

W5YI

America's Oldest Ham Radio Newsletter

REPORT

Up to the minute news from the world of amateur radio, personal computing and emerging electronics. While no guarantee is made, information is from sources we believe to be reliable.

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FCC Proposes to Unleash New Ultra-Wide Band Technology

"We believe that UWB technology holds promise for a vast array of new or improved devices that could have enormous benefits for public safety, consumers and businesses. Further, we anticipate the UWB technology could create new business opportunities for manufacturers, distributors and vendors that will enhance competition and the economy. UWB technology may also enable increased use of scarce spectrum resources by sharing frequencies with other services without causing interference. It is important that we find ways to encourage the development and deployment of technologies that may allow more efficient use of the spectrum." [Excerpt from ET Docket 98-153, released May 11, 2000]

Wireless communication is expanding exponentially, but radio spectrum is limited and filling up fast. Something's gotta give. The next wave in radio transmission technology may be Digital Pulse Radio ...otherwise known by the letters UWB. It stands for "ultra-wide band." It opens up virtually infinite bandwidth in the existing electromagnetic spectrum.

The FCC has released a *Notice of Proposed Rulemaking* seeking to amend the Commission's Part 15 rules to pave the way for new types of unlicensed RF products incorporating ultra-wideband technology. The commission is currently seeking comments on its proposal which could have an enormous impact on wireless consumer and business broadband applications for access to the Internet, as well as public safety use of the technology.

On August 20, 1998, the Commission adopted a *Notice of Inquiry* in ET Docket 98-153 to investigate the possibility of permitting the operation of UWB devices on an unlicensed basis under Part 15 of the rules. The FCC invited comments on any other matters or issues that may be pertinent to the operation of UWB systems. In response to the NOI,

42 parties filed comments including the American Radio Relay League on behalf of the amateur community..

The FAA argued that the National Telecommunications and Information Administration (the White House advisor on telecommunications matters) claims UWB transmitters have the capability to interfere with global positioning system receivers, "...soon to be the backbone of the global aeronautical radio navigation system." While GPS has many commercial applications, it is a government-managed navigational system

The FCC is now moving forward with this proposal and beginning the process of identifying potential rule changes and alternatives necessary for the deployment of UWB technology. The proposals in the NPRM are designed to ensure that existing and planned radio services, particularly safety services, are adequately protected.

Part 15 devices

Part 15 RF devices are permitted to operate without a license from the Commission and do not require frequency coordination. The technical standards contained in Part 15 are designed to ensure

that there is a low probability that these devices will cause harmful interference to other users of the radio spectrum.

The primary operating conditions under Part 15 are that the operator must accept whatever interference is received and must correct whatever interference is caused. Should harmful interference occur, the operator is required to immediately correct the interference problem, even if correction of the problem requires ceasing operation of the Part 15 system causing the interference

Just what is Digital Pulse Radio technology?

UWB was patented in 1987 by engineer Larry Fullerton, chief technology officer of Time Domain Corp., a small privately held Huntsville, AL, company. "Ultra-wide band is today where the Internet was in 1993 and 1994," said Ralph Petroff, Time Domain's president and CEO. "Nobody's even heard of it, but it's going to explode on the scene."

Unlike communications technologies that send information in analog form, ultra-wide band uses a digital transmission format consisting of small on-off bursts of energy at extremely low power but over an extremely wide section of the radio spectrum.

By precisely timing the pulses within accuracies up to a trillionth of a second, the designers of ultra-wide-band radio systems are able to create low-power communications systems. The timing differences determine if a pulse is a 1 or a 0.

Conventional wireless transmissions vary the amplitude (the height of the wave) or the frequency (the number of wave cycles per second.) Time Domain's technology is similar to a Morse code system that switches on and off 40 million times a second. And unlike traditional radio signals, which are confined to a very narrow frequency, each pulse of ultra-wide band is transmitted across a wide portion of the radio spectrum, so that only a minute amount of energy is radiated at any single frequency.

Ultra-wide band systems actually fall into two categories: systems that use radar techniques for precise measurements of distance, and detection or imaging of objects; and communications systems that can be used for voice, data and control signals.

Somewhat similar to Spread Spectrum modulation, the precisely timed, extremely short, coded pulses can carry much more data than conventional communications systems and can support an unlimited number of users.

UWB is virtually impossible to jam or detect making it ideal for an assortment of applications ranging from networking to through-the-wall radar and secure communications systems.

Time Domain's devices can currently transmit 1.25 million bits a second up to 230 feet using just .5 milliwatts ...or one-thousandth the power used by the new wireless

industry connectivity standard known as "Bluetooth."

Bluetooth, which operates in the unlicensed 2.4 GHz frequency band, can send a million bits a second about 30 feet using 100 milliwatts (a tenth of a watt.) It is intended to interconnect devices like palm computers, laptops and cellular phones.

To transmit information, the pulses are transmitted using a technique called pulse-position modulation. The receiver is programmed with the right detection code to translate the pulses into digital ones and zeros. A receiver without the right code will only hear noise.

UWB technology is relatively new and further comprehensive testing and analysis is needed before the risks of interference are completely understood. The biggest advantage of UWB is that it holds the promise of dramatically reducing the pressure on wireless spectrum carrying mobile phone voice conversations and data transmissions. Another huge plus is that UWB devices are able to operate on spectrum already occupied by existing radio services without causing interference to their operations.

The FCC rulemaking proposal therefore could permit scarce spectrum resources to be used more efficiently. FCC chairman William Kennard has identified the problem of scarce spectrum as the most critical issue facing the wireless industry today. And he has asked industry to do whatever they can to address it technologically. The FCC believes that ultra-wide band could help reduce this pressure.

