TEK THOTS

Electronic Newsletter

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TEK THOTS
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News/Editorial

* Welcome to another issue of Tek Thots! A lot has gone on since the last issue, so in the interest of keeping these newsletters under 10MB ;) I'll just touch on certain personal interests. We got quite a few more UK subscribers over the past month - w elcome aboard! Also, welcome to the recent French, Polish, Belgian, Croatian and US subscribers. I'm always interested in stuff like this, and you may recall that I occasionally report where you guys are coming from. According to my logs, recent Tek Th ots readers are coming from the US (.net, .com, .edu, .org, .gov, .mil), Canada, UK, Norway, Germany, Australia, Sweden, Poland, France, New Zealand, Portugal, Austria, Italy, Iceland, Brazil, Singapore, Denmark, Japan, Belgium, Netherlands, Malaysia, Ire land, South Korea, Hong Kong, Spain, Israel, (the former) USSR (.su), Russia, Cypress, Greece, Czech Republic, Switzerland, Mexico, Finland, Croatia, and Estonia. Cool!

* Do you ever wonder if the chip makers worry about the Internet. If you think about it, the Net could be making high-end chips ... well, I wouldn't say obsolete, but unnecessary. Think about it. I could do nearly everything on the Net that I needed to with my old 486SX: email, browse the Web, ftp, telnet, gopher, everything. Until recently, I wouldn't have been able to utilize Java-optimized Web pages, but I have yet to find one such page which I view as necessary - to me, Java remains fluff. With m ore and more companies, people, apps, etc., going Net-centric, there's a decreasing need for high-end chips. Even though I don't want to admit this to my wife, the primary reason I got the new P200MMX is for gaming (ok, I argued that it was for programmi ng, but you know how it is...). Face it, gaming is driving the home chip market; everyone needs to upgrade to play the new games. Interestingly, gaming seems to be at a crossroads. Companies are spending millions now for FMV, yet many of those FMV-bas ed games just aren't doing well (could it be because they're MOVIES and not GAMES???). In fact, perhaps only the top dozen are so games are doing well enough to merit the investment being placed in them. Most others aren't even staying on the shelves (h ell, some aren't even getting TO the shelves). The question then is, can gaming continue to drive the chip market (can gaming continue in its current incarnation)? Maybe I'm wrong. Maybe it's a moot point. Perhaps there are enough people out there who want the new, biggest, best. But the fact is, I know more and more people content to run older versions of apps on older machines, cause there is no NEED to upgrade.... Your thots?

* Well, well well. It looks more and more like the Well's current prez, Maria Wilhelm, might buy the company from Bruce Katz. (Please, dear God!) As Tek Thots readers know, while I've loved the Well for years, I've also railed against them for the past nine months, my assertion being that ever since buying Hooked, their service has disintegrated - it certainly did through the end of '96. I met Maria at L.A.'s Internet World, and spoke with she and her PR lackey. First of all, at the risk of sounding like a complete misogynist, she's totally hot. However, far more importantly, I've heard really good things about her. She originally migrated over from Pathfinder, and seems to have a pretty good head on her shoulders. When I spoke with them, they ack nowledged their recent difficulties, and mentioned some solutions they're attempting to implement. Katz, of course, shouldn't be in the business - he needs to go back to shoes. So, done deal? Not yet, but quite possibly very soon....

* Tell me why I'm not surprised. Cyber Promotions, the spammer of all spammers, is now hosting a disgusting hate site. Yep, good old Spamford has lowered himself even more by allowing Godhatesfags.com (altho, ya gotta wonder what the hell the Internic w as thinking approving that domain name?) to put its filth on their servers. What next, the KKK Web site?

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PC Thots
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* One of the recent events I've been interested to see has been the MMX settlement Intel's made with Cyrix and AMD. I felt this would be pretty predictable, and it turned out to be. All parties had a vested interest in a quick settlement. So, how'd it turn out? All the other companies have to do to use the MMX word is put "(TM)" after it! Well, just in time for the K-6, eh?

* Cirrus Logic reported a $52 million loss, and word has it that they're axing 400 people, as well as doing the management re-shuffle (could someone tell me ... does that ever accomplish anything?). Why, you ask? Crappy sales of existing products and a real delay in introducing up-to-date graphics chips. Can we say U-N-D-E-R-E-S-T-I-M-A-T-I-N-G demand???

