Before the
UNITED STATES COPYRIGHT ROYALTY BOARD
LIBRARY OF CONGRESS
Washington, D.C.

In The Matter Of:	
Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	Docket No. 2006-1 CRB DSTRA

Testimony of

ANTHONY J. MASIELLO

Senior Vice President of Operations, XM Satellite Radio Inc.

Public Version

Witness for XM Satellite Radio Inc.

FINAL

XM Exhibit 7

PUBLIC VERSION

Before the
LIBRARY OF CONGRESS
Copyright Royalty Board

In the Matter of	)	
	)	
Adjustment of Rates and Terms for	)	
Preexisting Subscription and	)	Docket No. 2006-1 CRB DSTRA
Satellite Digital Audio Radio Services	)	
	)	

DIRECT TESTIMONY OF ANTHONY J. MASIELLO
(ON BEHALF OF XM SATELLITE RADIO INC.)

1. My name is Anthony J. Masiello. I am currently employed by XM Satellite Radio Inc. ("XM") as Senior Vice President of Operations. I have been employed by XM in that capacity since 1999. My responsibilities at XM encompass all technical aspects of our broadcast operation, including our broadcast signal, broadcast studios, transmission equipment, network operations and radio receivers.

2. My testimony will discuss, from a technological standpoint, the enormous effort and expense required to develop and launch the XM service, the ongoing efforts and expense of our operations, and our continuing commitment to innovation. This effort is unparalleled in the radio industry. Not since the introduction of FM broadcasting has an audio broadcasting service had to design, build and launch, virtually from scratch, all aspects of its service infrastructure from signal to receiver. But, unlike today's FM radio broadcasters, satellite radio had to pay for the spectrum, as well as design and build satellites and receivers in order to deliver their service to the public.

3. Each stage of this effort was undertaken with great care to deliver the best possible sound and a diverse array of program and data services using a finite amount of bandwidth. As a result of these efforts, XM has opened new technological avenues in the broadcasting field -- creating the world's largest state-of-the-art digital broadcast studio complex, which feeds more channels of audio with better sound quality, and new data services, to increasingly smaller car, home and portable radio receivers. Perhaps only the evolution of satellite television from a service utilizing expensive, large dishes as receivers to easy-to-install DBS service is comparable. XM, however, achieved this in just a few years, with much more compact equipment, and in a much more demanding mobile vehicle transmission environment.

Industry Experience Prior to Joining XM

4. I have more than 35 years of relevant experience in broadcast operations, starting with a position at Fordham University's WFUV-FM in 1968. At WFUV, I operated and maintained the transmitter facilities as part of a work-study assignment. I also took courses in basic broadcast signals and electronics, computer science, and tube design, and obtained my FCC First Class license to operate and maintain broadcast facilities. In 1971, I was employed by ABC Radio Networks, where I was assigned to the radio network division and began doing field and studio technical work. By 1977, I was manager of broadcast services for ABC Radio. My responsibilities included station interconnects to the network, and setting up remote broadcasts for major news and sporting events such as political conventions and the Olympics. Initially, the network operated over analog AT&T land lines. In 1979, toward the end of my tenure at ABC, the network was making the transition to use of digital broadcast satellites. On the management side, I was the team member receiving and reviewing bids on how to link to our affiliates to the

ABC Radio network via satellite, and we conducted numerous audio tests to evaluate the sonic quality of satellite digital radio transmissions.

5. In 1980, I became Director of Operations and Engineering for Enterprise Radio, a start-up 24 hour sports talk service. In 1982, I became the Vice President of Engineering for Dick Clark Productions' United Stations. I built the studios and satellite transmission infrastructure for the company, a 24-hour broadcaster and syndicator of programming to radio stations, including shows such as Dick Clark's "Top 40" countdown.

6. In 1984, I became Vice President of Engineering at Meadowlands Communications. The company built systems for satellite transmission at stadiums, all in digital format. We handled all of the 1984 Los Angeles Olympic coverage. We also handled news coverage, interconnecting with local audio/video lines and then uplinking the signal for distribution. In 1986, I became an industry consultant. For one of my clients, based in Homdel, New Jersey, I developed a business plan to deliver commercials to stations via satellite (as opposed to shipping physical tapes).