Already some cellular phone companies have found themselves at capacity in some markets, annoying customers who sometimes find themselves in areas unable to use their phones. The problem will only get worse as applications -- such as high-speed Internet access -- move to the wireless arena.

Most cell phones use specific frequencies to transmit their information. By contrast, UWB sends signals across a huge slice of spectrum at power levels so low that it can't be distinguished from the existing low level background noise floor (which is filtered out by normal radio circuits) except by the receiver at which it's directed.

At present, UWB can't be used by anyone without a waiver of the rules since the technology does not comply with FCC regulations which never anticipated devices that operate over bandwidth used by many adjacent radio services. UWB spreads its signal across a few gigahertz of spectrum including frequencies reserved for various military, government and civilian users. It may be necessary to program UWB radios with "notches" -- gaps in their transmission output to preclude operation on sensitive frequencies such as radio astronomy.

Applications of Ultra-Wide Band technology

While police, fire and rescue could use UWB communication devices to provide secure communications

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and find people buried under building rubble, the technology can also be used for communications applications involving the transmission of very high data rates over short distances without interference. Recent radar imaging advancements has also resulted in a potential UWB use of locating land mines buried under the ground.

UWB devices can be used to deploy wireless services such as phone, cable and computer networking throughout a building or home. UWB works best at short distances, and the technology is initially being aimed at the home networking market, where televisions, computers and stereos can all be lashed to a wireless connection indoors.

But UWB's high-speed data transmission ability makes it a highly suitable technology for broadband access to the Internet. Down the road, cell phones will be able to be produced using only 1 to 4 milliwatts ...about 100th the power used by conventional cell phones, which translates into smaller products, longer-life batteries and more users per cell.

Security is good as well. The U.S. military already uses a communications handset created by Time Domain because the transmissions cannot be pinpointed or tapped as easily as traditional mobile services.

The U.S. Marine Corps and the Army are testing radios that can transmit millions of coded pulses each second over 2 gigahertz of bandwidth for covert communications. The radios operate with just 5 milliwatts of power. They can also pinpoint the location of other members of the unit. Time Domain needed a special experimental waiver to produce the radios.

They can also now sell a limited number of their "RadarVision" units to police and emergency units to evaluate their ability to locate criminals behind walls or find survivors in an earthquake. Two other companies, US Radar, Inc., and Zircon Corp., have also received waivers from the FCC to develop the technology.

FEMA (the Federal Emergency Management Agency) is evaluating UWB technology in underground radar units that can locate victims trapped under rubble. It is superior to conventional radar systems because it doesn't suffer from multipath problems ...multiple reflections that plague indoor radio and radar systems because signals tend to reflect off many surfaces limiting imaging and ranging precision.

The technology allows a wide range of science fiction-like applications. Initially, the services were created as radar tools, which can see through walls when traditional radar is blocked. That could allow such things as devices allowing firefighters to see who or what is in burning buildings. There's still a long way to go before products hit the markets, however.

In their May 15th NPRM, the FCC said "We have thoroughly reviewed all of the comments and reply com-

ments filed in this proceeding. Based on this review, we believe that UWB devices may offer significant benefits for public safety, businesses and consumers....

FCC asks for more UWB testing

"Further, we observe that most UWB devices cannot operate under our current regulations. Therefore, we tentatively conclude that the Commission's rules should be amended to provide for UWB devices. At the same time, we recognize that any new rule provisions for UWB devices must ensure that radio services are protected against interference."

The FCC has committed to ensuring that safety services, such as the global positioning system are protected against harmful interference. Toward that end, it is asking for more testing before it gives its final approval for the technology to be used. The NTIA, the U.S. Department of Transportation, and other organizations are planning such tests, the results of which are due to regulators by Oct. 30.

"We have a number of concerns about generally permitting the operation of UWB devices in the region of the spectrum below approximately 2 GHz. This is perhaps the most heavily occupied region of the spectrum and is used for public safety, aeronautical and maritime navigation and communications, AM, FM and TV broadcasting, private and commercial mobile communications, medical telemetry, amateur communications, and GPS operations.

"...we tentatively conclude that it is appropriate to regulate under Part 15 of the rules low power UWB devices intended to be mass marketed to businesses and consumers. We recognize that UWB technology may be developed for higher power applications such as wide-area mobile radio services.

"However, we find that such applications raise many new and novel questions, such as consistency with the international and domestic table of frequency allocations, and how such services might be licensed to share spectrum across broad frequency ranges used by multiple existing services and licensees. We observe that there is insufficient information in the record to address such issues. Accordingly, we are not making any proposals at this time to allow high power UWB devices to operate under Part 15 or on a licensed basis."

The FCC said the process for final approval will likely stretch on at least until early next year. In the meantime, an Ultra-Wide Band Working Group has been formed by 80 companies who will work together to develop and advance the technology. And at least ten other companies are waiting to begin selling new UWB-based units ...including a gadget that provides continuous readings of your child's whereabouts in a crowded amusement park. [FCC Notice of Proposed Rulemaking, adopted May 10, 2000.]

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What is happening in the new Restructured Amateur Radio Service!

The following chart indicates the number of amateurs currently licensed in the Amateur Service as of a year ago (May 31, 1999), April 15, 2000 (the first day of the new restructured Amateur Service) and May 31, 2000. After the first seven weeks of the new restructured service there are 8,792 less Tech Plus and 7,490 additional General Class ...also 5,323 less Advanced Class and 6,379 additional Extra Class. This is caused by amateurs (1) trading in their Element 3B CSCE (the old General written exam), (2) "Old Tech" proof for a new General Class ticket, or (3) an Element 4B CSCE (the old Extra Class written exam) and upgrading to the new Extra Class. It is still very early in the process and there are still thousands of upgrade applications that have yet to be processed. We will keep you posted.

