



**Chapter 24, Inc.
Madison, Wisconsin**

Society of Broadcast Engineers

November 2000

HOW MANY LPFMs FOR MADISON?

By Tom Smith

Wisconsin will be included in the next filing window for low power FM stations. One concern of existing full power broadcasters is the number of these new stations and the interference they may cause. To see how the new LPFM service may affect Madison and other communities in South Central Wisconsin, I went to the FCC's LPFM Web site. On that site, the FCC has a search program that will give all of the possible FM channels that could be used at any given location. All one has to do is enter the latitude and longitude for the location and a few seconds later, the program will display all possible channels and a list of full power stations that could cause interference to a LPFM station located on these channels. This site has other programs, including one to find the height above average terrain at any location.

To find out how LPFM will affect Madison, I entered coordinates for a number of locations around Madison and the coordinates for all of the suburban communities around Madison. To find the coordinates, I used a street finder program that also gave the coordinates of the selected location. The coordinates for the outlying communities are taken from a mark on the map produced by the program that indicates the main reference point for that community. A number of locations were chosen because of the shorter spacing requirements for LPFM; short distances can affect the number of stations that can be found from the search program, compared to frequency searches for full power allocations. In a full power FM search program, one normally narrows the search down to a particular frequency and the nearest site the transmitter can be located at for that frequency. Because of the separation required for full power FM stations and the number of stations in the band, one may need to search over a large area to find a new frequency available.

The number of channels available across Madison vary with fewer being
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Next Meeting:

**Tuesday,
November 21, 2000**

**Vibrant News
Editing
Demonstration**

**Dutch Treat Dinner
at 5:30 PM**

**at J.T. Whitney's
674 S. Whitney Way**

**Meeting and
Program at 7:00 PM
at WKOW-TV**

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Internet 2: Video over IP

By Paul Stoffel

On November 11th, WPT will originate an Internet2 transmission of a local Badger Hockey game to Anchorage, Alaska, for carriage by Alaska public TV stations. This experiment is part of Internet2/ Reforging the Links, a project designed to reforge the links between public television stations and their university hosts.

This live event originates from the Kohl Center and is sent via fiberoptic cable to Vilas Hall. A Minerva MPEG-2 encoder streams the signal at 5

megabits/second over the UW-campus backbone network to DoIT, the Division of Information Technologies.

The IP video/audio travels from DoIT to Chicago via Wiscnet; Chicago to Seattle over Abilene (Internet 2); Seattle to Fairbanks; and Fairbanks to Anchorage over the University of Alaska Research Network.

The amount of action in hockey, and the required high transmission bit rate, will make this a demanding test of "video over IP." Instead of using DoIT's regular commodity

network traffic (sometimes operating at maximum bandwidth between here and Chicago), a "different virtual circuit" will be used to connect DoIT to Abilene.

This still does not guarantee success. In the TCP/IP environment, video packets do not have priority over other data packets. David Devereaux-Weber, DoIT, explains, "In video over IP, quality of service is only indirectly achieved by significantly overdesigning the system bandwidth. There are no standards to protect or guarantee a video stream in a TCP/IP

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October Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Wednesday, October 18, 2000 during the Broadcasters Clinic at the Marriot West in Madison, Wisconsin. There were 20 members in attendance, 15 of who were certified, and 19 guests.

Chairperson, Kevin Ruppert, called the meeting to order at 7:14 PM. Minutes of the September meeting, as published in the October newsletter, were approved as published. Kevin congratulated Mike Norton and Steve Paugh for winning national awards from the SBE. The SBE award for "Best Chapter Newsletter" went to editor Mike Norton. Steve Paugh was awarded for "Best Technical Article, Book or Program" for his "Digital Television Presentation" for organizing a DTV presentation and creating a DTV brochure as a part of the 1999 UW-Engineering Expo.

Chairperson Kevin Ruppert adjourned the business meeting at 7:17 PM.

Consultant Nancy Gray presented the evening's program. Ms. Gray spoke about Interactive Communication Styles.

