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**From:** Isabelle Kluger <IKluger@county.com.au>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 1:03pm  
**Subject:** Internet Telephone

I would like to add my comments on the issue of using the Internet for telephone communications. Speaking from a country long governed by the "tyranny of distance", I am fully in favour of such applications of current technology.

I understand that as an Australian citizen, my comments do not hold as much weight with you as those of Americans. But I feel it is important, in this case, to remember the global implications of what you are doing. As America is the major player in the Internet's development, any moves to stifle it in America in effect, stifle it all around the world. Given that this is the case, I am sure you understand that any decisions you make affects more than just America. Please take this into account.

Thank you  
Isabelle Kluger  
IKluger@county.com.au

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**From:** Chip Shapley <chips@netscape.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 1:22pm  
**Subject:** Internet phones

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With respect to the ACTA petition, let's review some principles of the economy.

**Free market:** A system which works very well!

**Competition:** the natural selection which keeps the national economy healthy and delivers goods and services to consumers at the lowest price.

**Monopoly:** one or more businesses who seek to keep new players out of the market in order to stifle competition establish or maintain artificially high price points for goods and services.

**Internet phones:** an innovation which provides a service at a lower cost

**ACTA:** a cartel of monopolists seeking government regulations to protect their monopoly, stifle competition so that their artificially high price point can be protected, and so that consumers have to pay this artificially high price for phone service.

**FCC:** No government regulation is needed here. Do not put our country at a competitive disadvantage with the rest of the world!

Chip Shapley

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**From:** Tom Head <thomash@blue.misnet.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 3:43pm  
**Subject:** Internet Telephones

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I just received word that you folks were looking for comments on the Internet Phones debate. My two cents worth:

1. I can see why regional phone companies oppose this. If Internet software continues to improve, it could put many of them out of business; calls made on the Internet are generally free, even if long distance.
2. The only money involved in this new technology (besides the money paid to Internet Service Providers) involves companies that sell this software. To my knowledge, one cannot find freely distributed software for this purpose. This borders on a monopoly.

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On the other hand, the Telecommunications Deregulation Act of 1996 allows regional providers to give Internet access, blurring the distinction between Internet service and telephone service. For this reason, I see no reason why the reverse shouldn't apply. If telephone companies can legally provide access to Internet services, I can see nothing morally wrong with Internet Service Providers granting access to the telephone as well.

The problem is that Internet Service Providers can't decide whether or not this telephone service is used; that's not an option.

In my opinion, the problem will solve itself. When someone writes free software to allow Internet telephone access (and someone inevitably will), this will break up the monopoly held by the aforementioned software companies and, while it would still probably cause problems for telephone companies, will at least ensure that nobody will benefit from these problems. Telephone companies will still be at an advantage, as Internet phones are (and will probably remain) more slow and unreliable than traditional telephones.

-----  
 \ Thomas Head (thomash@misnet.com) | 204.177.124.2 \

-----  
 \ Homepage -/- <http://www.misnet.com/~thomash> -/- \

-----  
 \ "One's self is verily one's own friend; one's |  
 \ self is verily one's own enemy." |  
\ -- The Bhagavad-Gita (6.5)

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**From:** Jim Ray <liberty@gate.net>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 4:41 pm  
**Subject:** Internet Phone

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Should NOT be regulated by anything but the free market  
[or what's left of it].  
JMR

---

Regards, Jim Ray <liberty@gate.net>

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"The means of defense against foreign danger historically have  
become the instruments of tyranny at home." -- James Madison  
[anticipating ITAR]

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PGP key Fingerprint 51 5D A2 C3 92 2C 56 BE 53 2D 9C A1 B3 50 C9 C8 Public Key id. # E9BD6D35 --  
<http://www.shopmiami.com/prs/jimray>

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**From:** Rance DeLong <Rance.Delong@ebay.sun.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 12:57pm  
**Subject:** Internet and ACTA

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Federal Communications Commission

To Whom It May Concern,

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I am responding to you solicitation for comments regarding the America's Carriers Telecommunication Association's (ACTA) petition to stop companies from selling software and hardware products that let people use the Internet to transmit digitized voice (audio) data.

The Internet is a marvelous new medium with capabilities to provide new and rich ways of communicating due to its capacity to allow mixed forms of data to be communicated. It is only beginning to realize it's potential to provide a unique new quality and new capabilities in the information age. It would be a tremendous disservice to mankind to squelch and restrict the Internet arbitrarily as it's ready to blossom, just because some parties in the commercial telecommunications establishment feel threatened by progress.

I have tried to be brief, but I hope that I have made my sentiments clear.

Thank you for giving consideration to my opinion.