Class	5/31/99	% Distr	4/15/00	% Distr	5/31/00	% Distr	Change	% Chg
Novice	54,993	8.1%	50,409	7.4%	49,015	7.2%	(1,394)	-2.8%
Technician	196,598	29.1%	204,981	30.2%	206,854	30.5%	1,873	0.9%
Technician Plus	134,222	19.9%	133,812	19.7%	124,133	18.3%	(9,679)	-7.2%
General	110,914	16.4%	109,699	16.2%	118,079	17.4%	8,380	7.6%
Advanced	103,645	15.4%	102,931	15.2%	97,099	14.3%	(5,832)	-5.7%
Extra	75,004	11.1%	76,113	11.2%	83,164	12.3%	7,051	9.3%
Total	675,376	100.0%	677,945	100.0%	678,344	100.0%	399	0.1%

AMATEUR RADIO STATION CALL SIGNS

...sequentially issued as of the first of June 1, 2000:

Radio District	Group A Extra	Group B Advanced	Group C Tech/Gen.	Group D Novice
0 (*)	AB0MK	KI0RV	(***)	KC0IBT
1 (*)	AA1VO	KE1LX	(***)	KB1FEP
2 (*)	AB2IN	KG2RM	(***)	KC2GKE
3 (*)	AA3UG	KF3DY	(***)	KB3FAB
4 (*)	AF4UZ	KV4FC	(***)	KG4HWT
5 (*)	AC5XA	KM5XB	(***)	KD5KHS
6 (*)	AD6OD	KR6EP	(***)	KG6BNS
7 (*)	AC7EB	KK7WK	(***)	KD7JEM
8 (*)	AB8HA	KI8JX	(***)	KC8OPR
9 (*)	AA9YO	KG9QS	(***)	KB9WJF
N. Mariana	NH0Q	AH0BC	KH0JR	WH0ABN
Guam	(**)	AH2DN	KH2UV	WH2ANX
Hawaii	WH7Z	AH6QJ	KH7ZZ	WH6DGJ
Am. Samoa	AH8T	AH8AI	KH8DO	WH8ABF
Alaska	AL0Y	AL7RP	KL0XO	WL7CVE
Virgin Isl.	(**)	KP2CP	NP2KS	WP2AIN
Puerto Rico	WP3F	KP3BL	WP3HH	WP4NOT

* = All 1-by-2 & 2-by-1 call signs have been assigned.

** = All 2-by-1 call signs have been assigned.

*** = Group "C" (N-by-3) call signs have now run out in all districts. Group "D" calls now being assigned.

Note: New prefix numerals now being assigned in Puerto Rico (KP3/NP3/WP3), Hawaii (AH7/KH7/WH7) and Alaska (AL0/KL0)

[Source: FCC Amateur Service Database, Washington, DC]

NEW AND UPGRADING AMATEUR STATISTICS

For the Month of May 1998, 1999 & 2000

License Class	New Amateurs			Upgrading Amateurs		
	1998	1999	2000	1998	1999	2000*
Novice	70	57	24	4	0	0
Technician	1,411	1,453	991	21	0	800*
Tech Plus	199	157	50	341	317	0
General	19	18	90	334	215	6,600*
Advanced	2	2	0	237	239	0
Extra Class	5	2	7	172	134	5,600*
Total:	1,706	1,689	1,162	1,109	905	13,000*
Increase:	(43%)	(1.0%)	(0.0%)	(23.8%)	(18.4%)	N/A*

(* Due to report change upgrading amateurs are estimated.)

■ **FCC makes it harder to put external antennas on Part 15 devices** - The FCC says it's modifying its Part 15 rules to make it harder to put an external antenna on an unlicensed Part 15 device. The Commission this week issued a *Public Notice* that says MMCX, MCX, and reverse polarity, SMA, BNC and TNC type connectors no longer will be sufficient to meet the requirements of Sec. §15.203 for all Part 15 transmitters. In the past, these connectors were considered acceptable because they were not readily available and helped to prevent modification of a Part 15 transmitter by adding an antenna or external power amplifier. The FCC says that because these connectors now have become readily available, they no longer are considered sufficient to demonstrate compliance with Section §15.203 of the rules. The new regulation takes effect within 30 days of the Public Notice.

[Thanks: N5FPW.]