Submitted by Vicki W. Kipp, Secretary

SBE Short Circuits - November 2000

By John L. Poray, CAE
SBE Executive Director

SBE SUBMITS LETTER TO TELCOM SUBCOMMITTEE CHAIRMAN TAUZIN

On October 18, SBE hand delivered a letter to the Chairman of the House Subcommittee on Telecommunications, Billy Tauzin of Louisiana. Signed by SBE President, Andy Butler, the letter expressed concern about the lack of action by the FCC on a technical rule making that is critical to the timely roll-out of digital television. RM-9418, a 1998 petition for rule making filed by the Telecommunications Industry Association, proposed that digital modulation be allowed in all TV BAS microwave bands. The letter's entire text can be found on the SBE web site, www.sbe.org.

MAPS OF FREQUENCY COORDINATION AREAS NOW AVAILABLE

Specially designed maps are now available on the SBE web site that help people locate the proper frequency coordinator anywhere in the US. The maps were designed by Dane Ericksen, P.E., CSRT of Hammett & Edison Consulting Engineers and member of the SBE National Board of Directors. There is a map for every state illustrating all its counties. Frequency coordination areas are depicted on the maps and there is also a list of counties covered by each coordinator. When used in conjunction with the list of coordinators, also found on the web site, users can easily determine which coordinator to contact. To view the maps, go to the SBE web site, www.sbe.org and click on Frequency Coordination.

Internet 2: Video over IP (continued from page 1)

environment. Products that stream video over IP are usually sold to corporate environments, where the environment can be managed more authoritatively."

The IP world is experimenting with giving video a higher priority by adding certain bits to the packets. But these bits would need to be recognized by routers and switches, and vendors would need to standardize.

Thanks to WKOW-TV for providing copying and folding facilities for the Chapter 24 newsletter!

Thanks to WISC-TV for maintaining the web server for the Chapter 24 Web page!

Thanks to Al Johnson, Denise Maney, Jay Mielke, Vicki Kipp, Kevin Ruppert, and Fred Sperry for hosting the SBE Booth at the Broadcasters Clinic.

The *Chapter 24 Newsletter* is published monthly. Submissions of interest to the broadcast technical community are always welcome. You can e-mail your articles to: MNorton@ecb.state.wi.us



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AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

- The all-ham crew of US astronaut and ISS Expedition 1 Commander William "Shep" Shepherd, KD5GSL, and Russian cosmonauts Yuri Gidzenko and Sergei Krikalev, U5MIR, now is aboard the International Space Station. After blasting off from Baikonur Cosmodrome in Kazakhstan October 31, the crew arrived at the ISS aboard a Soyuz vehicle that remains docked with the space station. Operation from Amateur Radio's first permanent foothold in space is expected to debut soon. The ISS crew could be on the air by mid-November.

The Amateur Radio on the International Space Station—or ARISS—initial station gear includes VHF and UHF hand-held transceivers. The FCC granted vanity call signs NA1SS and NN1SS to the International Space Station Amateur Radio Club on October 11. The NA1SS call sign will be used on board the space station, while NN1SS will be for ground-based communications from Goddard Space Flight Center in Maryland. A Russian call sign, RZ3DZR, and a German call sign, DL0ISS, also have been issued for use aboard the ISS. Tentative operating frequencies are 145.80 MHz for downlink for voice and packet, 145.99 MHz for packet uplink, and 144.49 MHz for voice uplink in the US.

- Amateur radio's next-generation Phase 3D satellite now has a firm launch date and time. The AMSAT News Service says it's been informed by "various sources" that the Ariane 507 carrying Phase 3D and other satellite payloads aloft will head into space Wednesday, November 15 from the European Spaceport in Kourou, French, Guiana. The Radio Club of Kourou's FY5KE has announced plans to broadcast the Phase 3D launch on 14.315 MHz in French "and probably in English."

Also atop the Ariane 5 rocket will be the PanAmSat 1R communications satellite, the largest and primary payload. Once in the geostationary transfer orbit and deployed, Phase 3D will fire its own motor and thrusters that eventually will put the satellite into a high elliptical orbit that's almost 30,000 miles from Earth at its farthest point. Establishing the satellite's final orbital configuration will take up to one year.