7. I joined CBS Radio Networks in 1988 as the Director of Technical Operations, and was later promoted to Vice President, Technical Operations. In these roles, I had responsibility for all the technical and engineering aspects of CBS's AM and FM owned and operated stations, as well as the CBS radio network programming delivered to affiliate stations. My work included designing facilities and building studios for broadcasting. I led cutting-edge technology efforts at CBS in which I developed substantial expertise in the processing of digital audio signals, and in "audio compression" technology that could reduce the amount of digital information in a broadcast transmission signal yet still produce clear digital sound quality. I also developed a second area of expertise concerning digital audio broadcasting by terrestrial radio

broadcast services. I studied the European Digital Audio Broadcasting system, and worked on early in-band on channel digital audio transmission systems (a technological standard that provides a method for transmitting near-CD quality audio signals to radio receivers along with new data services such as station, song and artist identification, stock and news information, as well as local traffic and weather bulletins). I also participated in founding a company known as USA Digital, which later became iBiquity – the company that created the terrestrial broadcast signal technology used in HD Radio in the United States.

My Role at XM

8. In 1999, I was recruited by XM. When I joined the company as Vice President of Broadcast Operations, XM had little more than an FCC license and satellite designs. There were no studios, no chipset technology and no satellites had been launched. The owners of what would become XM had invested $90 million dollars in an FCC license on the assumption that the right team of people would be willing to come to XM to design and build the entire technology and operating infrastructure needed for the successful launch of the audio service, a service that competes with AM/FM radio, which people traditionally used for free. The satellites needed to be built to XM's specifications, insured and launched. Likewise, a network of terrestrial repeaters had to be constructed so that the XM signal could be heard coast to coast with little interference or interruption. Signaling protocols, integrated circuits, chipsets and radios had to be developed from scratch. An entire broadcast operations center needed to be created, including studios for production and transmission of programming.

9. My job was to oversee the design and build out of XM's broadcast infrastructure. This was an enormous technological challenge. However, I thought it could be accomplished, and was fairly confident that consumers would pay for radio as they did for cable television

service. I was enthusiastic about the opportunity, and left a conventional and secure broadcasting job to move to Washington and help start XM.

10. My primary responsibilities include oversight of all technical aspects of XM's operation through to the uplink to the satellite. My department includes about [ ] technical operations employees at our Washington, D.C. facilities. Another [ ] technical employees reside at our Florida technical development location (known as the "Innovation Center"). Since I started at XM, I have recruited top tier people with the ability to think "outside the box," which was necessary when launching a new technology service. On the satellite side, we hired people who had worked at RCA Americom (now SES Americom), a pioneering communications satellite firm. Patent holders and innovators who previously worked at Motorola, Inc. make up part of the staff in Florida.

XM's Facilities and Technology

11. In our D.C. facility, XM built the largest digital broadcast studio complex under one roof, using state-of-the-art digital production and broadcast technology. All of the 82 studios in that facility, including dedicated production studios, are able to go live on-air. By way of comparison, at the time that I worked for CBS, CBS radio network had only 10-11 studios. In addition to being the largest digital complex, I believe XM has one of the largest radio studio complexes of any type, analog or digital, in the western hemisphere. Only the BBC can rival the number of distinct studios under one roof. [

]

12. To accommodate air talent in other parts of the country, we have three studios in New York City, including one at Jazz at Lincoln Center; one in Nashville, Tennessee; and one in Chicago (used in conjunction with Oprah Winfrey's Harpo Productions). We lease the space at

Jazz at Lincoln Center, have built studios and own all of our broadcasting equipment. Likewise, in Nashville, our studio is at the Country Music Hall of Fame, but we built out the studio and provided the equipment. At the other two locations in New York, we lease the space but have built the studios to our own specifications and supplied all equipment. The Chicago studio is owned and operated by XM and was built in conjunction with Harpo Radio, Inc. as part of the agreement to create the Oprah & Friends channel on XM. In addition to the effort and expense involved in building these state-of-the-art studios, XM must maintain the equipment, create the technological link to the XM's main broadcast center, and staff the space with skilled personnel. Masiello Exhibit 2 is a photograph of our Jazz at Lincoln Center studio. Masiello Exhibit 3 is a photograph of our Nashville studio. Masiello Exhibit 4 is a photograph of our Chicago studio.