* For you 75 die hard Amiga lovers out there, hey ... at least someone bought the company. Yes, perennially bankrupt Amiga was recently purchased again, this time by Gateway 2000 (ok, the deal's not final yet, but it's darn close!). The last company to buy it was German, and they discovered that ... gee, people haven't been buying Amigas since, well, since it was a Commodore. I don't mean to bag on the Brits who love it more than Mac groupies love their machines or Linux fans love Linux. The fact it, Amiga just hasn't been fiscally viable - at all. So, why does Gateway even want the Amiga onboard? Because, as CEO Rick Snyder states, "This acquisition ... will strengthen our intellectual property position and invigorate a company that has been a pion eer in multimedia solutions and operating systems technology." Uh huh. So, how will this affect both companies? Answer: It won't.

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Mac Thots
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* Pointcast and Marimba both released new Mac versions of the apps (although both are for PowerPC only). Pointcast 1.0.1 has a bunch of new channels and a control strip. It's under 4MB, and users of previous Pointcast versions (I guess that would be 1.0 ???) will have it downloaded automatically when they connect. Marbima's Castanet Tuner 1.0 is about a 3MB download. It's got a lot of cool possibilities (although I've said in previous issues, that I think it's pretty much hype until more solid content is available). You do need the Mac OS Runtime for Java for it, but you can snag that at Apple. Check 'em both out, and let us know which you prefer.

* Well, the Hack a Mac contest ended recently, and a lot of people are crowing about the results - probably with reason. If you're not familiar with the contest, some Swedes set up a Mac Web server, installed WebSTAR 2.0 and Open Transport 1.1.2 and dare d anyone to crack it, offering a (small) cash reward for anyone who did. After three months, they ended the contest. No one had cracked it. And, they hadn't used a firewall! Understandably, the Apple crowd's enthusiastic about this. BTW, they're goin g to open the contest back up; you can check it out for yourself at http://hacke.infinit.se/indexeng.html.

* Well, a $700,000,000++ second quarter loss, eh? 4,000+ layoffs? And people say Apple's recovering? I'll believe it when I see it. On the other hand, Rhapsody is being released, so who knows? If they haven't lost all but 100 users due to backwards c ompatibility issues, then maybe there's hope....

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Web Development Thots
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* So, there's a new VB-to-Java conversion tool which seems interesting. Black Dirt Software recently released Convert 1.0. Even though I haven't had a chance to play with it yet, allegedly, Convert 1.0 allows VB developers to directly translate VB scree ns into Java source code. It also comes with "sophisticated" Java classes for tabbed dialogs and VB-style frames, as well as features for creating email surveys. It is only $60, which doesn't seem too bad. You can find out more about it at http://www.bl ackdirt.com/bdvb.htm,

* HP has come out with a new HP-UX JIT compiler. In doing so, they claim it will push them past Sun as the fastest Unix Java platform. HP says its compiler runs Java apps 13 times faster than pure interpreted code from the Java VM, and they claim that b enchmark tests indicate a 30% performance boost over Sun's JIT compiler. Well, what do you think? I'm hoping some HP-UX users will snag it, try it out, and report back (hint, hint, hint - Ron, that means you!). You can get it at http://www.hp.com/go/Ja va.

* Has anyone else snagged the new Netscape Visual JavasScript? I have to admit, I like it. Granted, it's in beta (and we all know that Netscape's beta is everyone else's alpha...) but it shows a lot of functionality (for JS anyway). It's got a debugge r, is CORBA-compatible, is drag-and-drop, and contains the ability to embed JavaBeans into apps. Nice!

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This Issue's Plug-in
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* This issue's plug-in is a "productivity" tool. It's a Windows-based spell-checker for Netscape mail! CyberSpell (http://www.inso.com/consumer/cyberspell/democybr.htm) is easily integrated in the browser, and it does more than just spell-check; it chec ks punctuation, formatting, spacing, capitalization errors, etc. Cool, eh? Moreover, it has159,000 English words, including thousands

of techie words (such as router, browser, hotlink, hyperlink, HTML, etc.), business words (i.e.., Amex, coinsured, Fann ie Mae, munibond, sharebuilder, etc.), and legal words (such as coexecutor, interpleader, malconduct, and more).