- The FCC says it has reached an agreement with the eBay auction site that's aimed at curtailing the sale of clearly illegal radio equipment. FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth says eBay has agreed to cooperate in removing advertisements in which the item for sale "is clearly non-certified" under FCC rules. Hollingsworth said most of the equipment involved falls into the CB category, including illegal amplifiers. He also said a review team within the Technical and Public Safety Division of the FCC Enforcement Bureau is screening eBay ads each week. He said the practice could be extended to other auction sites if the FCC learns of similar problems.

(Excerpts from the American Radio Relay League's "ARRL Letter")

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HOW MANY LPFMs FOR MADISON? (continued)

available on the West side compared to the East side. According to the results from the search on the FCC site, there are 17 channels available to the Madison Area. They are 90.7, 92.5, 95.5, 95.7, 96.9, 97.1, 97.7, 98.7, 98.9, 99.1, 99.3, 100.9, 103.1, 103.3, 103.5, 104.7, and 107.9. By selecting other coordinates different than the ones I picked, there may be other channels available. Figure 1 gives the frequencies available for each location in Madison from my search. You can see how the number of channels available varies as you move around the area.

Not all channels may be able to be used and some could be used twice. There are nine channels that are adjacent to each other and depending

on the location selected for each station, only four or five may be able to be used. Co-channel station LPFM stations must be 24 kilometers (14.9 miles) apart and adjacent channels stations 14 Kilometers (8.7 miles) apart. Because of the distances between parts of Madison and the distances between some of the suburbs, some channels could be used twice. So there is a possibility of maybe 10 to 20 or more LPFMs.

I also did a search of other communities in South Central Wisconsin. Figure 2 is a list of the communities with the frequencies that the FCC program listed.

Because of adjacent channel rules many of these channels are unusable, as many of the proposed LPFM are adjacent to each other and there may still be

interference from full power stations that may prevent the use of other channels. The FCC warns LPFM applicants to listen for signals from nearby stations on or near their proposed frequency. I did find it interesting that some channels keep coming up in many places over a considerable distance, but cannot be used for a full power station because of FCC spacing requirements on the first, second and third adjacent channels to a particular channel.

It will be interesting to see how many of these LPFM channels are applied for and how many are built. Those who are concerned about interference from these stations or economic impact should remember that many of the construction permits for low power TV were never built, so many of these will probably not be either. A number more will probably go silent when the group operating the station loses interest in it.

Locations	Frequencies
Capitol	95.5, 95.7, 96.9, 98.7, 107.9
Warner Park	95.5, 95.7, 107.9
East Towne	95.7, 96.9, 97.1, 98.7, 99.3, 103.1, 103.5, 107.9
Sun Prairie	96.9, 97.1, 103.1, 103.5, 103.7
DeForest	96.9, 97.1, 103.1, 103.5, 107.9
Cty BB & I 90	95.5, 96.9, 97.1, 98.7, 99.3, 103.1, 103.5, 107.9
Cottage Grove	96.9, 97.1, 98.7, 103.1, 103.5
Monona	95.5, 96.9, 97.1, 98.7, 107.9
McFarland	95.5, 95.7, 96.9, 97.1, 98.7, 98.9, 103.1, 103.5, 107.9
Park & Beltline	95.5, 95.7, 98.7, 107.9
Fitchburg	95.5, 95.7, 98.7, 99.1, 100.9, 103.1, 103.5, 104.7, 107.9
Oregon	90.7, 95.5, 95.7, 96.9, 97.1, 98.9, 99.3, 100.9, 107.9
Waunakee	95.5, 96.9, 97.1, 98.7, 103.1, 103.5, 107.9
Hill Farm	107.9
Middleton	107.9
West Towne	100.9, 107.9
Verona	95.5, 95.7, 96.9, 98.7, 100.9, 104.7, 107.9
Mt. Horeb	90.7, 92.5, 95.5, 95.7, 96.9, 97.1, 97.3, 98.7, 103.1, 103.5, 104.7, 107.9

Figure 1. FCC search program results for possible Low Power FM frequencies for locations around Madison, WI.