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AMATEUR RADIO SERVICE CENSUS BY STATE AND LICENSE CLASS

Currently Licensed Individual Stations - As of May 31, 2000

State	Name	Extra	Advanced	General	TechPlus	Technician	Novice	Total
AK	Alaska	388	428	575	476	1,121	193	3,181
AL	Alabama	1,340	1,453	1,723	1,866	3,641	431	10,454
AR	Arkansas	834	951	992	1,196	2,477	338	6,788
AZ	Arizona	1,788	2,325	2,517	2,708	5,333	665	15,336
CA	California	9,805	12,792	14,672	18,384	38,106	9,016	102,775
CO	Colorado	1,502	1,875	1,989	2,218	3,766	667	12,017
CT	Connecticut	1,189	1,255	1,676	1,522	1,844	817	8,303
DC	Dist. of Columbia	65	78	102	52	76	34	407
DE	Deleware	215	199	270	275	336	92	1,387
FL	Florida	4,943	6,766	8,584	7,016	9,104	3,405	39,818
GA	Georgia	1,852	2,255	2,539	2,681	4,351	779	14,457
HI	Hawaii	438	409	513	547	1,030	271	3,208
IA	Iowa	872	1,153	1,310	1,030	1,589	483	6,437
ID	Idaho	431	548	686	762	1,701	190	4,318
IL	Illinois	2,830	3,449	4,050	4,303	6,267	1,757	22,656
IN	Indiana	1,654	2,060	2,513	3,034	4,433	1,003	14,697
KS	Kansas	865	946	1,457	1,268	2,184	513	7,233
KY	Kentucky	1,089	1,052	1,408	1,591	3,014	625	8,779
LA	Louisiana	907	1,108	1,213	1,189	1,964	436	6,817
MA	Massachusetts	2,156	2,206	2,761	2,773	3,267	1,213	14,376
MD	Maryland	1,764	1,769	2,099	1,995	2,769	781	11,177
ME	Maine	577	603	912	789	1,167	300	4,348
MI	Michigan	2,615	3,026	3,874	3,875	6,196	1,261	20,847
MN	Minnesota	1,438	1,652	2,117	1,822	2,926	648	10,603
MO	Missouri	1,641	1,878	2,393	2,136	3,823	765	12,636
MS	Mississippi	596	718	791	773	1,539	229	4,646
MT	Montana	380	410	558	478	1,056	179	3,061
NC	North Carolina	2,317	2,646	3,064	3,236	5,676	1,339	18,278
ND	North Dakota	183	200	338	279	474	89	1,563
NE	Nebraska	478	626	874	707	964	233	3,882
NH	New Hampshire	756	683	856	963	1,342	327	4,927
NJ	New Jersey	2,165	2,641	2,840	3,226	3,448	1,419	15,739
NM	New Mexico	692	804	846	804	1,961	184	5,291
NV	Nevada	533	672	817	789	1,527	205	4,543
NY	New York	4,050	4,631	5,824	6,182	8,668	3,309	32,664
OH	Ohio	3,609	4,124	5,030	6,435	8,825	2,098	30,121
OK	Oklahoma	1,130	1,205	1,369	1,548	3,294	485	9,031
OR	Oregon	1,448	1,880	2,498	2,434	3,875	790	12,925
PA	Pennsylvania	3,310	3,843	4,566	4,804	5,845	1,747	24,115
PR	Puerto Rico	313	530	772	1,867	1,047	2,202	6,731
RI	Rhode Island	338	310	455	547	488	219	2,357
SC	South Carolina	931	947	1,404	1,169	1,948	369	6,768
SD	South Dakota	200	286	314	255	411	106	1,572
TN	Tennessee	1,859	1,996	2,371	2,633	4,252	710	13,821
TX	Texas	5,488	6,586	6,948	7,309	12,785	2,036	41,152
UT	Utah	619	730	817	1,600	4,450	321	8,537
VA	Virginia	2,373	2,677	2,922	3,140	4,612	1,065	16,789
VI	Virgin Islands	47	35	61	41	82	21	287
VT	Vermont	318	272	400	367	753	116	2,226
WA	Washington	2,646	3,347	4,037	4,597	7,850	1,421	23,898
WI	Wisconsin	1,403	1,554	2,050	1,705	3,206	597	10,515
WV	West Virginia	716	646	976	1,087	2,641	351	6,417
WY	Wyoming	199	220	257	279	535	83	1,573
Other	(See Note below)	197	153	189	258	718	80	1,595
Total		82,492	97,608	117,189	125,020	206,757	49,013	678,079
	Percent of Total:	12.2%	14.4%	17.3%	18.4%	30.5%	7.2%	100.0%

("Other" includes U.S. Island possessions and U.S. military overseas addresses.)

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CUTTING EDGE TECHNOLOGY

■ **"Well-heeled" as well as grounded.** For extra anti-static protection, Static Technologies Corp. offers a grounding strap for technology workers to wear inside the shoe, rather than just clipped onto the sole. The MG-1000 disposable heel grounder slips inside the shoe for direct contact with the foot, for extra protection in static-sensitive areas.

■ **Can a mechanical switch actually emit RFI?** Yes. Unless you shield it with an EMI-RFI-shielded switch boot. It looks like a standard colored rubber cover on the switch's toggle lever, but APM's Hex-seal includes a special metallic mesh inside as a liner to keep undesired RF emissions inside (or outside!) the switch. Shielding efficiencies can be as high as 120 dB.

■ **As astronomy progresses, planetariums keep up.** Pinhole projectors and 16mm films just won't cut it anymore. Full-motion color video is often standard these days, shown on domes from VCR-based video projectors. Even the Hayden Planetarium in New York City has upgraded to High-Definition TV projectors. High-resolution pictures of the outer planets and Hubble Space Telescope images surround you in multi-channel sound and practically take you into outer space.

■ **By the time you read this, we'll be in Hurricane Season.** It runs from June through November each year. The official list of Atlantic hurricane names for 2000 are as follows: Alberto, Beryl, Chris, Debby, Ernesto, Florence, Gordon, Helene, Isaac, Joyce, Keith, Leslie, Michael, Nadine, Oscar, Patty, Rafael, Sandy, Tony, Valerie and William. (There is never a hurricane name beginning with the letter Q, U, or Z.) By international agreement, Atlantic hurricanes are named alternately with boys' and girls' names, and the names can be French, Spanish or English.

■ **A pen that automatically detects forged signatures?** It's here. The LCI Smartpen's internal computer automatically senses handwriting pressure and angle when making a signature, comparing those parameters against an authentic signature's parameters. It also records how much time a signature takes to write, using that as an additional comparison because forgers generally take slower, more careful attention to how a signature looks.

■ **"This tape won't erase!"** When the audio and video industries began using metal recording tape in the 1980s, they raved about its excellent fidelity. But they noticed something peculiar about it: bulk tape erasers couldn't erase it! Many studios and radio stations (before the digital era) regularly erased old tapes for re-use because it was cheaper than buying new stock. But the commercial tape erasers (which normally erased entire reels of tape in seconds) were designed to work with regular tape; metal tape inherently has a much stronger affinity for "hanging on" to its recorded signal -- a higher coercivity. Metal tape's coercivity is at least twice that of regular tape, so most bulk erasers wouldn't work. Special erasers had to be manufactured for metal recording tape.