There are a couple of downsides though. First, it's not free. After trying out the 30 day demo, you're supposed to ante up $25. More importantly, though, not only is it available only for Windows, but it's available only for Navigator 2.0 -2.01! Hell o, some of us are up to 4.0 now...! Still, a good idea, and possibly worth checking out.

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This Issue's ActiveX Control
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* This issue's ActiveX control is pretty interesting (at least to me). Bob Lemm's PC Clock Synchronization (http://shell.rmi.net/~rlemm/ActiveXPages/NistSynch/NistClk4.htm) is designed to allow PC users, using IE 3.0+ (obviously), to synchronize their PC clock to the National Institute of Standards and Technology's (NIST) Time and Frequency Division. Now, this is something I should probably have for all of my computers, as my co-workers are constantly telling me my clocks always run 10-15 minutes fast.

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Stock Thots
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* After all the delays, rumors, financial problems, etc., Wired Ventures has WITHDRAWN their IPO! Wired, HotWired, HotBot, etc - all possibly in trouble due to lack of investor confidence. Interesting to see how things will turn out for them....

* Get in on the Amazon.com IPO. That's all I have to say....

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Game Thots
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* Eugene Ridenour, EarthLink's Gamemaster, provides this issue's game demos for us.

PC Game of the Week: Emperor of the Fading Suns

Emperor of the Fading Suns, a grand-level strategy game, features combat in space and on planets as up to five players maneuver their powerful armies around the Known Worlds. The game takes place in the rich universe of the Fading Suns, the popular scien ce fiction roleplaying game from Holistic Design. (ftp://ftp.boxtop.com/pub/segasoft/EFS_VT10.ZIP)

Mac Game of the Week: The Tomb of the TaskMaker

In The Tomb of the TaskMaker, you are the leader of the land and the protector of the people. Messengers come to you with word of innocent people in need of your help. In each task, you explore dungeons, battle vile monsters, and disarm traps to remove the implements of evil. Featuring ten tasks and over twenty dungeons. (http://www.stormimpact.com/tomb.sit)

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Newbie Thot
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* Wow! I can't believe how popular my original MMX piece was! That baby has garnered more responses (mostly really, really specific questions) that anything I've ever done. I s'pose that's

good - the feedback certainly has been. Many people have writt en in explaining that they've passed out copies to their office-mates, people are citing it in research papers, newspapers have re-printed it. Wow! Well, the downside is, as alluded to, I've gotten more questions than I can begin to answer. (For those of you who haven't gotten answers from me, I'm truly sorry - I only have so much time.) Well, shortly after I wrote the first piece, I wrote an MMX follow-up, consisting of reader questions, and my responses. Feel free to check it out at http://www.eart hlink.net/daily/tuesday/mmx2/. BTW, I do love my new MMX machine!

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Privacy/Security Thots
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* Hey, privacy buffs - check this out. British AOL users were told a couple of weeks ago that a new contract between users and AOL would be going into effect in which AOL ''reserves the right to monitor or disclose the contents of private communication o ver AOL and your data to the extent permitted or required by law.'' Nice, eh? AOL swears that they're not bending to any government pressure, and if anything, they're probably just trying to save themselves some trouble. But it seems to me, limiting on e potential can of worms is just opening the door for another. Seems to me that they're using their British subscribers as guinea pigs. If this works, look for it here. Hard to see how this'll pan out. I've got to assume that EFF and the ACLU and all the others would be screaming the second AOL tried it here....

* Hey gang, that AOL4FREE hoax and AOL4FREE.COM trojan horse dilemma has elicited quite the confusion. An easy place to go to check out the scoop is Dr. Solomon's site: http://www.drsolomon.com/vircen/aol4free.html. I am posting fraud info on the Tek Th ots Web site though, so check it out when you hear about these possibilities. Also, on a related note, I've gotten so sick of spam, that I've decided to post my own blacklist of spammers who send me junk email. You'll find a link at the bottom on the Te k Thots Web site; the URL is http://www.well.com/user/sch/spam.html.

* Spam followers are familiar with the hatred AGIS has engendered by their woeful spam track record. Recently, the Net was abuzz with news that they'd been hacked/attacked pretty effectively in retaliation. However, I found an interesting interpretatio n of the "attack," and I thus thought this perspective on the AGIS "attack" might prove interesting to Tek Thots readers.

