



Overview of Ethics and Convergence of Emerging Technologies for the Seamless Society  
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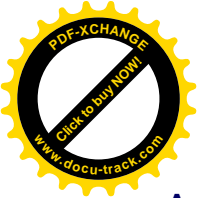
**Mr Chairman, Ladies and Gentlemen, The period 2006/2007 under consideration today by the Bureau of the Information For All Program may be seen in hindsight as that marking the beginnings of the end of one era ushering in a paradigm shift of hurricane proportions, though concrete visibility of this shift will not be immediately perceived.**

**At the outset of the UNESCO NGO Online WSIS Forum, as UNESCO Liaison for the Internet Society I was concerned with raising awareness of the impacts of Emerging Technologies and suggested adding this theme to the discussion. I was co-rapporteur of the final report which mentions IPv6 migration. I received for the IPv6 Task Force European Commission meeting in Brussels September 12<sup>th</sup> 2002 this note: Following conversations in Geneva, Hourtin and UNESCO over the last two years, the Executive Secretariat of the World Summit on the Information Society understands the societal implications of the IPV6 migrations. We are interested in exploring the creation of an interface between the IPV6 Task Force and the Summit. In order to grow awareness of these matters among all stakeholders participating at all stages in the Summit process we welcome a meeting facilitating a joint initiative.**

**Although on few agendas in 2002 it was felt that IPv6 would be perceived as a strategic area by and beyond the 2005 WSIS Tunis Summit. Drawing early attention to IPv6 convergence potential on the Information Society reinforced integration of emerging technology issues among stakeholders. Note that Internet infrastructure itself should be technically neutral with no embedded bias. There are ethical considerations in Internet Governance, and one is surprised there is no standing event/panel on Internet Governance scheduled for the coming Summit.**

**A brief overview of the technical aspects of Internet infrastructure seems useful. The current Internet infrastructure, Internet Protocol version 4 IPv4 has, since 1983 offered in theory around 4 billion and in practice around 250 million IP addresses for 6 billion people. IP addresses were not evenly distributed, and reflected information society involvement 25 years ago, - as an example note the high proportion of IP addresses reserved for and by the U.S. compared to the 30 million available for China. With networks' expansion, and despite some technical measures, the number of available addresses will be insufficient in the foreseeable future while expansion of mobile technologies and devices needs a robust scaleable secure end to end infrastructure to respond to the demands of a new paradigm – ubiquitous information interface offering “intelligent” intercommunication. These technical measures included so-called "classless addresses", to use address blocks as efficiently as possible, introduction of the dynamic host configuration protocol allowing a host to use a unique address for a period of time, and then pass it back to a common pool when no longer required in order to allow other systems to use it, the use of various forms of network address translators NATs to allow a small number of public addresses to be shared between a larger set of devices that are configured to use private addresses. G Huston ISOC <http://ispcolumn.isoc.org/2005-07/ipv6size.html>**

**China, Japan, and Korea, France and recently the U.S. inspired by the DoD, are advancing on the roadmap migration from IPv4 250 million addresses to IPv6 where “The optimistic estimate allows 3,911,873,538,269,506,102 IP addresses per m<sup>2</sup> of Earth’s surface.” "IP Next Generation Overview" R. Hinden  
<http://portal.acm.org/citation.cfm?coll=GUIDE&dl=GUIDE&id=228517>**



As IPv6 will integrate “End to End” Robust Scaleable networks, and Security which was not mandated for today’s Internet, we pass from shared to unique plug and play IP addresses potentially embedded either virtually or literally in everyone and everything.

To quote the US Airforce Communication Agency Air Force planners envision a network-enabled future where every Airman, aircraft and piece of equipment across the Air Force network will be IP addressable. The transition to IPv6 is a critical enabler providing decision superiority, greater speed and greater precision in the conduct of net-centric operations in the global ground, air and space domains.

<http://www.usip6.com/6sense/2005/aug/01.htm>

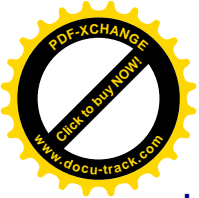
Ethical clarification is needed in respect of IPv6 address attribution and perennity should ISP economic viability be compromised. Transparency is an ethical issue throughout the system. While 64 address space of 128 numbers are assigned to individual IPv6 address this rises to over 90 for RFID Radio Frequency Identification. In switching from IPv6 to RFID, we note that as significant historical events have catalyzed unexpected solutions whose spin offs have in turn generated further expansion and innovation, the shift from “one to one” to “all to everything to all” offers unprecedented ethical challenges, opportunities and risks. As with WiMax, the Emperor has yet to prove his clothes exist, but the potential implications of IPv6 and RFID convergence should not be ignored.