13. Our Washington, D.C. facilities include our broadcast, network and technical operations centers. Broadcast operations consists of the studio and technical facilities that enable our programmers to generate the content aired on XM. Broadcast operations prepares and stores content and makes content available for broadcast to subscribers. Masiello Exhibit 5 is a photograph of our D.C. broadcast center.

14. Network operations runs the network and the satellite uplink. It is the control center that supervises operation of the satellite network and the terrestrial repeater network. The company also has a back-up uplink site in an undisclosed location. Masiello Exhibit 6 is a photograph of our D.C. control center.

15. Technical operations provides support for all of XM's departments. We support all aspects of the studio and broadcast operation, and the uplink to the satellite. We monitor IT operations (the servers, switches, and local area networks), but do not offer general IT support to XM desktop PC users.

16. Costs of broadcast operations were $17 million for 2005. These include costs associated with the management and maintenance of systems and facilities, production and performance studios used in the creation and distribution of XM-original and third party content via satellite broadcast, and web and other new distribution platforms. I now turn to a more detailed account of the development of XM from a technological perspective.

Initial Design

17. Contracting for the first and second satellite was completed by March 1998, and some work was done on XM's system technology during 1998. Most of the design and development process took more than three years prior to the launch of the XM service. The process encompassed the design of the XM signaling protocols, the design, manufacture and launch of the satellites, the design and construction of XM's broadcast and operations facilities, the design and manufacture of the terrestrial repeater network, the design and development of XM's chipset and the design and manufacture of the XM radio receivers. The satellites had to be specially designed for XM. The steps I describe below basically needed to occur in sequence.

18. The first and most critical step toward XM's launch was to develop the technical specifications (or "waveform") for the signals that transport the XM broadcast content from the studio to the XM radios. Many fundamental and difficult decisions had to be carefully made in developing these specifications. All these decisions had to be made correctly from the start. The audio signal protocols could not be changed once the service launched, because any such changes to the signal would make the signal incompatible with radios already in the field. Some of these critical design decisions were:

-- Because all XM subscribers receive exactly the same broadcast signal, the signal design had to take into account variations in listeners' locations and the demands of transmitting signals to moving vehicles and portable receivers.

-- The system had to be robust enough to uplink to the satellite and be received clearly by subscribers.

-- We had to select a secure encryption method that could guard against theft of the XM service, without imposing severe processing obligations on the receivers that would have to decrypt the signal.

-- The key question was how to manage the trade-off between the sound quality of each channel and the total number of channels that XM could broadcast. Better sound quality requires greater bandwidth, and the amount of total available bandwidth was a finite commodity allocated to us by the FCC. Therefore, one of the most important initial decisions was to test various compression technologies, and license the most efficient algorithm for broadcasting. To further maximize sound quality, XM also licensed from Neural Audio a processing technology customized for XM that would deliver a high quality, optimized stereo image to the consumer, while reducing the amount of data XM must transmit per channel. The distinctive "sound of XM" relates directly back to this decision. Two independent tests conducted in 2002 concluded that the XM signal yielded superior satellite radio sound quality. We were able to launch the service in 2001 with 100 digital channels and today we offer more than 170 channels of talk, music, and other entertainment on the XM service.

Satellite and Uplink Design and Launch

19. Another fundamental question that we needed to address when I joined XM was how to ensure the best possible reception of the satellite-delivered signal. XM has three

enormous challenges: delivering a signal to moving vehicles; delivering a signal in urban areas where a satellite may not have the necessary line of sight with the receiver; and ensuring complete, nationwide coverage. Because consumers long have experienced interference in receiving FM stations, and loss of signal when traveling out of the range of the station's antenna, XM had to provide outstanding nationwide coverage in order to convince consumers to pay for an XM subscription.

20. The entire XM transmission system consists of satellite uplink dishes that send the XM signal to several geostationary satellites, which in turn re-transmit the signals to the United States; and a network of approximately 800 terrestrial repeaters, located in the top broadcast markets, which receive and re-transmit the satellite signals in places where the direct satellite signal might otherwise be obstructed by tall buildings, mountains, or tunnels. These repeaters are installed on rooftops or existing tower structures. They receive the XM signal from one of the satellites, amplify it and retransmit it at higher signal strength to overcome any obstructions. Masiello Exhibit 7 is a photograph of one of XM's satellites. Masiello Exhibit 8 is a photograph of one of XM's repeaters.

