follow from the earlier actions. The ability to interact, by acting upon objects which themselves lack the capacity to respond in any other way but in accordance with that action, provides a strong reinforcement for the continuation of that action; most games and playful interactions exploit this form of interactive complicity. The actions of those who interacted previously (the last ten) is archived just below the registration section with information on the name, age, sex and the 'hit' or 'heal' on the male or female figure. This archive mimics that of arcade and video games where the scores of the top winners of the games are indicated both to inspire, frustrate and humble those who 'play after'. The association between the interactions with the virtual game entities and the 'virtualized real persons' of the Visible Human Project that is thus made by the work heightens the ethical ambiguity of these interactions even as it frustrates it. One's cognizance of the scores (and possible excesses) of others may both caution one to be a little more cautious in one's own responses and/or gain one's complicitous relationship to 'play along'.

Catherine Waldby in her excellent study of the Visible Human Project argues that the project exemplifies what she calls an 'iatrogenic desire'. Iatrogenesis is a pathological condition resulting from a medical treatment aimed at addressing an earlier and different pathology. The cruelly ironic situation of worsening one's heath by the very thing that was meant to cure or treat it reminds us not just of the vulnerabilities of our bodies but also of our frustrating attempts to correct them. Thus, iatrogenesis symptomatises the contingencies that mediate and frustrate the relationship between our bodies and the medical technologies that are targeted at addressing their pathologies, where there is no simple and direct correlation between illness and treatment. According to Waldby, "(I)atrogenic desire is a kind of authorial desire in that it wants to 'make up' entities as acts of technically specifiable procedures which will produce reliable forms of life... reproduced in stable, technically manageable ways." While the iatrogenic desire is most clearly exemplified in the history of medicine with its endless battle to shore up the body against its inevitable decline and delay death, it is arguable that developments of machines that compensate for the frailties of our bodies and its operations, like robots, computers and human-machine interfaces are also indicative of the desire towards creating perfect and/or perfectible entities. It is in fact the "desire for programmable matter, for a capacity to order materiality according to the algorithmic
efficiencies of the computer.” (Waldby, 2000: 114) Margaret Tan’s work provides an interesting
platform to realize and come to terms with the operations of this iatrogenic desire. Her work
reveals the iatrogenic desire by the liberties taken in and pleasures derived from the interactions of
those whose actions with these VHP figures have been relatively freed from the seemingly higher
ideals of medicine and science that justify the anatomical uses of these very same figures. It
reveals the extent to which this desire for programmable matter proliferates an ethically
problematic relationship to the world around us, whether it is ‘virtual’ or ‘real’.

Yet another work that deals with the notion of responsibility and the question of ethics with
reference to ‘the virtual’ is that of Irina Aristarkhova. The Greek term *chora* can be variously
translated as “place, location, site, region, mother, nurse, receptacle, and imprint-bearer”. It has
come into currency in contemporary architectural theory as a term referring to a pre-original site
that forms a chaotic space for the coming into presence of things. It is a space that is always
already there, to give place for possibilities. However, it is a space that is itself (supposedly)
outside of space, and that does not have a space of its own. It is a space for the creation of things
that come into being as a result of a mixture of untoward and creative actions. A website also is
thought to be a space for things to be presented, though it does not have a *topos* of its own.
Aristarkhova’s work converts her own website into a virtual chora wherein net participants can
freely create or simply upload whatever they wish to by having free access to its space. The
“welcome”, Derrida claims, “operates everywhere in order to speak of the first gesture in the
direction of the Other.” (Derrida, 1999: 25) Drawing on the theoretical works of Derrida and
Levinas on the notion of hospitality, Aristarkhova’s work seeks to demystify and problematize
notions of freedom on the net by enacting a hospitality that defies her own ownership and control
of ‘her’ web space. Her work questions as to what extent one can be open to the other, to the
‘totally other’ (not the predictable and prescribed responses) on the net. How does one own and
yet share, infinitely?

Albert Camus mused that “(T)here is but one truly serious philosophical problem and that is
suicide.” Suicide is an experience that cannot be reflected upon *ex post facto* and thus, can only be
experienced virtually by those who choose to live on. Insofar as the willful choice of death reflects
a disregard for the reality that living represents, contemplation of suicide constitutes one of the
most virtual of our encounters. The work of Vincent Leow presents an interactive installation that
enunciates the brink moments of suicide by a sampling of sounds and video images triggered by
the visitors’ curious interactions with a screen interface. The ‘realities’ of suicide are playfully
invoked and revaluated by its virtual enactments.

The work of *tsunamii.net* offers a serious critique of our conceptions of net space vis a vis what
we understand as ‘actual geographical space’. The work involves a performer carrying a Global
Positioning System (GPS) device whose urban movements sent via mobile phone simultaneously
initiate a series of web browsing movements and operations in net space. The webwalker, as the
specially created programme is called, ensures that physical walking is the only way to surf /
browse the net where the walk is across different IP addresses, themselves clearly issuing from
specific geographical spaces. The work examines the ways in which technological devices / facilities like the handphone, GPS systems and web tools conflate and expand conventional notions of geographical space, distances and the bodily engagements implied by them. By simultaneously traversing real geographical space, a GPS map space and net space the performance marks out the differences and continuities between these spaces.

The drive to find actual reference points for the ‘virtuality’ of cyberspace form the conceptual basis for the work, Body Browser, by Paul Lincoln. The body has historically and across several cultures been a major metaphor for the organization and conceptualization of space. Indian architectural theory has traditionally relied on the concept of Vastu, the figure of a human body that aids in the conceptual structuring of built environments. Le Corbusier notes that “(T)he builder takes as his measure what is easiest and most constant, the tool that he is least likely to lose: his pace, his foot, his elbow, his finger.” This results in a space that is made “to his own scale, to his own proportion, comfortable for him, to his measure. It is on the human scale.” (Le Corbusier, 71-2) He was so convinced of the value of the human dimension in structuring space that he conceived of the ‘Modulor’, an archetypal image of man with specific measurements assigned to it for his architectural projects. In a gesture similar to tsunami.net’s use of mapped space, the work of Paul Lincoln employs the body as a tool to reframe and map the net. An image of a body is used as an interface to initiate web browsing where the sites visited correspond to names of part of the body clicked on by the viewers. Both the works of Lincoln and tsunami.net symptomatise an anxiety about the expansive and mysterious extensions of net space and an attendant desire to domesticate and have better control over it.

Damien Lock’s installation, Acoustic Acclimation, presents a sound environment that samples the various acoustic experiences one encounters in Singapore on a daily basis through a juxtaposition with a selection of images. This ‘virtualized everyday’ that is both recognizable and strange, initiates a series of psychological connections and disruptions of these everyday experiences in the viewer / audience.

The work presents a series of non-linear audio visual pieces that derive from "tuning an acoustic environment by altering the spectral, temporal and spatial characteristics of a prerecorded soundscape". that is thus constituted by a music that develops on its own”. A sampling of suburban environments exemplifying themes of interiors, exteriors, motion,singularity, rapid change, control, multiplicity and silence are presented for the audience to interact with and change through a central map for navigating it.

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