Locations	Frequencies
Baraboo	92.5, 92.7, 93.5, 96.9, 97.3, 97.5, 103.5, 107.7, 107.9
Beaver Dam	96.9, 100.9, 103.3, 104.5, 105.5, 106.7
Beloit	92.9, 93.1, 94.7, 101.9, 102.1, 103.7
Columbus	96.9, 103.3, 105.7
Fort Atkinson	103.3
Janesville	92.9, 94.7, 103.5
Platteville	94.7, 95.1, 95.3, 95.5, 95.7, 95.9, 96.1, 96.7, 96.9, 98.5, 99.9, 104.5, 104.7
Portage	96.9, 97.1, 97.3, 97.5, 100.9, 103.5, 105.7, 107.7, 107.9
Reedsburg	90.7, 92.5, 92.7, 96.7, 97.5, 99.5, 99.7, 102.1, 103.7, 105.5, 107.5, 107.7, 107.9
Richland Center	92.5, 93.9, 95.5, 95.9, 96.7, 99.7, 100.3, 101.9, 103.3, 104.5, 105.3, 107.3, 107.5, 107.7, 107.9
Watertown	101.1, 105.7
Whitewater	92.9

Figure 2. FCC search program results for possible LPFM frequencies in various South Central Wisconsin communities.

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NEW FEES AND AUCTIONS PROPOSED

By Tom Smith

FCC Chairman William Kennard proposed new fees and President Bill Clinton proposed a new round of spectrum auctions. On October 10th, Chairman Kennard made a speech at the Museum of Television And Radio in New York, calling for Congress to impose a spectrum fee on TV broadcasters after 2006 to speed up the transition to DTV. Three days later, President Clinton ordered the federal government to review and auction large bands of spectrum now used by both the government and private industry.

Chairman Kennard, in his speech, proposed that TV broadcasters be charged a fee for their analog spectrum starting January 1, 2006. This is the date that was originally set for the shutdown of NTSC service. He referred to broadcasters as "spectrum squatters" and proposed a fee that would escalate each year as an incentive for broadcasters to give up their analog channels. He also proposed that all new TVs sold after January 1, 2003, be required to be capable to receive DTV transmissions and that Congress readdress the 85% penetration "loophole." In his speech, he complained that allowing broadcasters to retain their analog spectrum until there was 85% penetration of DTV homes would almost allow them to retain the spectrum indefinitely. He noted that it took color TV 22 years and VCRs 16 years to reach that mark. He discussed the need for spectrum for new services such as the new 3rd Generation wireless systems.

In another section of his speech, the Chairman also proposed additional public service requirements on broadcasters including a code of conduct, free time for federal

candidates, and more public service announcements during peak times. The FCC is currently holding inquiries into public service requirements.

On October 13th, the President issued an order that various agencies of the federal government inventory spectrum that could be used for third generation wireless systems which will give subscribers access to the Internet. This spectrum is to come from frequencies currently being used by the Defense Department, government agencies, and commercial providers. He wants this to happen as soon as possible, so that the US will not fall behind the rest of the world in the deployment of third generation wireless. He set a deadline of October 20th for the agencies to have a plan for selecting the spectrum and of November 15th for them to issue an interim report on current spectrum use and potential for reallocation or shared usage.

The FCC is to identify the spectrum for use by 3G systems by July, 2001 and auction it by September 30, 2002. The order listed a number of guidelines for the identification of spectrum. They include government agencies cooperating with industry, government being technology-neutral by not favoring one technology or system over another, supporting flexibility in spectrum allocations to encourage competition and coordinate allocations with other nations. He ordered that incumbent users of spectrum that will be reallocated or share to be treated equitably with national security and public safety considerations taken into account.

On the same day, the White House held a telephone press briefing with Tom Kalil, assistant to the President; Martin Baily, Chairman of the

Presidents Council of Economic Advisors; Greg Rohde, Assistant Secretary of Commerce; Linton Wells, Deputy Assistant for Secretary of Defense and FCC Chairman William Kennard.

They answered questions from the press after making statements on the possibilities of 3G wireless systems. They estimated that 3G wireless could be a benefit of more than \$100 billion to the economy. They also mentioned that European spectrum auctions had raised 150 to 600 dollars per capita. The 3G auction in Great Britain raised \$35 billion, and \$46 billion was raised in the German auction. In answering some of the questions, a number of frequencies that are being targeted for 3G use were listed. The two main groups were 1755 to 1850 MHz which is held by the Defense Department and 2500 to 2690 MHz which is used by MMDS and ITFS video services.