Rance DeLong  
Los Gatos, CA

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**From:** David Jensen <david.jensen@teldta.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 10:01am  
**Subject:** Opposition to ACTA Petition

Hello:

I am sending this informal comment as a consumer, not on behalf of my employer.

The ACTA petition against voice over the internet should be dismissed. Voice over the internet is a cheaper, lower-quality alternative to current long-distance services. It is an internet function that is essentially indistinguishable from any other routed internet data. All of the data is being routed over telecommunications lines that meet current state and federal regulations.

ACTA's petition misstates what voice over the internet is, it misstates the impact of voice over the internet, and it mistates the possibility of regulating voice over the internet. ACTA's petition should be dismissed immediately with prejudice.

David Jensen  
5022 Odana Road  
Madison, Wisconsin 53711-1160

also available at:  
david.jensen@mpcug.com

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From: Stuart Hosking <stuh@ozemail.com.au>  
To: A16.A16(m8775)  
Date: 4/24/96 10:31am  
Subject: Internet Phones

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Internet phone communication should NOT be banned.

Why should the Future be held back ?

Next thing you know someone will invent a water powered NON-Polluting car and the BIG oil companies will hide it!(if it hasn't already happened).....

Technology is what the future is all about and we cannot let large industries dictate that.

Money may make the world go around but people is what the world is about.

Soon every house will be online and if that means that people who cannot afford overseas phone calls can talk to their friends on the other side of the world for next to nothing then GREAT ...

Communication IS THE FUTURE.

Knowledge is power...

Stuart Hosking  
171 Whitehorse Rd  
Blackburn VIC 3056  
Australia.

=====

stuh@ozemail.com.au

Lots of StarTrek Stuff At:

<http://www.ozemail.com.au/~stuh>

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**From:** Robert Nolan <nolanr@peak.org>  
**To:** A20.A20(kwerbach)  
**Date:** 4/24/96 11:04am  
**Subject:** Intenet Telephone

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FEDERAL COMMUNICATIONS COMMISSION  
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Sir,

Any attempt to collect and regulate duties for using the Internet like a telephone is like collecting duties and regulating the Automobile because it transports goods and people like the horse. The FCC should recognize the Internet as the beginning of a new era of communication. Please do not endorse such short sighted legislation.

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**From:** Robert Nolan <nolanr@peak.org>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 11:13am  
**Subject:** Internet Phone

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FEDERAL COMMUNICATIONS COMMISSION  
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Sir,

I understand you are participating in legislation to regulate the Internet like all phone services. Putting duties and regulation on the Internet because it can be used like a telephone is like putting duties and regulating the automobile because it can be used like a horse! Please recognize the Internet for what it is and allow for the inovative creators on the Internet to continue to compete as our forfathers intentioned.....FREELY.

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**From:** Iman Karns <imank@on-ramp.ior.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 11:54am  
**Subject:** Internet Telephone Service

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To Whom It May Concern,

I don't understand why the telephone companies are complaining about individuals using the vocal services provided by the internet for several reasons.

1. If the person is using the vocal services that means that they have access to the internet and would send e-mail so that they would not have to pay for the long distance call.
2. Most people are like me. They have a computer but everyone that they would like to make a long distance telephone call to don't have a computer and know nothing about the internet.

I truly believe that the telephone companies would not profit one iota from a law being passed.

Thank You  
Juley A. Karns

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**From:** K. Berry <kb@cs.umb.edu> **DOCKET FILE COPY ORIGINAL**  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 11:55am  
**Subject:** internet voice regulations

APR 24 1996

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I feel strongly that there is no need for regulation of Internet telephone software and hardware, and urge you reject the ACTA petition.

Karl Berry / 135 Center Hill Road / Plymouth, MA 02360 kb@cs.umb.edu

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**From:** Gary McGath <gmcgath@mv.mv.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 8:59am  
**Subject:** Internet Telephony

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Gary McGath  
d.b.a. Conceptual Design  
8 Ardon Drive  
Hooksett, NH 03106

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I am very concerned about the effort by ACTA to enlist the FCC to restrict competition from Internet telephony. It is not a valid purpose of government to help the businesses with the strongest lobbying organizations to outlaw competition from smaller businesses with new technologies. The government does not have a right to tell me what software I may run on my computer, so long as I have acquired it legally.

Data sent across the Internet is bits. It may be interpretable as images, sounds, words, or algorithms. ACTA's petition singles out data which is interpretable as speech and asks that it be outlawed. As such, it is asking the FCC to directly override the First Amendment.

ACTA's frivolous, monopoly-seeking, Constitution-attacking petition should be rejected out of hand by the FCC.

Thank you for considering my comments.