These ethical challenges take on a novel nature and proportion unknown since the dawn of civilization. Man has always lived in a point to point environment connected by stream, sea, road, later by rail and air then through a centralized interface now evolving from fixed telephone, to mobile technologies. Before alphabets, point to point expansion was ‘one to one’ contact or lack thereof. With printing Mankind went from one to many, and as we progress, more barriers are dissolved while individual and community memory/experience storage capacity increases. As information sharing gains momentum the sum of human knowledge readily available to all – especially online - is doubling every 5 years.

When we pass to an indefinitely extensible real time “many to many” multi dimensional networks communication enablement combined, with the increase in computing capabilities outlined by Moore’s Law, then we shift from a left brain hierarchical mindset of an organized “one to one” world to a more right brained seamless society grid. The frontiers of “real” and “virtual” are already becoming blurred and will we be talking in terms of computers or even distinguishing “information society” from society in ten years time ?

Some governmental lobbies concerned with “security” have sought to extend both the amount of Internet log information they feel they should receive and also the effective timespan during which that information should be retained. Interesting in theory, this fails to take into account the amount and nature of information that will be stored and processed when we evolve from 56k to 6 Giga bandwidths of Internet 2, noting that I 2 has already successfully transmitted data at around 50 giga.

The ethical considerations of the Information Society should better integrate the blurring of frontiers between real and virtual which mobile interfaces is currently initiating. What are the ethical considerations of obliging individuals to use the Internet, because such use is more “cost effective” for the Government or Industry stakeholders ? How should the question of Identification versus Authentication be tackled within the online/offline debate ? In the context of today’s meeting I would respectfully suggest that all divisions of UNESCO contact all of its NGOs with a mandatory questionnaire asking how IPv6, RFID, and evolutions in mobile technologies will effect their own agendas, how these



changes could be shared with other UNESCO NGO's and also what they expect as aid from UNESCO to empower INFORMATION FOR ALL to meet these new challenges. This could both help UNESCO help itself and share knowledge building among many NGO's who have, it seems, yet to integrate these challenges in their own strategies.

Interdisciplinary walls are dissolving, through economic pressures for logistic efficiency, through advances in biometric and biosciences, or through enabling innovations throughout the system. The ethical context arises when one party is unaware of the way his, her or its interests may be impacted by third parties. It is not for this paper to pass judgement on all that is being hung on the convenient peg of "security" in a post 9/11 environment. As Tony Blair has said "The name of the game has changed". This does not necessarily mean individuals should be held three months without accusation depending upon definitions of "terrorism". Empowerment of so called 'UBID' Universal Biometric Identification call for careful examination, both in respect of ethical and of economic impacts notably in respect of bidirectional interfaces for the day after tomorrow.

It should be noted however, that massive investments in emerging technologies inspired by "security priorities" have historically accelerated inter and intradisciplinary innovation momentum in unforeseen areas - although without guaranteeing that time lags between investments and crisis management automatically follow expectations.

It is interesting to note that faced with the enormous challenges for reestablishing a traditional and thus vulnerable fixed telephone infrastructure, New Orleans is now said to be actively considering a VoIP autonomous network throughout the area. Thus the challenges of natural disasters once again accelerate the deployment of innovative technologies and contribute to new business models and new ethical challenges replacing some of the old ones. One ethical challenge to information access in the developed world is the cost of such access, and in the developing world the absence of infrastructure. If the VoIP model works for tomorrow's New Orleans, this completely sidesteps many of the barriers to information access throughout the developing world. After all if the IPNG Inter Planetary Network Group of the IETF exists, there is no reason to suppose man cannot service his own planet.