21. Our system, which was initially designed entirely on paper, included repeaters from the outset. We launched commercial service only when a sufficient repeater network was in place so a consumer could drive from coast to coast through dense urban and wide open areas and never lose the XM service. XM had to participate in the design of the repeaters, as satellite radio was the first (and remains the only) satellite based service that uses S-band repeaters this extensively. We also had to determine proper placement of the repeaters, and take into account the degree of overlap needed and the chance that repeaters may cause interference with one another, as they all share the same frequency band.

22. After the "on paper" phase of this signal design was complete, the transmission system had to be tested in the field before we launched our satellites. Our testing included simulations where test XM transmitters were "launched" in helicopters, and the signal was received on pre-prototype XM satellite radio receiver boxes.

23. We next had to design and map out the basic elements of the satellite system including the physical uplink, the construction of the satellites, and the actual launch. This effort was enormously expensive, at a cost of [

] Hughes (now part of the Boeing Company) constructed the satellites, which includes the basic satellite infrastructure. Alcatel provided the communications payload elements of the satellites that are particular to the transmission of XM and were designed specifically to handle our application. Each of the satellites was launched by rocket from the sea. The Sea Launch consortium handled the launch for XM. Sea Launch was a new satellite launch service at the time, having successfully launched only a handful of satellites before sending XM's first satellite into orbit. Launching satellites is inherently a risky endeavor, even for the most experienced launch companies, and therefore insurance is required, costing per satellite over [ ]

24. To enable nationwide reception and the technology necessary for a viable satellite radio service, XM had to launch its own satellites built to its own power and other specifications. Thus, XM did not have the option of merely renting time on another company's satellite. Commercial communications satellites generally transmit low-power signals that can be received by dishes of various sizes, from the relatively small dishes that feed DBS such as DirecTV or Echostar to commercial dishes several feet in diameter. But cars cannot drive around even with the small parabolic dish antennas that focus and amplify a low-power signal. The need to

purchase and install dishes would also limit the appeal for home use, and would rule out any reasonable opportunity to develop portable and personal radios. Moreover, because the signal must be delivered to moving vehicles, this signal must be omnidirectional, rather than narrowly targeted to specific stationary receiving dishes. Therefore, to be successful, XM needed satellites capable of blanketing the country with an extremely high power signal that could be received by a very small antenna mounted on the roof of a car, or situated in a consumer's home, or embedded in a hand-held portable device.

25. We planned the launch of two geostationary satellites located at widely spaced orbital positions (85°W and 115°W) covering the entire 48 contiguous states with overlapping footprints. Each satellite alone covers the entire 48 contiguous states. (We named these satellites "Rock" and "Roll.") Each satellite has two transponders that transmit across different frequencies. The purpose of having multiple satellites and transponders is to ensure that if a subscriber's receiver were to lose contact with one satellite, it could quickly pick up the signal from another satellite. The different positioning of the two satellites in space provides for "Space Diversity" making satellite reception robust. In addition to space diversity, XM's waveform also employs "Time Diversity" which buffers 4 seconds of all signals (from the satellites and terrestrial repeaters) in the radio receivers eliminating "drop outs" when the vehicles travel into small tunnels and/or highway underpasses.

26. We have launched a third satellite, named "Rhythm," in February 2005 and will launch a fourth satellite, named "Blues," sometime in 2006. We had to launch additional replacement satellites, only four to five years from our initial service launch, due to the unexpected rapid deterioration of the transmission power of the two original satellites. This was

the result of a manufacturer's defect in the satellite's solar power system which was discovered shortly after the satellites were launched into space.

27. The "uplink" side of XM is the transmission of broadcast signals from large (7-meter wide) parabolic satellite dishes located at XM's facilities to the satellites, which then beam back down to subscribers' radios and the terrestrial repeaters. In case of technical interruptions, XM also has a redundant uplink facility in an undisclosed location. Masiello Exhibit 9 is a photograph of XM's parabolic satellite dishes used in our uplinks.

28. The uplink system that prepares the signal and transmits it to the satellites had to be developed from scratch. The uplink system first compresses the 170 channels of audio and the non-audio data channels and builds them into a single encrypted XM signal. That "multiplexed" signal then is modulated onto a carrier frequency, and is fed to the satellite dishes which amplify the signal for transmission to the satellites. The uplink system also includes the business authorization system. This is part of the broadcast signal that transmits commands that "turn on" each individual subscriber's radio when a consumer activates a new subscription account.