Gary McGath  
gmcgath@mv.mv.com  
<http://www.mv.com/users/gmcgath>

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**From:** Brian Huff <huff0013@itlabs.umn.edu>  
**To:** A16.A16(rm8775)  
**Date:** 4/24/96 9:32am  
**Subject:** My comments on internet "phone"

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the ACTA's petition for you to not allow internet phone services is a thinly veiled self-serving last ditch effort to make more money. The only reason why an individual would want to make people pay \$90 an hour to talk long distance rather than spend \$1 to do it on the internet would be if that person were in a position to make that \$90.

Lets face it, they are upset because they are not going to make as much money anymore in the information age. If you give these people what they want, the US will lose its dominant position on the internet because the government cared more about the profit of a few than the overall good of the country.

-- Brian Huff huff0013@itlabs.umn.edu

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**From:** <2033779@mcimail.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/23/96 7:09pm  
**Subject:** Internet Telephones

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My comment is simple, just leave the internet telephone alone!!!!

Dennis

SQD  
Dennis Cummins  
2033779@mcimail.com  
Paris, AR USA

April 23, 1996  
6:08 pm

\_\_\_\_\_

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From: Hamish Moffatt <moffatt@yallara.cs.mim.EDU.AU>  
To: A16.A16(rm8775)  
Date: 4/23/96 7:36pm  
Subject: Banning internet phone software

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FEDERAL COMMUNICATIONS COMMISSION  
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I was saddened to hear that the FCC is considering banning the use of internet phone software, following a petition received from 130 telephone companies.

Telephone companies should not have a monopoly on our communication.

Surely you would not have banned radio communication (amateur, shortwave, CB etc) if the telephone companies had approached you to do this; how is internet phone software any different? Will postal mail be banned too, soon?

In short, there is no reason to criminalize the use of said software except to protect the revenue of telephone companies. Telephone companies have already benefitted well from the Internet's vast expansion in the past few years, through providing ISDN, T1 etc services. You should also remember that the nature of the Internet means that banning this sort of software is simply not practical.

\*Telephone companies should not monopolize our communication.\*

Hamish Moffatt, Stud.IEAust  
Communications engineering student

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**From:** William Johnson <wtj@primenet.com>  
**To:** A16.A16(rm8775)  
**Date:** 4/23/96 10:39pm  
**Subject:** Internet Phones

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Pls dont cave to the pressures of the \*buggywhip\* manufacturers. Allow technology to take its course - Our nation will be hurt if you butt in and disallow a natural evolution of technology to unfold Tx, WM.

William Johnson wtj@primenet.com <http://tucson.com/2001>  
When PRIVACY Is Outlawed  
Only OUTLAWS Will Have Privacy!

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**From:** Lenny Turetsky <leonid.turetsky@yale.edu>  
**To:** A16.A16(rm8775)  
**Date:** 4/23/96 10:42pm  
**Subject:** ACTA's petition against Internet phone service

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I am writing to you as a concerned citizen and "netizen" in opposition of ACTA's request to outlaw Internet telephone service.

The request amounts to nothing more than a candle-makers' petition against Edison's marketing of the light-bulb.  
(Or, better yet, read  
Frederick Bastiat's essay parodying a candle-makers' petition against sunlight.)

Sincerely,  
Lenny Turetsky

--

Lenny\_Turetsky@Yale.EDU ~ <http://pantheon.cis.yale.edu/~lturetsk/>

To design something really well, you have to get it. ... It takes a passionate commitment to really thoroughly understand something, chew it up, not just quickly swallow it. Most people don't take the time to do that.  
-- Steve Jobs

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From: walter alter <walter@teleport.com>  
To: A20.A20(kwerbach)  
Date: 4/23/96 7:09pm  
Subject: new technology

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This is a multi-part message in MIME format

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-----6B005CB165C2

Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit

hi- this communique is a protest against any move to limit long distance voice telephone capability on the internet in any way. the truth is that this technology REVEALS the true cost of long distance telephony to be FAR LESS than the telco giants want us to believe. the perception of this fact by a large enough public will end up with the telcos' heads on a platter. the pressure for full access to information throughput density by the average citizen will drive a revolution equal to the Industrial Revolution. i wouldn't want to stand in its way.

sincerely, walter alter artist

-----6B005CB165C2

Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit  
Content-Disposition: inline; filename="Rclibrte.txt"

walter alter- the list of recalibrations

1. gauge function is the highest order of cognition. comparison is measurement. a non-varying field goes imperceived, yet maintains it's field effect. this is why "The Medium Is Not the Message", sort of. this is why increased intelligence requires constant zooming in and out of category flux fields.

2. the level of technological development in any given society is the primary measurement of the state of its intellectual and cultural maturity. the result of technological advancement is axiomatically the production of free time, that is, time available to an expanding array of choices rather than to an expanding array of necessities. freed from necessity, a society can invent forward, project a wide field of ideals determined by curiosity and exploration rather than inventing backwards within a narrow field determined by irritants.