■ **Anthropologists learn a great deal about how various peoples lived by literally rooting through their garbage.** That holds true for us today as well as civilizations that have been extinct for thousands of years. To better develop household appliances, many companies employ professional anthropologists to examine and record how people behave in everyday life. Engineers can therefore design a product that most people don't even think they need, but upon examination decide that they can't live without -- such as the microwave oven.

■ **Sensors the size of credit cards let you see infrared and ultraviolet light.** Normally invisible (and therefore difficult to work with), these wavelengths of light become visible when they strike the sensitive phosphors of the Visualize cards. The IR card displays a dot of green visible light when struck with infrared light, and the UV card glows with yellow light when hit with ultraviolet light. These cards are meant to be used with laser diodes but can be easily adapted for a variety of applications. They're made by Applied Scintillation Technologies.

■ **Most (if not all) electronic components are sensitive to heat.** RF transmitters can generate plenty of heat. What if the heat-sink circuitry isn't enough (or is inconveniently placed) to dissipate the heat energy? A circuit designer can "deliver" that heat to an entirely different area of the board through the use of a cable load. In effect, you attach a load to a short coax cable and mount it in a non-critical area. The load heats up without affecting other components. This helps maintain long circuit life and prevents detuning. It's also inexpensive.

■ **What will happen to paper-based novels?** The future may be in computer-delivered reading. Stephen King, the famous writer of horror novels, recently released a novella called *Riding the Bullet* only on the Internet. Half a million fans tried to download a copy within a couple of days, a load which temporarily crashed the server. Bypassing the time-consuming printing operation and delivery to stores saves money and gets stories to readers much faster.

■ **A recent study reveals that the American household, on the average, spends about \$1,000 a year on consumer electronics, such as televisions, VCRs, sound equipment and computers.**

■ **Multi-disc DVD players are now available.** Samsung's DVD-C700 can hold five DVD discs at once, so viewers can run their own "film festivals." Could we soon see multi-pack DVD players, as many CD players now offer?

EMERGING COMMUNICATIONS

■ **Want to buy a satellite?** Since the Iridium project filed for bankruptcy last year, its 66 low-earth-orbit satellites have been languishing, unused, hoping for buyers. Since none have been forthcoming, it is unclear what will happen to all of the "birds." It takes time, money, equipment and staff to maintain a satellite fleet. It appears that they will all be decommissioned. Satellites that have reached the end of their useful lives are often purposely sent back down through the atmosphere to burn up, or are launched into orbits where they won't interfere with other spacecraft. Experts say that the Iridium satellites don't have enough fuel to be directly de-orbited, though it will be possible to adjust their orbits to make them fall faster than usual. It could take a couple of years for all of the "birds" to fall back to Earth.

■ **Many hospitals don't want cellular telephones inside their buildings, citing potential effects on sensitive electronic medical gear.** It doesn't take much RF to throw off sensor readings or even scramble a control system. As an ounce of prevention, the CellAlert Cellular Telephone Detector is appearing in hospitals to alert the medical staff to cellular telephone activity. It doesn't monitor conversations, it just samples the common cell phone frequencies and triggers an

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alarm when RF levels reach a particular level. The device is made by Holaday Industries.

■ **Co-ordinating the events of the Olympic Games can be trying enough,** but add 250,000 visitors wanting to know when and where everything is and you'll be glad that an automated system is taking care of things. Visitors to Sydney, Australia this September will be able to get information by phone on the running of the Olympic torch (including faxed-back maps of the route), tickets for each event, and more. The system is said to handle as many as 3,000 calls per hour.

■ **To help provide safety for communications technicians, makers of fiber-optic cable are attaching self-closing shutters onto the cable connectors.** They help guard against accidental exposure to high-powered laser beams, should a technician happen to look into the unshielded end. When not in use, the shutter remains closed; when connected, the shield is raised and the laser light reaches what it needs without possibly blinding anyone.

■ **Speared by a fiber-optic cable?** It happens. Small-diameter optical fiber glass can behave just like a needle if it's broken into small pieces and accidentally driven into the skin. Technicians have to be careful of what happens to the bits and pieces of cable they chop off when installing fiber-optic communications networks; you don't want them just lying on furniture or sticking up out of carpets. The Panduit Corporation makes a book of stickers for the purpose of picking up tiny pieces of glass fiber. The sticky tape makes a handy temporary resting place for the fibers until the technician can dispose of them all at once.

■ **How safe is that picture tube?** Relax; they're built to take a certain amount of abuse, but they won't spontaneously implode in a TV set or computer monitor. Government regulations require stringent safety codes during cathode-ray tube manufacturing. Even the largest commercially available CRTs are designed and engineered to remain intact for at least 100 years.

■ **A radio tower on wheels?** You may sometimes see a cellular phone tower parked on the back of a truck in rural areas. At least one company, Aluma Towers, has several models of them. Some can be cranked up as high as 100 feet. Such towers are useful for disaster applica-

tions or other temporary use. They can also be used to provide cellular communications in a remote region while the permanent tower is being built.

■ **The "Dick Tracy" wrist radio is now a reality.** Samsung Electronics recently announced their Watch Phone, a tiny cellular phone packaged as a wrist watch. It's now available in Korea and should be available in America later this year.

■ **A report from Japan says that cellular telephones are now banned from Tokyo trains and buses.** Tokyo's transportation systems are famous for being crowded, and people with pacemakers have reported feeling ill after being trapped in close proximity with other riders who use cell phones. Studies suggested that strong RF fields from the popular communication devices could adversely affect pacemakers.