One question was asked about industry considering moving the 2500 MHz services to either three or five gigahertz bands. Kennard said such a move was unclear and needs study. Some of the MMDS spectrum was auctioned previously to the some of the current licenses. Another question was about auctioning the ITFS spectrum, so someone can order flowers on their cell phone while education is in the spotlight. Mr. Kalil answered that ITFS would only be relocated, not eliminated.

Other spectrum discussed was 700 MHz (channels 60-69) that will be auctioned next year and the Analog TV spectrum that broadcasters will be returning. Mr. Rohde mention the 2025 to 2110 MHz band which is the 2 gigahertz TV ENG band as a possible band to be used. The government is

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FCC Rulemakings

Compiled By Tom Smith

FINAL RULEMAKINGS

MM Docket 99-25; FCC 00-349; RM-9208; RM-9242 Creation of Low Power Radio Service

The FCC has issued a Memorandum Opinion and Order for Reconsideration on the low power FM ruling. For the most part, the FCC upheld it's earlier notice that created the LPFM service. The FCC did make a few changes to the rules.

The first rule change was to require LPFM station to provide third adjacent protection to non-commercial stations that carry reading services for the blind on their subcarrier services. This is in response to a petition from National Public Radio. The FCC upheld their ruling eliminating third adjacent protection for full power stations from all other LPFM stations.

The second change is allowing government safety and transportation departments to apply for multiple licenses to be used for transmitting safety and traffic information. These stations would be the FM version of the Traffic Information Stations that are normally on 530 or 1610 kHz AM. They also ruled that they would accept applications from college student

groups for student-run stations, where the college is already operating a non-student (public) station. Approval for both groups is subject to absence of conflicting applications. One of the commentators for the rule changes for the student stations was David Black from WSUM, the unbuilt student FM station from the University of Wisconsin. The FCC also ruled that the ownership of LPFM stations on different campuses of a university or school system did not violate the single station ownership rule.

The third rule change was the creation of a system for settling interference complaints between full power and low power stations. The procedure can be started if a full power station receives complaints from one percent of its listeners concerning interference from a LPFM station. The stations have 90 days to find the cause and work out a solution with the FCC providing assistance. After 90 days, the FCC will issue orders for modification of the LPFM's license.

The FCC also made a few minor changes such as the use of directional antennas for traffic stations. They adopted the rules on September 20, 2000 and released it on September 28, 2000.

From FCC Releases (www.fcc.gov)

Al Anderson Remembered

By Fred Baumgartner

[Friday, October 27] Yesterday, about midnight, I'm sitting at the desk of a Theater District hotel room, processing the day's email; switching to my personal mail box, I've saved a note from "Alvin W. Anderson" for last, sure that it's a joke or piece of mind candy suitable for the night's capper. It's been a while since I've heard from him. I met Al about 1980 when he joined the overnight engineering staff at WIBA, I being the other half. On Sundays we overlapped to do the transmitter work. You get to know a lot about someone you spend nights with. Al's full-time gig was a mail route near his home in Spring Greene. He needed the two jobs and the trips to Madison's South side to put kids through school and for himself. Al needed to play with the toys. I don't think there were 12 names in my email address book when his showed up one day. Another new communications toy, and Al had to be a first adopter.

It was more than a decade ago that I met his better half, when they stopped in Denver briefly on a retirement (sort of, I don't think Al ever really retired) trip. I don't think he ever made an SBE meeting, the logistics being what they were, so I apologize to the most of you who never had the opportunity to know Al. But alas, the email came from Al's daughter, who sent this last message of his pending funeral to his electronic universe.

I have a little one-transistor phase shift oscillator he built with hand matched components; 1 KHz, give or take a few cycles; better than 00.005% distortion. It has run constantly on my bench for nearly twenty years now. I'll bet its identical twin is still in service in
(continued on next page)

NEW FEES AND AUCTIONS (continued)

looking for 100 to 160 megahertz for 3G wireless.