3. up to now, invention has concerned itself with the creation of objects in space. in an electronic free-time society, invention will emphasize organizational schemata for information throughput. information throughput will tend to be undramatized, gradiently accessible and diagrammatic. info-inventors will be busy mainly with creating gradient skill upgrade kits for various starting level demographics. info intake skills will amplify our capacity to both perceive (structural) and to organize (conceptual) larger quantities of information. the impetus will be to design frames of reference unfettered by ideology. the virtuous application of these newly acquired skills will follow naturally as a result of the intrinsic nature of the self-amplification process. fulfilled, creating beings are intrinsically virtuous. scarcity and scarcity alone makes for social pathologies. scarcity and scarcity alone makes for social pathologies. stereo.

4. technology is inherently democratizing. period. technophobia is increasingly perceived to be against the interests of humanity. in dense information fields, social uncertainty or trauma is dissipated when full attention can be applied to gathering information for problem solving applications. technology supplies the tools for amplifying intelligence to every citizen. the economics of mass production dissolves hierarchies of privileged access to resources. what were considered luxuries of the privileged classes in the past- education, transportation, sanitation, good diet, free time, and so on, are now taken for granted by citizens in the industrial nations.

5. technology, on account of its abundance producing efficiencies, shares created wealth, rather than concentrating exploited wealth. technology requires educated workers in the production end. under feudalism, divisions of labor were decided upon by tradition, birthright, wealth, privilege, etc., and resulted in caste system boundaries that tended to freeze the evolution of intelligence, hence the tendency of all pre-capitalist societies to exploitation, self-cannibalize and eventually collapse. ruling class control of technology is now an historic futility. the genie is out of the bottle. human knowledge is approaching the threshold where it can self-amplify at a geometrically accelerating rate rather than at the pre-electronic, pre-TV linear rate.

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6. imaging technology is the primary organizing principle of 21st century social forms for two reasons: a) information density- "a picture is worth a thousand words" really means that a picture oriented society has more accuracy of detail about its status and needs and can better predict the outcome of its policy decisions. this makes for stable social evolution. image breadth also provides a basis for concluding that all other human beings are very much like oneself b) image plasticity- a wider variety of imaginary constructs can be brought into mind, integrated and re-synthesized back out onto the 3-D world and tested for reality. it is no accident that invention springs from an interplay between necessity and daydream imagination. as necessity becomes less a factor, creative imagination will be the possession of everyone and everyone will be an artist both born and conceived.

7. in an image rich culture, individual eidetic prototyping, i.e., fantasizing, becomes less bound to subjective personality loops and better able to engage problem-solving efficiencies within the measurable realm of the externally perceived universe. over half the brain's neurons are used to process and understand visual input. the human imagination is a perfect laboratory for the construction of reality models. when deeply engaged, imagination is capable of all the resolution, memory referencing and tactile positioning of the dream state, but with analytic faculties accessible. the biological brain's visual input data channel has a bandwidth estimated to be about 2 gigabits per second. 99% of this data channel is available to the imagination for plastic inner construction. consciousness is a heads up display, kids.

8. an imaging screen (TV, computer monitor, flat panel display, etc.) is plastic within its own frame of reference and allows for multi-functions of the same instrument. with the addition of touch screen, data glove or other "hot screen" technology, a PC computer can multi-function as memory storage, data computation, gauge display, media interface, and process controller. this multi-function capability is a powerful form of throughput amplification. any tool that can lessen boundary pile-up and discontinuities between phases or objects is more efficient. that is what efficiency is- the reduction of boundaries around simultaneity and velocity shock front boundaries, i.e., societies' generational boundaries. the human mind is very good at alternating or simultaneous functions. it can walk and chew gum; it can both perceive and conceive. the imaging screen tool best reflects our capacities to both view and visualize and will probably be the first component of an artificial intelligence array that exceeds the primary limiting factor of human individual sentience- our built-in focus outward from a binocular being point singularity. an A.I. setup with multi-points of view, many eyed, will accelerate the next revolution in applied knowledge.

9. artificial intelligence efforts and their mathematical modeling tools to date have been flawed by the impulse to mimic human perceptual and cognitive abilities. this will remain an impossible task for the foreseeable future mainly because we are the product of a billion or so years of biological evolution built upon miniaturization from the molecular level. attempts to reverse engineer even a fraction of what occurs within cellular metabolism is an absurdity. our minds represent the integration of an uncountable number of experiments with the aim of insuring biological survival over an incredible array of hostile physical circumstances. had humans evolved to fulfil functions such as one sees mimicked in A.I. laboratories (a machine that can carry a pizza up a flight of stairs, for example), we'd probably now have the stature of a large spider with a brain to match. A.I. research is finding itself better served by efforts concentrating on a limited range of precise, directed autonomous primary tasks rather than emulating broad band human physical or mental attributes. spinoff from A.I. research has been unfulfilling and, insofar as increasing our understanding of human mental function- crippling. human cognition has nothing to do with quantaic digitizing or binary, on/off processing. japanese robotics were forward engineered for specific task application and the utility of that approach has not only paid their economies in real terms, but is dictating the shape of current A.I. research globally.