(Bogus "news.admin.net-abuse" in Newsgroups line replaced by
news.admin.net-abuse.email, and followups set to the latter group.)

In article <5jjfir$lnd@dfw-ixnews12.ix.netcom.com>, rb1000@ix.netcom.com (Ron Bennett) writes:
|> According to an articles posted today including this one at URL:
|>
|> http://www.wired.com/news/technology/story/3322.html
|>
|> AGIS.NET was recently hacked as a result of their belligerent attitude towards
|> complaints about spam coming from Cyber Promotions and similar domains that
|> AGIS.NET hosts.

Actually, it looks right now like the "hacker" was invented by AGIS to cover up the fact that they screwed up when switching to ATM routers and caused their service to fail. I.e., right now, there is no evidence that there was a hacker; the only evidence there is points to AGIS incompetence.

That may change, but right now, that's how thing slook. Read the last week or so in news.admin.net-abuse.email for more information.

|> AGIS.NET will soon be changing their policy substantially on mass unsolicited
|> email (spam) and expect all Cyber Promotions connections to be terminated very
|> soon!!

Nope. Instead, AGIS has stated that they're going to form some sort of industry organization for responsible bulk email advertising, and require their customers to join it if they want to do bulk email, and require them to honor a "master remove" list maintained by the organization. It's all pretty bogus, and it makes it rather clear that they don't actually intend to do anything reasonable

to put a stop to the spam traveling through their wires. Again, re ad the last week in news.admin.net-abuse.email for more details. -- Jonathan Kamens | OpenVision Technologies, Inc. | jik@cam.ov.com

* Most everyone knows that CyberPromotions is the worst spammer on the Internet. Most everyone has heard of the lawsuits and settlements with the big ISPS. (BTW, EarthLink just won an injunction against them!!!) The news.admin.net-abuse.email newsgroup has been full of pissed off people talking about mailbombing the hell out of CyberPromo. It was s'posed to happen sometime last week. Well, I did see headlines like "Hackers Hit Cyber Promotions" around, but word in the newsgroups is that it didn't hap pen. In fact, many are claiming Spamford Wallace is faking this for empathy (oh look what those mean, nasty anti-spammers did me to, etc).

So, are the spammers of the world (AGIS, CyberPromo, et al) now stooping to crying wolf, in addition to all of their other *crimes*? Interesting....

* Since I'm ranting about spam, try this out. Familiar with the notorious Woodside Literary Agency spams? If not, be glad. These creeps have spammed the entire Usenet with bogus ads seeking writers for publication. People who send manuscripts are typi cally accepted, and then cash is demanded, repeatedly, for various reasons. Scam. Oh yeah, the "Agency" is allegedly in some shack in the middle of a dumpy part of New York City, surrounded by a chain link fence.

Well, recently some naïve writer-wannabe named Jane Hitchcock fell for it, got upset that she'd been scammed and tried to make a few waves. Since then, her life has been hell. (You can read about it here: http://www.geocities.com/~hitchcockc/story.html.)

Well, this week, a friend of mine who is a Security-type for an ISP tried contacting them numerous times to beg them to quit spamming through this particular ISP (it was being routed through illegally). What happens? Death threat! I kid you not. Well, the NYPD and FBI were called. We can only hope that these freaks are put away where they belong.

* Thanks to Winn's Infowar.com for this one:

A Swedish teenager who paralyzed U.S. telephone switchboards for months, prompting a global hunt by the FBI, was fined the equivalent of $350 by a Swedish court on Wednesday.

The self-styled "Demon Freaker," who was not named in court, jammed Florida switchboards last year by linking them to sex lines. He had cracked the codes of a company that enables Americans to call home from abroad, allowing him to call anywhere in the Un ited States free.

Working from his bedroom at night in this western Swedish city, he made around 60,000 calls, ringing up two million crowns ($250,000) of phone bills at the U.S. company's cost.

He managed to transfer the telefax number of the soft-porn magazine Hustler to his own line so that he received orders for the magazine and for sexual paraphernalia

The Federal Bureau of Investigation (FBI) picked up the teenager's trace in February 1996 when he called a U.S. emergency number with what sounded like a dire emergency.

"My penis is glued to the wall," the 19-year-old told the telephone operator, saying he was calling from the American west coast. The operator kept him on the line and investigators soon established he was calling from the west coast of Sweden.