29. For urban areas, where the satellite signals could be blocked by tall buildings, we needed to design and install a network of signal terrestrial repeaters on the ground that would receive the satellite signal and retransmit that signal to fill in the gaps in coverage. These repeaters had to be designed to operate on a different signal frequency and use a different modulation method than the satellites. This optimizes propagation of the signal, and avoids interference with the satellite signal. As noted above, our approximately 800 terrestrial repeaters are a central part of the XM system architecture, and contain some custom-built components. XM obtained a separate FCC authorization for these repeaters. That authorization was granted

on an interim basis in 2001. Creating our repeater network is not just a one-time investment, since we have to maintain the repeaters on a continuous basis. Subject to FCC approval, we are also planning to add repeaters during the next 1-2 years, and on an ongoing basis, to replace existing repeaters to further enhance the integrity of our signal reception. For 2005 alone, XM's costs relating to its satellites and terrestrial repeater network was $42 million.

Progression of Radio Receivers

30. All XM radios perform the same essential functions. They receive the signal from the XM satellites and repeaters. They then amplify the signal, de-modulate the digital signal from the carrier frequency, separate (or "de-multiplex") the single signal into channels that can individually be tuned, then tune in each individual channel. These radios are capable of receiving and processing the XM signal from XM satellites and from terrestrial repeaters. These radios are one-way receivers that send no information back to the satellite. For that reason, XM has no technological way to know whether or how long a particular XM radio is on, or what any subscriber is listening to.

31. XM itself designed all aspects of the radios used to receive the XM signal. These XM radios have several key components. The first, most fundamental, element is the chipset, which provides the "brains" of the radio devices subscribers use to receive the XM signal. It has evolved substantially over the years to become more capable, sophisticated and complex, yet significantly smaller and lower cost than the first generation chips. Our own engineers at XM's Deerfield Beach, Florida facility designed the radio, including proprietary chipsets. Although it was more expensive to do it this way, XM reaped a tremendous competitive benefit by retaining control over all aspects of the design process and understanding how all of the technological

elements came together. Once the chipset was developed, we sent it to outside manufacturers to mass produce.

32. The second element is the "XM stack" – the software the radios use to control the radio hardware, tune individual channels, and display information to the user. All display functions, including the information displayed about a song as it is played on XM and data-only displays, such as scrolling stock prices and sports scores, are controlled by the stack. The XM stack also incorporates complex algorithms resulting in a robust signal reception in "difficult" terrestrial environments (areas with high terrain and multiple building reflections).

33. The third element is the antenna to receive the XM signal. All XM antennas must be electrically powered to receive the signal from the XM satellites and the terrestrial repeaters, and then to amplify the signal. A major radio design milestone was the reduction of the size of the antenna, which has led to development of portable receivers similar in size to a cell phone (which I discuss below).

34. Through dedicated development efforts, we have evolved these three elements substantially over time to provide additional functionality in a much smaller form factor, while remaining compatible with the same XM signals that still work in the very first generation of radios.

35. The first XM radio receivers available for consumers were after-market units designed for use only in vehicles, and were produced by Pioneer and Alpine. To install these units, the old car radios had to be replaced with the new XM unit. The XM radios consisted of two pieces. One was a very large (about 6" by 9") black box unit that was installed in an automobile's trunk. The other part was a head unit installed in the dashboard, which allowed for tuning to different XM channels. A separate antenna for satellite and repeater reception that

looked like a shark fin was installed on the roof of the car. Masiello Exhibits 10 and 11 show an early radio and antenna.

36. Sony was the first manufacturer to come out with the first generation "Plug and Play" XM radio, with a chipset designed by XM, which enabled subscribers to add XM radio to their existing car audio system using an adapter unit rather than replacing the existing car radio. Masiello Exhibit 12 is a photograph of a first generation "Plug and Play" radio.

37. The constant reduction in chipset size led to the next generation "Plug and Play" radio, the "SKYFi," a unit that could be powered by an AC adaptor or batteries, allowing subscribers to experience XM in the car, at home or virtually any location. The SKYFi was designed entirely by our Florida engineers and branded by Delphi. Masiello Exhibit 13 is a photograph of a SKYFi radio.