COMPUTER INFO

■ **Microprocessors continue to get faster.** Even though Intel broke the 1-GHz barrier last year, their latest 32-bit chips promise to run as fast as 1.4 GHz.

■ **Now you can play Game Boy 24/7!** Hauser's "Worm Light" is a small lamp assembly that plugs onto a Game Boy, illuminating the handheld video game's display for nighttime use. It resembles a tiny goosenecked lamp but is much tougher. The Worm Light incorporates a white LED instead of an incandescent bulb.

■ **What will be the world's most powerful computer?** The crowd of participants just got bigger. Cray (which developed the first supercomputer) is building a new machine for the army's research and development department. They will expand a Cray T3E system by adding more parallel processors, bringing the total to over 800. Its memory will be expanded to half a terabyte, and the system's computational speed will reach over 1 trillion calculations every second..

■ **No more Intel microprocessor serial numbers!** Intel recently announced that they will no longer manufacture their chips with internal serial numbers. So many people rebelled against the practice, claiming it was an attack on people's privacy, that Intel finally decided to halt it. Intel said from the beginning that they

only wanted to provide computer owners with a reliable means of tracking their own computers as a guard against theft.

■ **"Why don't these images match?"** Exchanging graphics files between Macintosh computers and Windows-based PCs sometimes reveals a subtle picture skewing. It's not because of any software incompatibility, it's due to the different resolutions of pixels between the two hardware platforms. The aspect ratios don't match, just as the screen size between TV sets and movie screens aren't compatible. Adjusting the graphics program's vertical height resolution or the horizontal width often cures the problem.

■ **Too much data, not enough storage.** The latest digital oscilloscopes are designed to read data in various waveforms and share that information with other instruments. It wasn't long ago that an oscilloscope with a built-in floppy drive was the latest thing; but today, it isn't enough. A 1.44-MB floppy drive just isn't big enough to record thousands or even millions of data events. We're already seeing SCSI ports on the latest test equipment, for high-speed sharing of data. Hard drives, ZIP drives or recordable CDs can store waveforms in vast libraries, and do it quickly. We may soon see higher-speed Ethernet connections on the backs of lab-quality test gear

INTERNET NEWS

■ **Some scientists working in the perfume industry say they expect the development of an integrated circuit that will actually emit smells** (besides burning up, that is). A woman could theoretically change her scent by just pushing a button on her watch that contains the chip, or perhaps by changing earrings or necklaces embedded with the technology. Scents could be sampled, sold and downloaded over the Internet. The scent's intensity could be adjusted at any time, or even turned off.

■ **Most companies expect to be doing business over the Internet within the next two years.** The vast majority of large American firms at least have a presence on the World Wide Web, but many are still working the bugs out of their on-line ordering systems. It's expected that at least 90% of companies will be exchanging goods and services thanks to the Internet as a go-between.

■ **The music industry claims that they are losing vast amounts of money because of songs being illegally copied and exchanged over the Internet.** Anyone with a computer can make one copy or thousands. The largest music companies have banded together to form the Secure Digital Music Initiative (SDMI) and are presently hammering out standards for a "digital watermarking" technology. They hope to prevent illegal copying of music through the use of embedded digital data; or, if not prevent it, at least copies will provide a subliminal trail that detectives can trace to the source. The final watermarking standards should be agreed upon by the end of this summer.

■ **Where is the digital bottleneck?** Since the Internet is a worldwide network, digital data can sometimes slow down in certain areas. This can be due to local thunderstorms, a backhoe digging in the wrong place, or just too much computer traffic. One site, www.internetweather.com, provides animated maps of current Internet lags around the world.

WASHINGTON WHISPERS

■ **The U.S. Patent and Trademark Office already offers copies of patents from 1976 to today on their website.** You can search the database and download whatever you want, rather than pay someone in a distant city to search archives for you. The website is updated every week. Plans are under way to offer the rest of the patent database, from 1790 to 1975, on the website as well -- if the funding is approved. In its history, the U.S.P.T.O. has approved over 6 million patents.

■ **The National Archives announced recently that they are looking into the possibility of having audio experts re-examine the famous Watergate tape with the 18.5-minute "gap."** Careful listening of the faint buzzing implies that that particular section of conversation was erased more than once. The technology of the early 1970s had no hope of recovering the original recording. But today's technology just might be able to. No matter how many times you erase a recording tape, a very, very faint echo of the original signal remains. Since no other sounds were recorded on top of the Watergate erasure, it may be possible for today's digi-

tal audio technology to recover those lost minutes.

■ **New GPS satellites being built.** Earth-orbiting satellites don't live very long; they're usually designed for a lifetime of only a little less than 10 years. Space is a hazardous environment, particularly in low-earth orbit where thousands of pieces of space junk zoom along. Boeing is building 12 new satellites for the Global Positioning Satellite fleet, to replace older models as they reach the end of their useful lives.

■ **Another three-digit telephone number?** We're all familiar with 9-1-1 as the universal telephone number for emergencies, and 4-1-1 for directory assistance. A push is on to use a new number, 2-1-1, as a regional information source for communities. An automated phone menu system can direct callers to non-emergency local programs. The FCC is looking at making this a universal number.

■ **Local, state and the federal governments are concerned that the new global economy makes taxing harder ...or impossible.** According to a United Nations report, multinational companies are shifting profits to countries where taxes are low. Some countries have intentionally lowered their tax rate to attract businesses, investors and shoppers. More people are working outside of their home country. And cross border credit card purchases over the Internet make taxing difficult to administer or collect.

Tax rate for individuals in Saudi Arabia is only 2.5%, Bolivia: 13%. Chile has a corporate tax of 15%, Zambia: 10%-15%. The UN concludes that a uniform tax rate among the various countries of the world would solve the dilemma, but it is not politically feasible.