The FBI contacted Sweden's computer crime unit, which soon closed in on the 19-year-old, who was the only Gothenburg citizen making so many U.S. calls at the time the switchboards were being disrupted.

Police who raided his home found a single computer and 117 floppy disks.

His mother said the boy had problems with alcohol and glue-sniffing but she had no idea he was spending his nights on the phone to America.

Under Swedish law, the boy could only be charged with abuse of telephone emergency services. He did not enter a plea.

"The crime of sabotage is limited to Swedish territory so I couldn't bring those charges even if I wanted to," said Gothenburg state prosecutor Gunnel Skeppholm.

* When I saw Jon Littman had a new book out, I snatched it up immediately. I loved his Mitnick book, and thought it was far more accurate a portrayal of events that Markoff's version. Littman and I even talked about it a few times, via email. I enjoyed his perspective. This new one, The Watchman, is about Kevin Poulsen. I really wanted to like it, and to a certain degree, I did. I thought it was typically well written, and quite entertaining. However, it seemed, I don't know, more Markoff-like than the last one. More theatrical, I guess. I was curious what Poulsen thought about it, so aware that he had recently put up a Web page (http://catalog.com/kevin/), I checked it out. I wasn't disappointed. He's got a page up with a mock-up of Littman's book, and a spoof on the title: The Litt-man: The Twisted Lies and Writings of Serial Hack Jonothan Littman. You can even play a little game there! My only question is, if he's banned from access to computers with modems, how'd he get the Web page up? ;)

* India has ordered two Kilo-class diesel electric submarines from Russia, and will produce two more under license. This new deal comes on the heels of a purchase of Su-30MK fighter-bombers allegedly worth more than $1.5 billion. Gee, maybe this has so mething to do with the first meeting in eight years held Monday between India and Pakistan....

* From the Journal of Electronic Defense

According to reports published in the international defense trade press, Russia is stepping up its efforts to export items from its inventory of EW assets to a world market. An item published last month in Jane's International Defense Review (IDR) disclos ed that the Russian military sales organization, Rosvooruzhenie, held a press conference to announce the availability of a jamming system to use against airborne terrain-following and target-locating radars, "including those used by the US Airborne Warnin g and Control System (AWACS)." The Russians claimed that their Tuman (Fog) system can consist of a battery-operated, unattended chain of emitters (jammers) effective against low-flying enemy penetrators (presumably by prohibiting the use or degrading the performance of the penetrators' terrain-following radar altimeters), thus forcing the enemy aircraft to fly at the higher altitudes where they are more vulnerable to ground-based SAM or AAA radar-directed air defense systems. (The published report did not indicate if the Russians made any distinction between a penetrator's radar altimeter or other on-board radar systems.) The Rosvooruuhenie executive reportedly went on to say that the jammer system was also able to "reduce the effective range" of AWACS fr om 300 to 30 km, "forcing the aircraft to fly closer to [ground-based] defenses."

The IDR report also stated that the system was automatically triggered by the hostile (presumably radar altimeter or AWACS MTI radar) emissions and that it automatically shut down after each attack.

Government and industry sources contacted by JED, and our own understanding of the operational profiles and capabilities of modern ground-attack and airborne surveillance or command and control aircraft (such as AWACS or Joint STARS), discount the Russian claims for the effectiveness of any system of this type. Knowledgeable sources who declined to be identified were certain that in order to deny low-altitude (nap-of-earth), radar-evading flight profiles to attacking aircraft, the ground-based jammers wou ld need to be deployed in such large numbers as to make the task economically and logistically prohibitive. This is because the low sidelobe levels of current radar altimeters would be unlikely to trigger jammer turn-on unless the jammer were on or very c lose to the flight path of the aircraft. As far as effectiveness against such airborne surveillance platforms as Joint STARS or AWACS, the report implied that the Russians were not cognizant of the fact that these aircraft normally operate at medium to hi gh altitudes while flying racetrack patterns on the friendly side of the forward edge of the battle area. At such slant ranges, even high-power ground-based noise jammers would be able to do little more than produce a relatively small blind spot in the im mediate vicinity of each jammer. While this might partially limit the very large field of view of the down-looking Joint STARS, an AWACS, whose radar is more likely to be sweeping out or up in order to orchestrate the movement of friendly aircraft and vec tor these to their engagement of the enemy aircraft it locates and tracks, is even less likely to be affected because of its radar view of interest and the geometry of its position relative to the ground-based jammer.