38. The chipset continued to shrink, allowing for production of the smaller "Roady" series. In 2005, XM introduced the first portable "XM2Go" receiver radios that subscribers could use either to receive live XM signals (like a portable transistor radio) or to record 5 hours of XM to enjoy in locations where XM signals cannot reach (such as in an office, the gym or on an airplane). The technological breakthrough with these "XM2Go" devices was a reduction in chip size and power consumption and development of an integrated antenna without losing signal quality in outdoor environments. Masiello Exhibits 14 and 15 show an XM2Go and MyFi (with integrated antenna) radios.

39. Following the introduction of radios in the retail or automotive after-market channel, XM began working with automotive partners to include XM radio as a factory-installed option in new cars. GM began to offer XM radio as original equipment in certain new Cadillacs in late 2001 and expanded its offering to other vehicle makers in subsequent years.

40. In less than five years, XM not only released the first satellite radio receivers, we reduced the size of the entire radio – including the chipset and antenna – to a device that could fit in the palm of a subscriber's hand.

41. Hardware innovations continue at a fast pace. Just this year, XM introduced two new devices. One is the "Mini-tuner," which is a matchbook sized XM radio receiver unit that a consumer can snap into a specially-equipped car unit or home stereo. The second is our new series of smaller, more attractive XM2Go devices. Known as the "inno" by Pioneer and the "Helix" by Samsung, these devices can receive live XM radio, record XM channels or programming (like a TiVo or VCR), and store sound files from the subscriber's own collection (such as from the Napster online music service or from the subscriber's own PC). Masiello Exhibit 16 is a photograph of an XM mini-tuner. Masiello Exhibit 17 is a photograph of an inno radio.

42. Another innovation by XM is the delivery of audio channels in "surround sound," that can be enjoyed on home theater systems manufactured by consumer electronics manufacturers such as Yamaha, Pioneer, Onkyo, Denon, and Sony. At present, the XM Classical "Pops" channel and XM's "Fine Tuning" are encoded for surround sound.

43. XM's research and development efforts are extremely costly. For example, costs of research and development were total $31 million for 2005. But innovation is essential to help make the XM service more ubiquitously available to consumers, as well as to drive down costs of the hardware. To penetrate the mass market rapidly, radios had to evolve from bulky, expensive devices to a range of price points, including small, $30-50 units that could easily be used in a car or home stereo system.

XM's Data Services

44. The XM service also includes transmission of data, some of which is broadcast on non-audio data channels. For example, data concerning channel identification, program content and/or song information is sent for each channel. All of this information is sent on a Broadcast Information Channel separate from the audio channels themselves. Other data also enables textual and graphic features (such as channel names and logo designs) on XM radios or display of sports scores and stock prices.

45. XM's local traffic, weather, and emergency alert service provides audio channels dedicated to 21 metropolitan areas, covering 177 million people, just over 50% of the total population of the United States. The traffic data is provided by traffic.com, which is a service that uses traffic sensors on roadways, coupled with state and local Department of Transportation data, to create a database that in turn provides usable information to XM. Weather data is provided by The Weather Channel, which has a dedicated website that XM may access. Emergency alert information is provided by a number of government sources, as well as broadcast and cable news networks. XM employees create the audio broadcasts for each of these channels from our studios utilizing this third party data.

46. We also provide "XM WX Satellite Weather," an aviation and marine service. This data provides real-time graphical weather data, including NEXRAD radar, temperature, windspeed, and other information in plane cockpits. It has been adopted as the leading cockpit weather solution for the aviation industry, and is now a built-in feature on over 80% of new general aviation planes sold in the U.S. Baron Services provides the weather data to XM for broadcast. Masiello Exhibit 18 is a page from the XM website describing the XM WX Satellite

Weather service. This service is only possible because of the extensive capabilities of the XM broadcast system to deliver real-time data to an aircraft while in flight.

47. XM's "NavTraffic" service provides real-time traffic updates to a vehicle's on-board GPS navigation system. The service, which launched in October 2004, is now available in 44 metropolitan areas. Honda, GM, Toyota, and Nissan offer vehicles equipped with suitable GPS navigation systems to receive the NavTraffic service and leading manufacturers of aftermarket navigation systems, including Garmin, Pioneer, and Alpine, offer devices which also use the service. The data for the NavTraffic service is provided by Navteq, a provider of digital map data for vehicle navigation systems. Navteq gathers traffic data from multiple government and commercial sources and transmits the data to XM in a codified form that is relevant to a map-based display. Masiello Exhibit 19 is a page from the XM website describing the XM NavTraffic service.