10. multi-screen image display arrays are key to solving the problem of information overload. there is not too much information, there is too little cognitive ability to handle it. the synthetic capabilities of the visual cortex (mass-free mental imaging, thought pictures) coupled to the synthetic potential of our matter-composed universe (molecular leggo kit) provides us with a very large number of invention activated problem solving avenues. actually we are over-engineered for survival. meeting the necessities of biological survival is a piece of cake, an amoeba can do it. but systems propelled by discomfort are limited in that they focus backwards upon point-causal determinants. (see #2) these rearward facing systems are automatic (reflexive/instinctual), not autonomous. systems attracted by pleasure are area-diffuse rather than point-focused. they exercise forward acting (future oriented) area/multiplex-causal field apperception over a range of possibilities. the implication of choice requires a modeling system which allows the comparative consideration of options in an autonomous manner. this modeling system should borrow as much as it can from the dimension of simultaneity in order to hold several or many choices up against each other for comparative judgement and pattern synthesis/re-synthesis. for this reason, external modeling systems which most closely mirror the internal one are ideally multi- screen with zoom in/out potential at all foci and inclusive of the peripheral (diffuse) field as well.

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8. various studies on the nature and effect of television upon culture have been made, their results and attendant opinions published. none, however, have taken into account a hitherto unknown potential of the video medium, that of active, analytic multi-screen viewing. when television is discussed it is always within the parameter of a single screen, much like cinema. Marshal McLuhan first hypothesized an important characteristic of technological advance- the tendency for the previous technology to dictate the form its subsequent evolution will take. for example, the first automobiles looked like horse carriages, but as velocities increased, they reflected more the streamlined shape of their potential and the unpredicted forces at play near performance boundaries. this is a societal shock reducing mechanism which serves to validate the past in its form while incorporating a new utility and its consequent new identity. so it is with television. we have a medium imprisoned within the form of its predecessor, cinema/theater. it has been captive to cinema's physical form up to this point, (a single screen) and theater content (the presentation of dramatic pathos). television, however, is actually ideally suited to multi-screen arrays. furthermore, being electronic and portable at both its point of origin and its point of reception, its content is ideally suited to instantaneous update and real time look-in on relevant events.

8a the ability for the viewer to switch through channels, to view within the autonomous framework of the home environment and to utilize the autonomous potentials of VCR and camcorder is lessening the power of remote authority as well as "theatrics" in political life. theatrics, or overly emphatic caricaturing, is the tyrant's first line of attack and can only operate in a controlled social environment characterized by the absence of comparisons. it is the "dictatorship of the modality". however, with electronic (simultaneous-with-event) media, a comparative modality, or a modality of modalities, is now beginning to be felt politically and culturally. the sheer density of global electronic communications pretty much precludes its being "jammed" physically, and is making it harder to "jam" ideologically. media monopolies are giving way to media autonomies, first via cable TV and soon via computer multi-media.

9. multi-screen arrays imply more than one point of view which is the basis for the dimensionality of space, among other things. we perceive time from the standpoint of a succession of temporal points of view. we perceive space from a binocular point of view, the conceptual fusion of which gives us 3-D. we see "behind" appearances to find true causes. multiple points of view is a very powerful attribute of full awareness and, moreover, is the primary means by which awareness amplifies itself. putting oneself in the other person's shoes, for example, is a key to successful communication and the generation of understanding. having the flexibility to adopt many points of view during the analysis of a situation is the creative way to avoid traps in cognition. multi-screen arrays are tailor made for collaborative problem solving via tele-conference hookups. we can map out facets of a situation like a cubist painting and come upon a more complete picture. completing our picture of the universe is the name of the game.