The US wire service-Associated Press (AP) picked up on the IDR report and amplified it by introducing other EW assets into the range of products recently touted by the Russians. The AP story, presumably based on interviews with editorial staff members of the UK-based publication, goes to greater lengths to conjecture that the Russian jammers could defeat AWACS and Joint STARS but

offers no elaboration of how it would do so, nor does it acknowledge any of the operational questions raised above. The AP repo rt does however mention ground-based Russian jammer systems more powerful than the battery-powered ones cited in the IDR article. These are the SPN-2 and SPN-4 jammers (for a more detailed description of these systems, see "The New Capitalist Frontier," J ED, July 1995, p. 44) made by Kvant, but which have been offered for sale by the Russians for several years.

The family of vehicle-mounted, threat-adaptive noise jammers are operated by a five-man crew. Usually, between two and nine jammers are networked. - H. Gershanoff

* In a March 11 speech to the Acquisition and Technology Subcommittee, Senate Armed Services Committee, Larry Lynn, the Director of DARPA made some really interesting comments about DARPA itself and where they're going regarding research. I'd love to pri nt all of his comments, but it'd be way, way too long, so what follows are simply some of the tidbits which stuck out for me. (I've paraphrased some of these....)

Automated speech technology: Computers that can respond to spoken commands have been a long-term DARPA investment area. Now, success is nearly at hand: A DARPA-developed hand-held computer has been demonstrated in real-time language translation in Bosni a. From a spoken English phrase, the computer responds through a loudspeaker with the equivalent Serbo-Croatian translation. Even now, the system is being tested by military police, border crossing guards and others who come into contact with the local population. A more sophisticated version of this computer is being used by military field intelligence units to gather information from civilians in the field and wirelessly transmit this information back to headquarters. Ten more experimental units wer e sent to Bosnia last month.

Also, DARPA has initiated a biological warfare defense effort recently. The goal of the DARPA Biological Warfare Defense Program is to develop and demonstrate those technologies that will minimize the impact of biological weapons (bacteria, virus, toxin and genetically engineered species) on the conduct of U.S. military operations.

With funds programmed by DARPA into Office of the Secretary of Defense accounts and programs fully coordinated with the assistant to the secretary of defense for nuclear and chemical and biological defense programs, we are emphasizing the development of real-time warning and all-clear sensors, immediate medical countermeasures for those already exposed and information technologies to mitigate and manage the effects of an attack. In the FY 1997 authorizatio n act, Congress granted DARPA the authority to budget separately its biological warfare defense efforts for work uniquely focused on the far-term, high-payoff horizon. Accordingly, a separate DARPA program element has been established in the FY 1998 pres ident's budget.

Last year, we described the canary-on-a-chip sensor to warn of the presence of bioagents on the battlefield. As we proceed with our immediate medical countermeasures work, this year I am happy to report recent success at the University of Virginia, where a heteropolymer bound to the red blood cells of monkeys reduced the concentration of a virus in the bloodstream by over a million times in less than one hour. In other work, we are investigating engineered T-cells for enhanced immunity.

On the future of the Internet, Lynn stated, Internet technology (packet switching), first demonstrated by DARPA in the 1970s ARPANET, is the foundation of today's military and commercial network systems. Virtually all networking systems use this technolog y, which has become the basis of a multibillion dollar industry.

The Next-Generation Internet program is a new, multiagency initiative to make major advances in tomorrow's Internet technology. It has three elements: first, to significantly increase networking speeds by 10 to 1,000 times; second, to apply and extend re search to provide the guaranteed performance in networks that is not possible with today's technology; and third, to enable a new generation of applications based on significantly more capable networks. Other participating agencies, including DoE, NASA, and the NSF, will concentrate on near-term additions to Internet capabilities.

In FY 1998, DARPA's efforts, in keeping with the high-end needs of the DoD, will be aimed at the long-term, ultra-high performance elements of this initiative. Part of our strategy is to build on the successes of the DARPA Broadband Infrastructure Technol ogy (BIT) Program, where 40 billion bit per second, multiple wavelength division multiplexing and crossconnect switching is being developed and demonstrated. This technology, as well as the prototype technologies being developed in the networking and com puting programs, will then be applied and integrated into a ultra-high speed next-generation Internet test bed, where we will develop and test technologies needed to operate at

performance levels 1,000 times greater than that available today.