The reports suggests an exchange of information among taxing authorities, international codes of taxation and conduct ...and an internationally accepted definition of taxable income.

AMATEUR RADIO

■ **Enforcement actions:** - **Enrique G. Medina KE1LH of Bridgeport, CT** and **Henry Mateo N2GRH of Richmond, VA** were required to retake the Advanced Class Amateur examination on or before May 20, 2000. Neither appeared for the examination and their Amateur licenses

have been canceled by the FCC.

Reyes Lugo, NP3N of Chicago, IL has been ordered to retake all of the license exam elements leading up to and including the Extra Class license. All exams must be completed by July 31, 2000 at the FCC's Park Ridge Illinois field office.

Tom E. Lee, AC5RU of Jerusalem, AR has been advised that the FCC has information that he has been operating a repeater on 146.625 MHz that is interfering with the coordinated KD5CYA repeater on the same frequency in his area. "Section §97.205 of the Commission's rules states that where there is interference between a coordinated and an uncoordinated repeater, 'the licensee of the uncoordinated repeater has primary responsibility to resolve the interference.'" AC5RU has been asked to respond to the FCC within 20 days "...stating what steps you are taking to resolve the interference problem."

John A. Green, Jr., KD4TTE of Mobile, AL has been warned by the FCC that it has evidence that he has "...been deliberately and maliciously interfering with the radio operations of other licensed Amateurs on the 20-meter Amateur band. This includes deliberate interference, interference to emergency communications and broadcasting." Further incidents "...will result in a monetary fine being levied against you and in revocation proceedings...."

Kean C. Aw KG4APA of Santa Clara, CA has had his license set aside based on his "...radio station operation on March 11, 2000 on the 147.240 repeater in your area in advance of the March 16 grant of your license...." Kean said that he thought he was operating on a reciprocal agreement between the United States and Malaysia, his country of citizenship. The FCC has asked him to furnish a copy of his Amateur license granted by Malaysia.

Frank J. Pinkley, Jr. KC7DUZ of Cheyenne, WY has had his Technician Class license canceled since he did not appear for reexamination as required on March 13, 2000. He was to retake the examination at the Lakewood, Colorado FCC office prior to April 30, 2000.

The Tucker family who hold 36 Amateur Radio Club call signs have proposed a settlement whereby 12 Club call signs would be reassigned to "non-Tucker" family trustees. The FCC has written their attorney requesting a clarification on the proposal.

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ISS AMATEUR RADIO ANTENNA STATUS REPORT

by Miles Mann WF1F

May 30, 2000 - MAREX-NA (Manned Amateur Radio Experiment, North American Division) The long and short-term plans for Amateur Radio antennas on the International Space Station (ISS) are progressing very well. It was originally proposed in 1996 by RSA Energias Chief of the Amateur Radio Cosmonaut Department, Sergej Samburov, to use a temporary navigation antenna on ISS for the initial antenna for Amateur Radio experiments. And then after a few space walks, a dedicated group of antennas for Amateur Radio experiments could be installed. This plan seems to be working.

The Russian Zarya Control Module, also known as the Functional Cargo Block (FCB) is currently in orbit and connected to the NASA Unity module. There is an existing externally mounted antenna on this module which was used for telemetry. Now that the Zarya module is in orbit, the telemetry antenna is now available for other uses. WF1F was told by RSA that the antenna is tuned for approximately 147 mc, which is perfect for the Amateur Radio satellite band 144.000 - 146.000 MHZ.

When the first ISS crew moves in later this fall, they will have immediate access to this antenna port from inside the Zarya module. No space walk will be required. The only limiting factor, is when will the ISS crew be allowed the time to install the amateur radio voice/packet station.

The ISS crews time line (or workload) is calculated down to the minute. You are even assigned times to go to the potty. During a recent visit to the European Space Agency, one person said the ISS crews would use the Amateur Radio station during their Free time. Then another ESA representative then said, "There is no such thing as Free time for the crew while in space. All of their time is scheduled."

Limitations: Since the Zarya module antenna is limited to the 2-meter band, there will only be 2-meter mono band access for the first year. This is actually good news for beginners, since it is much harder to work "split band" 2m/70cm. The original ISS 2-meter system will operate both FM voice and 1200 baud AX.25 packet. This is the same packet protocol used on Earth for your local BBS access. This is also the same packet format used on Mir, however some of the commands may be different.

The Zarya module 2-meter radio will be limited to approximately 5 watts of output. If you have a zero gain antenna, you will be able to get access on a few passes per day. A real gain directional antenna system will improve your link reliability.

Time-Line: Here is a NASA link for the proposed time line. <<http://spaceflight.nasa.gov/station/assembly/flights/chron.html>> When will the Amateur Radio Station on ISS be turned on? That's a good question. The best

guess is a month or two after the ISS crew moves in.

Sergej Konstantinovich Krikalev is part of the first ISS crew. Sergej is a real Ham. He knows the importance of Amateur Radio for long duration Missions. I am sure he will do his best to get the system on line in a reasonable amount of time (crew workload and permissions permitting).

Next Antennas: The engineers at RSA really did a great job in planning for additional antennas on ISS. The Service module has 4 extra multi purpose antenna ports installed. Each one of these empty antenna ports can be used simultaneously for commercial and amateur radio access. The simultaneous access is achieved by properly filter the signals which allows 2-3 different signals to share a single antenna port.

The Service Module Antenna port number 1 will have three antennas duplexed into one cable, supporting Amateur Radio bands 2-meters (144 - 146 MHZ) and 70 centimeters (435 - 438 MHZ) and a wide band L/S antenna, which supports 1.2 - 2.5 GHz. AMSAT Italy designed the ISS triband antenna for port 1 and additional proposed antenna for other ports

Some of the long-term proposals for ISS include Amateur Radio access to all ITU satellite sub bands, including HF. The Service Module is scheduled to be launched this summer (Aug 2000). The new Service Module ports are just empty antenna feed through ports at this time. There are no antennas connected to the Service Module ports before launch. The Service Module antennas must be installed after docking via a space walk. The space walks to install the Service Module Amateur Radio antennas are not scheduled until the summer of 2001.