Although Information Society ethical challenges do not depend on infrastructure but essentially on how governance oversight or economic surveillance acts or abuses, the risks are held greater for mobile technologies. That does not mean that these are one sided, - thus informed awareness by all stakeholders is vital. This introduces the notion of arbitrage of choice. Nobody wants big brother or big browser tagging every step. But CCTV identification of the July London bombers, or the search for survivors after natural or man-made disasters benefits from technology convergence. Though bidirectional chip implants could save lives through real time health or location monitoring, who guarantees and/or oversees ethical use of emerging technologies ? Note two terms : "Skimming" when RFID chip information is surreptitiously gathered by an unauthorized individual. "Eavesdropping" when data is intercepted as it is read by an authorized RFID reader." These underscore the need for transparent network security.

The ethical implications of digital divides are intra national and international. Some emerging technologies address the challenge of disabilities and special needs. Implanted RFID already offers life cycle livestock tracking, and, has been extended to Delhi's 40,000 sacred cows. It could become a priority factor in extending life expectancy while reducing reliance on health infrastructures. Both pose contradictory ethical challenges in areas such as pensions, unemployment and lifelong learning. Life long learning with an active life expectancy of over 100 years is a different proposition from yesterdays 60 year lifespan, and the 40 years of 200 years ago. Children are currently



leading their parents online, but communication discrepancies are not unusual when the former employ Right Brain emotional impressions to adults with hierarchical outlooks. This is one area where Asia will probably overtake all networking interfaces because an ideogrammatic education is far more conducive to tomorrow's Information Society than that based on the '26 soldiers of lead' with which Caxton set out to "conquer the world".

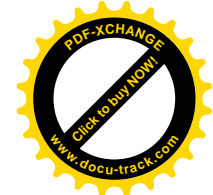
Copyright issues are seen through different lenses depending on where one is positioned on the spectrum but there are ethical issues raised by lobbying and by strategic positioning of certain groups within infrastructure decision making bodies. For example last week's announcement of RMAA RIAA membership of Internet 2. If the letters of the alphabet had been copyrighted at the outset humanity might have evolved towards telepathy. This is NOT a neutral but a priority issue. IBM believes by mid century we will be able to store and reproduce individual memories, experiences, emotions and even take them out of "cold storage" for use by ourselves or our heirs. If these experiences are not –in inverted commas – open sourced from the outset, the ethical implications are significant. This highlights challenges from emerging technology convergence that, though out of this world today, may not seem so strange tomorrow.

Time has not enabled me to include to many references to the ethical challenges of the Information that some are only beginning to define while to others many concepts mentioned in this paper seem still to remain outside their radar screen.

The question of archive integrity and format integrity should be borne in mind. Other areas of concern include SPAM not only in the context of today's networks but especially in the different perceptions held by Industry stakeholders in respect of this subject. Over and above the "nuisance value" or lack of value of SPAM there is a total dichotomy between the concepts of ONLINE and OFFLINE advertising by Industry. The first in some instances blocking the second there is much confusion on advertising models for the future, especially as when Television and Radio migrate increasingly towards IP and Internet broadcasting in the wider senses of the term, - be it fixed or mobile – we will doubtless see more and more advertising blocking software upsetting vested interests. As the Information Society spreads from the virtual to the physical world greater attention will be brought on the ethics of advertising in the self styled real world.

Another area to follow is how blogs will evolve, - both adding transparency and also as potential disinformation channels, - or even manipulation or lobbying such as the Kerry swift boat comments. It is interesting to note that some blogs may attract overnight attention due to the perceived "truth" they set out to portray. This appears to be a healthy response to an increased tendency for top level news media to share information sources, and/or to archive these sources in anticipation of content related economically viable future business models. Once again information access is a priority subject for attention, as is the varying hierarchies attributed by search engines – some of whose neutrality is felt to leave much to be desired. Furthermore, how will Television and Radio content providers react when real time TV or Radio search engines are introduced ?