The general tone of the statements by Kennard and Clinton and those at the press briefing is that all current

spectrum users are at risk of losing their space to new services at auction. Copies of the memo from the President and the transcript can be found on the White House web site. (www.whitehouse.gov)



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Al Anderson Remembered (continued)

WIBA's master control room. He had found the schematic in some old hobby text he had, and of course, with all the complex components and designs, and the professional gear I acquired along the way, nothing has ever come close to beating Al's oscillator.

In the last 20 years, in so many ways, I don't think I've ever found anyone that came close to beating Al either. Al, you may have thought you were just putzing with a radio station, but you taught me more than you'll ever know those late nights, and I'm sure I'm not alone. Before I erase your address, I'm sending you one last email. Somehow, I think you'll get it.

When I get home tonight, the first thing I'll do is dial up that oscillator, and

cry a bit more. For now I'll try to explain that I'm all right to the flight attendant... but of course, I won't be able to. Al, thank you... your footprints remain on the communications you loved, and with me.

(Fred Baumgartner is Director of Broadcast Satellite Operations at AT&T's National Digital Television Center near Denver.)

SBE CHAPTER OF THE AIR:

HamNet meets the second Sunday of each month at 0000 GMT on 14.205 MHz. Hal Hostetler WA7BGX is the Control Station.

EMPLOYMENT OPPORTUNITY

MEDIA TECHNICIAN 3 RADIO AND TELEVISION MAINTENANCE TECHNICIAN

University of Wisconsin-Platteville Television Services, Platteville WI. Minimum starting pay is \$13.8478 per hour. A six-month probationary period is required. This classification is included in the Technical Bargaining Unit.

JOB DUTIES: Maintenance Engineer for the campus FM radio station, campus CATV system, and classroom video and audio equipment. Maintain audio studios, FM transmitter, and audio broadcast chain; maintain RF broadband distribution system and related equipment; maintain video cameras, camcorders, videotape recorders/players, video monitors, public address/classroom audio systems, video projectors, and related equipment. In addition, applicants must have the ability to climb ladders, lift 50 pounds, work in confined spaces, and maintain records necessary to the needs of the job.

KNOWLEDGE REQUIRED: Proven repair and troubleshooting skills for analog and digital audio and video equipment and systems. In-depth knowledge of FM broadcast transmission systems, Emergency Alert System equipment, CATV distribution equipment, industry standards, FCC rules, and advanced computer skills. Preferred applicants will have a BS in Radio/TV Broadcast Engineering and a FCC General Class license or Society of Broadcast Engineers (SBE) certification.

To request special application materials, contact Kathleen Kelley, Personnel Director, 1 University Plaza, Platteville, WI 53818; (608) 342-1176.

Application materials must be received by November 27, 2000 at 4:00 p.m. Materials will be evaluated and the most qualified applicants will be invited to participate in the next step of the selection process.

CHAPTER 24 SUSTAINING MEMBERS

RECENT RENEWALS:

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Panasonic Broadcast

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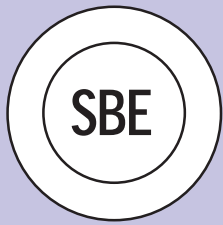
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FIRST CLASS MAIL

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NOVEMBER MEETING and PROGRAM



**Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Tuesday, November 21, 2000**

Vibrant News Editing Demonstration

Join us at this month's meeting for a presentation on Vibrant News Editing with GVG Profile. Tom Sibenaller from Roscor and a Grass Valley Group representative will be on hand to show how the system works and to answer any question you may have.

**Dutch Treat Dinner
at 5:30 PM**

**at J.T. Whitney's
674 S. Whitney Way**

**Business Meeting and Program
at 7:00 PM**

**at WKOW-TV
5727 Tokay Boulevard**

Visitors and guests are welcome at all of our SBE meetings!

2000/2001 UPCOMING MEETING/PROGRAM DATES:

Day	Date	Program
Wednesday	December 20	VBI Info
Thursday	January 18	RF Measurements
Tuesday	February 20	Future of Radio

Program Committee:	Denise Maney 277-8001	Steve Paugh 277-5139	Fred Sperry 264-9806	Steve Zimmerman 274-1234
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