10. problem solving is very simple given enough information. the facts usually sort themselves out into necessity fields and mental effort is potentially freed up to pursue more and more pleasure of creativity. the inability to solve a problem is invariably the result of an incomplete set of facts, ie., a set of blindnesses, which most characteristically takes the form of a mind set, an ideology. we are going to have to learn how to operate anti-ideologically with freedom of choice within an incredibly dense global information matrix. the densest personal info matrix is the visual one. the human retina is capable of differentiating about 2 million color hues and intensities and probably a larger number of shapes, spatial attitudes, distances and motions. we mainly use only a small portion of the visual field at any one time, a pencil thin cone of maximum attention, and we presently pretty much see as we read, in a scanning manner. this leaves the peripheral visual field almost unused, merely a cue-up function; like hearing- an attention director. expansion of peripheral apperception is desirable because it allows a wider field of view for the simultaneous comparative gauging of visual info which will, in turn, amplify that same potential within the memory and projective areas of the mind. in short, we can make parallel processing abilities accessible to consciousness. one can get a taste of this ability by setting two TV sets side by side, tuning in two different stations with audio up on both and concentrating on getting the gist of both programs simultaneously. within ten minutes you should be catching on.

11. high definition tv (HDTV) should be perceived by the media aware public as more than an embellishment upon the world of entertainment. 1,120 scan line resolution will transform our perceptual field and its resultant social appetites much as photo-journalism via "life" and "look" magazines helped to transform america from agrarianism to industrialism. HDTV viewed upon a living room tv set will make such superficial genre as game shows, soap operas, sitcoms and allied exercises in inanity naked to our faculties of analysis and skepticism. nature does not represent itself to us in low definition. we do that. low definition communication leaves us in a state of mystery. mystery does not fulfil, it leaves hunger. HDTV fills in the blanks. if the TV program content is a mismatch with the detailed configurative capability of the retina, the viewer will change channels to program content which does that capability justice. with HDTV, video as a single-screen artifact reaches its maximum point of exploitation. it is

suitable for nothing less than a documentary approach at all times. low definition sectarian ideology is incapable of instantaneous update and will be perceived as a retrograde, obstructing cartoon. the viewer will be freed from any frame of reference which locks interpretation into pre-orchestrated categories. fields of knowledge will become wide angle, making apparent the interconnectivity of event flux and causality. requirement will supplant style. the demand for precision in all bio-necessity aspects of life will dictate a form-follows-function structuralist aesthetic. HDTV is available now to anyone with a high resolution computer screen by the addition of a video signal interface card which allows broadcast or video tape programming to be seen at over 1,000 scan lines. the combining of what has heretofore been an entertainment medium with an information processing device will force entertainment towards a basis in reality and force info processing towards a basis in fun.

12. the compact handcam allows us to look in on areas of human discovery as they occur without the mitigation of commentary or editing or political top spin. exploration, laboratory and field research, global conferences, classroom lectures, etc. could be tuned in to for personal enjoyment and university credit. the key is "real-time". CSPAN is the most important network currently in existence. emergency situations already benefit to a degree from this technology, particularly in the medical field where difficult procedures are accessible to world wide expertise while in progress. the recent events in china were covered in large measure by students with smuggled handcams. we are witness to events as they unfold. abuses of police or government procedures captured by a palm-corder, cannot be denied without the peril of full discovery and blown cabals. video testimony and video documents are being recognized as legally true. the drama is reality itself.

13. McLuhan's prediction of the electronic "global village" is no joke. we are beginning to see into the cultural lives of our global neighbors on an unprecedented and intimate scale, independent from the force feeding of "us vs. them" stereotypes via ideological and governmental channels. the most important network program to date is "America's Funniest Home Videos". the most important broadcast demographic was eastern europe. they cast off a doomed economic system in order to "get their MTV". real life is far more transformative and entertaining than entertainment, touches us more deeply, and bonds us together at the level of reality. truth is manifold viewpoint, manifold and cross-referenced verification. the hottest new category of programming is the talk show, because, though superficially exploitive of human frailty, presents the human drama as worthy of beholding in its plain, base and democratic form. essentially- art is dead.

14. we no longer have the option to select whether or not we perceive an event, but only where to place it within our frame of reference- what causality and, hence, predictive importance to give it. in an era of remote telecast, nothing remains remote, everything is right in front of our face. your hand held channel selector is a marvelous anti-gravity device. you don't have to get up to change the channel, consequently you don't tend to get trapped inside mass/inertia systems. the tendency, then is to not pattern your mental life after mass/inertia systems. the remote channel selector is democracy's most powerful weapon. truth is never boring, particularly in large, 500 channel therapeutic quantities.

15. digital signal processing (the quantaic sampling of video and audio continua) and the accessibility to professional quality multimedia gear will decentralize all media production and distribution networks. professional studio quality results will be available on consumer multimedia equipment. the entertainment industry will have to cope with a citizenry able and content to entertain itself. needless to say, the star system as a mystery religion will more and more appear to be composed of quaint, if not clownish, eccentrics. computer multimedia capabilities will spin off to the family album level. Andy Warhol's prediction of 15 minutes of fame for everyone was stingy. we'll all be the stars of our own media extravaganzas until the magic wears off and it dawns on us that we have in our hands the most powerful tool for autonomous self-evolution yet devised. in the face of abundance, previously scarce media commodities-of-the-mind such as "fame" will become the domain of compulsive fetish collectors.