The GHz commercial antenna will be used to receive TV signals from crews during a space walk (just like in the movie *Aliens*.) Each crew member will be wearing a TV camera attached to his helmet. It may be possible to hams to hear the weak GHz signals live, that is if you have 24 dbD of antenna gain on the GHz band.

After the new antennas are installed in 2001, we will be able to connect additional Amateur Radio experiments to these ports. The Service Module has some cabinet space reserved specifically for Amateur Radio experiments. The MAREX-NA team is actively developing a software version of Slow Scan TV for use on ISS.

- Our German correspondent tells us that the delegates of the **German amateur radio league (DARC) at their annual meeting voted for a reduction of the Morse test speed from 12 to 5 wpm** in the HAREC regulations (harmonized amateur radio regulations in Europe, also used for US guest licenses.) The next EUROCOM meeting of all European Amateur Radio societies will be held in Friedrichshafen in southwest Germany this month (June.) It is widely expected that the EUROCOM will ask all European governments to introduce 5 wpm.

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HAMS MAY BE CHECKING TV SIGNAL LEVELS FOR FCC

Action Related to Consumer Access to Distant TV Signals via Satellite

In a May 26th *News Bulletin*, the FCC announced that it was implementing new requirements related to a consumers' eligibility to receive distant TV signals via satellite as set forth by the *Satellite Home Viewer Improvement Act* (SHVIA), enacted on November 29, 1999. As the law now stands, satellite providers are prohibited by the Act from delivering programming that can be adequately received from local television broadcasters.

The commission also began an inquiry to determine if the broadcast signal standard used to determine whether satellite delivery of distant broadcast programming should be modified.

The Act generally seeks to place satellite carriers on an equal footing with local cable television operators when it comes to the availability of broadcast programming. It also authorizes satellite carriers to provide distant broadcast programming to eligible subscribers.

The SHVIA generally relies on a computer model to determine whether a subscriber is eligible to receive satellite retransmission of distant television network signals. The Act further provides that subscribers who are denied satellite retransmission of distant signals may request that the satellite carrier seek a waiver of the denial from the network station that is asserting that retransmission is prohibited. If the network station rejects the waiver request, the subscriber may submit to the carrier "a request for a test verifying the subscriber's inability to receive a signal that meets the signal intensity standard ..."

The SHVIA specifies that under these circumstances, "the satellite carrier and the network station or stations asserting that retransmission is prohibited shall select a qualified and independent person to conduct a test in accordance with section 73.686(d) of regulations."

The test must be conducted "within 30 days after the subscriber submits a request for the test" and if the test demonstrates that the subscriber "does not receive a signal that meets or exceeds the signal intensity standard..., the subscriber shall not be denied the [satellite] retransmission of a signal of a network station ..."

A household is eligible to receive distant TV signals via satellite if it can not receive a signal of Grade B intensity using a conventional outdoor TV antenna.

The existing Grade B signal intensity standard has long been used within the television broadcast industry. Generally, if a household receives a television signal of Grade B intensity, it should receive an acceptable television picture at least 90% of the time. More specifically, Grade B represents a field strength that is strong enough, in the absence of man-made noise or interference from other stations, to provide a television picture that the average observer would classify as "acceptable."

In the FCC's *First Report and Order*, the Commission improved the prediction technique to more accurately determine the ability of individual households to receive television signals broadcast over-the-air by local stations.

Television station licensees, Direct Broadcast Satellite (DBS) operators, and other Direct to Home (DTH) Satellite operators may use the technique to establish the eligibility of individual households for satellite delivery of distant television programming. The model is usually used at the time the satellite equipment is sold or when a customer contacts a satellite company to determine eligibility for distant signal reception.

The improved prediction technique will take into account vegetation and other land cover. The predictions will then be adjusted based on propagation effects associated with the appropriate land cover feature.

In its Order, the FCC also named the American Radio Relay League as the entity that will name the person to conduct a signal strength test at a subscriber's household since it was an "independent and neutral entity."

We called both the new ARRL president Jim Haynie W5JBP and Charles Iseman, an engineer at the FCC's Office of Engineering and Technology to get further information.

If the broadcast station and the satellite provider cannot agree on who should conduct the test, the ARRL will designate someone to conduct the field strength test. The FCC determined that the ARRL is a particularly appropriate choice for this role because it has no commercial connection with delivery of television services, it has field offices (15 directors and 71 sections) across the U.S., and its members are actively engaged in activities related to the measurement of radio field intensity. The *Order* outlines how to contact ARRL.

Haynie told us that "If a home owner can not adequately receive over the air television they may want to receive television programming via satellite. Since both the local TV broadcaster and satellite provider want to provide the programming and retain the customer, the ARRL has volunteered to designate a person or firm to conduct field strength readings to substantiate the fact that the consumer can not adequately receive over-the-air TV signals. The FCC looked at many organizations and decided that the ARRL and ham operators could provide unbiased field strength readings."

"We don't expect that many people to contact us, but there will be some. The ARRL will provide a designee - who need not be an amateur -- who is neutral and skilled in the measurement of RF. We were contacted by the commission. I thought it was good PR," Haynie added.

Comments on the *Notice of Inquiry* on Grade B signal intensity standard are due: June 27, 2000; reply comments: July 12, 2000 (*Unanimous action by the FCC Commission, May 22, 2000, by Notice of Inquiry and First Report and Order*)