Storage of data is a huge problem that must be solved if the DoD is to realize the full-spectrum dominance of Joint Vision 2010. We are meeting this challenge through the development of a new technology in which data is densely stored in the form of an i mage in a transparent crystal. Recently, under DARPA's aegis, IBM has demonstrated a record data transfer rate of one gigabit (one billion bits) per second from an experimental holographic data storage system. Although the data density is very high, the most important feature of this technology is the ability to retrieve data instantly using light. Other technologies like magnetic or optical tape require long search times that are unworkable for weapon applications such as automatic target recognition (ATR).

ATR is a very difficult problem and requires more than high-volume data storage. It also requires order-of-magnitude increases in data processing well beyond current or foreseeable hardware. But new mathematics, called waviest, may form part of the solution. Using wavelet-based algorithms in the Army's Longbow Fire Control Radar System, we have achieved a dramatic reduction in the processing required to perform target classification with increased accuracy.

Advanced efforts in computers and microelectronics are focused on technologies that enable engineered microsystems to both perceive and control the battlefield environment. Advances in these microsystems will increasingly be paced by electronics that do more than just compute, including high-power electronics for controlling and conditioning megawatts of electrical power; radio-frequency electronics for single-chip, mobile communication; and microelectromechanical systems technologies that merge sensing and actuation with computing and communication.

Investments in advanced electronics are focused in four thrust areas: sense and action amplifiers for the warfighter, battlespace information channels and connectivity, large-scale integration of multitechnology systems and exploratory device and fabrication technologies. Supporting activities in advanced materials, electronic design aids and the development of tools and processes for flexible and affordable manufacturing will accelerate DoD's incorporation of emerging advanced electronics technologies into existing and planned weapons systems.

The High-Performance Computing Program is completing its efforts on scaleable massively parallel systems and is exploring new adaptive computational architectures. For adaptive computing, the goal is to demonstrate a factor of 100 increase in performance when compared to conventional systems by developing new forms of agile computer architectures that can configure their hardware to specific military problems, even as these problems arise. The computing technologies developed by the program will be demo nstrated for military applications where small size, weight, power, real-time and fault-tolerant performance are important.

This year, we are developing the advanced multicast services needed to support distributed simulation and demonstrating an extensible, modular operating system framework that will be capable of supporting the rigid demands of real-time, fault-tolerant operations for defense missions. In FY 1998, we plan to complete software development environments for scale able systems and produce prototypes of the component technology. We will validate the technology concepts by emulating the subsystems in an overall system simulation. These embedded technology components will be inserted into test bed systems for command and control, missile avionics and unmanned underwater vehicles.

Optoelectronics -- the use of light instead of electricity -- is, today, where electronics was in the late 1950s. That is, only a few optoelectronic devices can be integrated together in a circuit. But the recent breakthrough invention of a new type of laser emitter device called the vertical cavity surface emitting laser (VCSEL) by DARPA promises to make very large scale integrated photonics (where tens of thousands of optoelectronic devices are integrated with silicon) feasible, reducing the volume and power of signal and image processors by as much as 1,000. This means that critical processing functions that pre viously had to be performed on large aircraft or on the ground could be performed on a UAV or mobile platform.

In FY 1998, we plan to demonstrate the feasibility of smart pixel arrays (monolithic integration of small arrays of VCSELs and detectors with electronics) for a high-performance, three-dimensional-based optoelectronic signal processor for military battlef ield information processing.

When data is transmitted by radio, the rate of transmission is severely limited by the laws of physics. And in many cases, no alternative to radio is possible. In these cases it is very important to compress information prior to transmission to gain the required speed. DARPA's Intelligent Bandwidth Compression (IBC) Program is developing and demonstrating new data compression techniques for complex synthetic aperture radar (SAR) imagery and for contextual background detected SAR imagery. This compress ion technology, combined with real-time, area-of-interest detection

algorithms, will allow the downlinking of wide area surveillance SAR imagery from airborne platforms with economical, low-data-rate communication links.

Believe me, there's a lot more there, but I'll spare you. I have to admit, though, that I find DARPA's research efforts fascinating!

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