16. up to now, what we call communication is really sound wave communication carried out in our atmosphere at relatively slow speeds within a linear sequential framework. light travels 100,000 times faster than sound. this is the speed of vision- 5 orders of magnitude faster than sound. that's a lot, but a conceivable lot. the full visual field is also somewhat simultaneous. you can recognize several objects at a single glance. the advantages of incorporating a visual language into everyday affairs is readily apparent as a way to graphically update the viewer on a very broad front of world events. the nature of that language is totally wide open. it could be any mix of graphic symbol, color cues, positional cues, motion cues, 3-d display, audio intermix, you name it. fast cut advertising is the beginning of a visual language where situations themselves become icons, an advance over fixation on a content composed of object icons. the trick will be to communicate bidirectionally in real time and in high resolution. "lemme tell you one thing, kid. diagrams."

17. Nikola Tesla, in his later years, claimed to have invented a process whereby mental images could be

transferred to an external imaging screen. his absolute mastery over the theory and application of electro-magnetic phenomena is a matter of historic fact. we use his patented AC current, polyphase motors, broadcast radio, fluorescent illumination, transformers, transducers, etc. on a daily basis. in the early '70's the U.S. military took the threat of Soviet deployment of Tesla-physics' electro-magnetic resonance and diffraction weapons very seriously. it was the impulse to develop the SDI program and that program's subsequent technological accelerations which led to the collapse of the Soviet Union and the current world political realignment. we should make the attempt to understand electro-magnetic phenomena as Tesla did, the vacuum being no vacuum at all, rather a seething sea of electrostatic potential, a stressed vacuum. Tesla also claimed to have knowledge of a revolutionary broadcast technology wherein upwards of a million discrete high-bandwidth channels could be broadcast without interference or signal degradation resonantly through the earth, from anywhere, to anywhere.

18. the leading edge of media research is currently to be found in the field of aircraft cockpit instrumentation display. whenever you have two systems in relative motion, the requirements for rapid information updating rise exponentially as a function of the increase in velocity. necessity dictates accuracy, i.e., a high volume of data, a dense data flux. these lessons can be applied to everyday life where the velocity and instability factors are less than in-flight systems, but the simultaneity factors are greater. information throughput density is constant in either case. information density is conceptually akin to object velocity. the more of it that pours through your visual perceptual field, the faster you are going, even though you may be physically at rest. this is why television "couch potatoes" are actually rocket sled pilots travelling at warp speed.

19. what we presently enjoy as technological progress has, up to this point, been essentially a spinoff from military R & D. national destinies has heretofore required the motive of an external political threat to unify and drive science via weapons research. with the easing of Cold War tensions, technology can, for the first time in human history, be harnessed directly to global human needs, but the motive of discovery must be powerful enough to supplant the motive of war threat. space exploration is vital as a replacement "science driver" because only in that realm is the crucial factor of power vs. weight, i.e., miniaturization and its subsequent high level of production knowledge and skill, the primary factor. in the wake of the comet Shoemaker/Levy impact on Jupiter, we become aware of our vulnerability in this corner of the Universe. we have here an opportunity to employ the motive of national survival. the "national security" of all nations can be universalized into the issue of human survival capable of employing hard core militaristic factions in ways that environmental emergencies cannot. were the military/industrial sector of global economies to find themselves facing extinction, the subsequent global economic collapse would act upon society as did the stock market crash of 1929 upon Weimar Germany.

20. tele-synthetic reality- virtual reality imaging and allied tactile- referent systems are intrinsically spatial/simultaneous rather than acoustic/sequential. their greatest lesson is that the inner and outer worlds are identical in vastness. its spinoff developments are already showing potential. two forms of goggle-type display technology have recently been made available which will have consequences beyond their immediate markets. the first goggle display places heads up data overlaid upon the normal visual panorama. the prototypes do not have head movement tracking and directional capabilities, but can superimpose any word or symbol code upon the real world. no reason why one couldn't read the paper while driving the car, for example, simply a matter of depth of field awareness. the other goggle technology projects any video signal directly in front of the eyes, but blanks out real world image. this British invention is designed as a substitute for regular television viewing with stereo earphones and goggle display in an integral unit. the remarkable potential in these videophonic goggles is that they will effectively cause the reintegration of the imaginative processes of cognition away from the subjective and towards the objective, real world. the effect is to put the viewer into the scene. documentary visual uptake will immerse the viewer within the docu-world and further accelerate the citizen's potential to participate in world affairs beyond the mere possession of an opinion.