When spectacles tap the entire Internet, the individual shifts from the search to know everything to the knowledge to search for everything, then resource mutualisation accelerate innovation at so many levels that this may challenge the structures of society as we perceive it. When Canon replaced the typewriter by ink jet technologies, few anticipated that these would lead to real time microchip medical diagnosis. Interdisciplinary interfacing could empower opportunities to reduce digital divides. Speaking at the Bucarest WSIS PrepCom in 2002 as today I specifically drew attention to Raising public awareness of the new Internet paradigm: by establishing a total interface between users and usages, the migration from IPv4 to IPv6 will catalyse societal, political, and economic



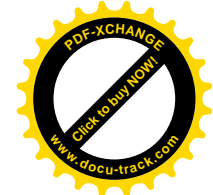
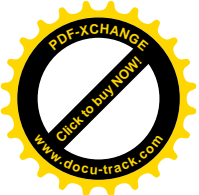
paradigm changes and to the macro economic and ethical implications of embedding micro chips within the printing of banknotes and implications for life-long learning. [http://66.249.93.104/search?q=cache:Ti1aoZrLbK8J:www.itu.int/dms\\_pub/itu-s/md/03/wsispc2/c/S03-Wsispc2-C-0074!!MSW-E.doc++Bucarest+%22Jonathan+Robin+%22&hl=fr](http://66.249.93.104/search?q=cache:Ti1aoZrLbK8J:www.itu.int/dms_pub/itu-s/md/03/wsispc2/c/S03-Wsispc2-C-0074!!MSW-E.doc++Bucarest+%22Jonathan+Robin+%22&hl=fr) At the time this was held to be Science Fiction but the technology existed then, and EPIC has drawn attention to the issue. [http://www.epic.org/privacy/rfid/comments\\_art29.pdf](http://www.epic.org/privacy/rfid/comments_art29.pdf) Though there are areas where I believe that some of the prohibitions advocated may be questioned.

I thank Jean Pierre Dupuy, Ecole Polytechnique, for sharing his contributions on nanotechnology to the High-Level Expert Group, European Commission for this meeting. : We have become capable of tampering with, and triggering, complex phenomena. Anticipating the consequences of technological choices is both more important and more difficult than ever, especially in the area of informed and neutral ethical implications which concerns us today. Advanced nanotechnology, molecular manufacturing, aims at "Complete control of the physical structure of matter, down to the atomic level." This, would have major societal impact and possibly entail major risks, the contrasting visions are correspondingly utopian or dystopian. On a positive side, molecular manufacturing may mitigate or avoid humanitarian and environmental crises, alleviate suffering, raise standards of living worldwide. Yet effective use depends upon sound well planned policy. Panic reactions might have significant negative consequences. Working molecular nanotechnology will require design and enforcement of policies to control the use of compact advanced manufacturing systems and their products. **Quoting the 1995 Foresight Conference on Molecular Nanotechnology:** "The risk in trying to stop others from using the technology to gain a strategic advantage, was that 'the uninformed policymaker is likely to impose restrictions on development of technology in such a way as to inhibit commercial development, ultimately beneficial to mankind, while permitting those operating outside the restrictive bounds to gain an irrevocable advantage."

We should focus less today upon specific advances in science, or society, more on how interdisciplinary interaction is gathering momentum in a context where each stakeholder seeks strategic advantages in its own territory. The 2006/7 IFAP Bureau window offers an important opportunity to raise awareness within UNESCO, and between its NGO's, to help all stakeholders to integrate an informed overview of domino emerging technology convergence into their own specific agendas. [This motivates the suggestion that the Bureau consider annual trans-divisional conferences to reinforce and sustain win/win understanding of ethical, societal, economic impacts of emerging technologies.](#) This could avoid the high cost of trying to preserve the ethical priorities from the uncomfortable arbitrages of unprepared damage control "after the event." Those with a sense of humour interested in arcane nanotech projects could link to the space elevator <http://www.liftport.com/research1.php>

The search for optimum responses to challenges like 9/11 yesterday, to Katrina today, accelerates interdisciplinary convergence, itself at times perceived to inflict collateral damage at expense of historical ethical tenets. Coordinated response to these and more mundane challenges accelerates self sustaining cycles dissolving today's economic and scientific barriers, dovetails into tomorrow's ubiquitous Internet which will – "will" and not "may" – profoundly impact globalization and influence societal and political barriers. This is not neutral. It is not the day after tomorrow, it is today, although through individual or institutional latency and "embedded" interests, the scope of societal change takes time to be validated.

Finally, increased emphasis upon security - be it political, economic, or closer to home, all too often reduces transparency and accountability. The ways in which ubiquitous intelligent interfaces will affect real time global interoperability are insufficiently understood.



I conclude this overview regretting that time restraints permit one only to skim the surface of the ethical challenges upon which IFAP's Bureau has sought clarification, and in thanking you for the opportunity of sharing these reflections with you.

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