21. in the recent discussions about the most strategic of our nation's industries, electronic design automation (EDA) has received undeserved neglect. the computer design of computer components and software is an absolutely crucial technology. file compression algorithms can shrink certain kinds of data, particularly visual, picture data, one hundredfold. phone line transmission of encyclopedic quantities of info will lead to the computer bulletin board/Internet supplanting colleges and universities as centers of learning. EDA is also key to rapid and coordinated manufacturing of upgraded and new hard products. the amazing fertility of electronic technology is constantly shrinking the "shelf life" of products, now down to under a year. rapid obsolescence has brought EDA into its own and is currently forcing the issue of standards for image compression, storage and transmission types. the implications of EDA, however, are far deeper. EDA is laying the practical foundations for productive artificial intelligence capabilities, in particular, the ability of a piece of hardware or program to educate itself about a task and then improve its performance on that task.

22. computer aided design, animation and engineering will integrate within the entertainment industry and will

eventually replace sets, actors, locations, cameras, everything, in fact, that we call "Hollywood". photorealistic animation will burst out of its "special effects" containment to take over the entire production. feature-length entertainment will be produced start to finish by a handful of men and women in an editing suite at a hundredth the cost. photorealistic animation will be as detailed as modern cinematography with the advantage of absolute creative freedom. the division between "amateur" and "professional", "b" grade and studio, "artistic" and "kitsch" will be dissolved by the power of the animation hardware and programs themselves.

23. fears about digitized media's ability to be counterfeited with undetectable alterations are misplaced. any hoax perpetrated on a large scale or on an important matter runs a very real risk of being blown, and once blown, will ruin any organization or agency attempting it. "national geographic" magazine was charcoal grilled recently for merely combining parts of two photographs into one on the magazine's cover. the tabloids' fake alien/elvis/two headed baby photographs are believed only by people who would believe anything anyway- witless hysterics and bar stool philosophers.

24. given proper in/out and control interface, any software program can be made to function in the form of electronic circuitry. any digitizeable signal can be softwareed through a computer to make the computer function in any way, as audio, video or radio gear, electronic testing and diagnostic gear, electronic gauge and monitoring gear. this potential plasticity is analogous to the multi-functional plasticity of the monitor screen, itself. the combination of the two makes digital computing the most powerful tool since the lever.

25. the economics of surplus 1st generation obsolete gear removes overheated costs from still viable technologies and promotes vigorous experimentation and "re-prototyping" into new and unusual functions. this area should not be overlooked for its potential to provide breakthrough applications of off the shelf gear and conceptual leaps unfettered by specialist myopia. rapid creation of surplus gear through design revolution and subsequent obsolescence allows low budget experimenters, hobbyists, tinkerers and artists to play fast and loose with previously expensive equipment, often minus the hindrance of the instruction manual, and often making discoveries far beyond the original scope of the gear in question.

26. computer modem communication has given birth to a new cultural phenomenon known as "virtual communities" in which the prime modality of personal relationship formation is the domain of the cerebral, ie., shared thought rather than shared action. the implications here are staggering insofar as thought is the medium of the ideal and human interaction is ultimately shepherded away from the banal and inconsequential by virtue of the nature of the technology itself. this community is both global and instantaneous. it's members are recognizable to one another not by their appearance, but by their substance. with land line/satellite linkage via portable laptop computer, no corner of the planet exists in isolation, and no private news network has a monopoly on perception. furthermore, enough expertise is accessible on a 24 hour basis so as to constitute a global university rivaling any accredited center of learning anywhere. soon, a three year apprenticeship with "futurenet" and its associates will be more prestigious than a degree from M.I.T. we will teach ourselves autonomously and hunger for knowledge like no commodity.

27. up to this point most futurist projections have been hampered by either a simpleminded "gee whiz" approach or an underlying social/political agenda or a philosophical opposition to technology per se. in absolutely no example of popularized futurology have authors exhibited an understanding of the process of mind that results in efficient, applied human invention. the origin of human genius is made into a mystery, an eccentricity, a matter of luck, or, incredibly, the "flipside of insanity". this outlook robs us of a great sense of security about the intelligence of our forebears and robs us also of a sense of confidence in our ability to educate ourselves out of any problem- eventually even that of mortality. without an optimism based on the potential of a culture to create intelligent beings at an increasing rate, we hobble and retard human progress to a great cost of unnecessary misery. it is a shame that the names and stories of the great inventors are not a universal part of our folk culture as are our movie stars and sports heroes and that the power of their method does not animate the hopes of every citizen.

28. "ninety-nine percent of humanity does not know that we have the option to "make it" on the planet and in the universe. we do. it can only be accomplished, however, through a design science initiative and technological revolution" r. buckminster fuller in his 1981 book "critical path"