48. Automotive telematics, which include data services such as "NavTraffic" that can interact with GPS systems, were envisioned by XM at the outset of developing XM's service. Other automotive telematics services now in development or in limited use include sending an overlay of weather information onto maps showing traffic information; information from Zagat on restaurants located close to the subscriber's vehicle; and information which utilizes sensors in parking garages to help locate open parking spaces.

49. The Zagat restaurant data is the result of a partnership with Honda, and is available in certain Honda and Acura vehicles. With this service, XM does not provide the data content itself, but acts as a pipeline to the carmaker's vehicles.

50. XM's far-reaching, reliable coverage uniquely positions XM to provide vital emergency assistance to communities in need; terrestrial disasters may devastate other

communication services but not affect XM's satellite-based communication. When Florida was devastated by hurricanes in September 2004, XM launched XM Emergency Alert Channel 247, which is dedicated to providing critical information after natural disasters and other emergencies. We make this service available to emergency responders with XM radios, without any subscription. In the aftermath of Hurricane Katrina, XM was able to broadcast to the affected areas, while traditional radio and television stations were knocked off the air for an extended period of time. XM established another free service during Katrina, the Red Cross Radio channel, which reached workers and aid stations in the Gulf Coast region. XM donated 300 radios during this crisis to quickly disseminate critical emergency news and aid information.

51. This commitment to public service led to the development of an alert feature that tells the user that important safety, weather or traffic information is being transmitted on another XM channel. [

]

Future and Continuing Technology Investments for XM

52. As discussed above, XM is continually innovating to make its service and radios attractive and more affordable to subscribers and partners. I expect such innovation to continue at an accelerated pace over the next five years so XM can remain competitive in the ever-changing consumer electronics and audio entertainment industries.

53. In addition to developing new features and hardware, XM must perform ongoing maintenance so that our infrastructure remains sound and there is no drop-off in the quality and coverage of XM's signal. This maintenance must be done on all of the systems I have described above, including some that I will highlight below.

54. Our fourth satellite will be launched later this year, and work is underway on our fifth satellite, which is being built by Loral. This satellite is being built as a ground spare. Our network operations department will continue to monitor the first two satellites, which will be powered down but kept as in-orbit spares.

55. Our network of terrestrial repeaters must also be maintained and expanded. As elements of these repeaters reach the end of their useful life, they must be replaced. Leases for repeater sites need to be renegotiated periodically. Subject to FCC approval, we also will add new repeaters to the network over the next five years to improve signal coverage.

56. Our production and performance studios and equipment must also be maintained and replaced as necessary. [

]

Certification

I declare under penalty of perjury that the foregoing is true and correct.

Dated: Washington, DC
October 30, 2006

Anthony J. Masiello

Anthony J. Masiello

Senior Vice President of Operations,
XM Satellite Radio Inc.

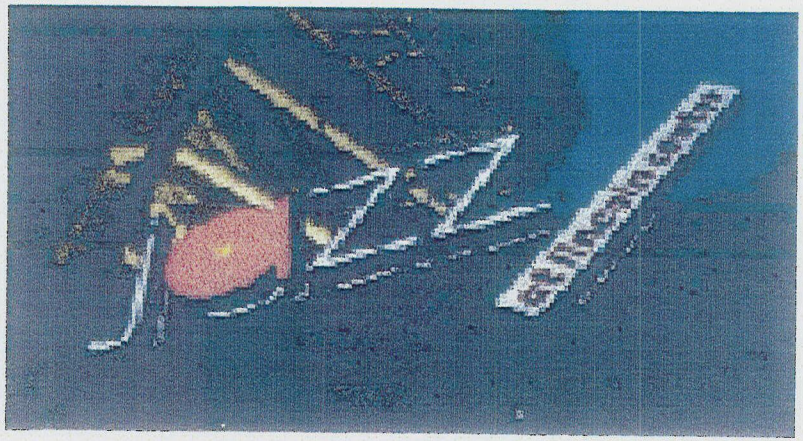
37 CFR 351.10(c) Statement For Exhibits to Testimony of **Anthony J. Masiello**:

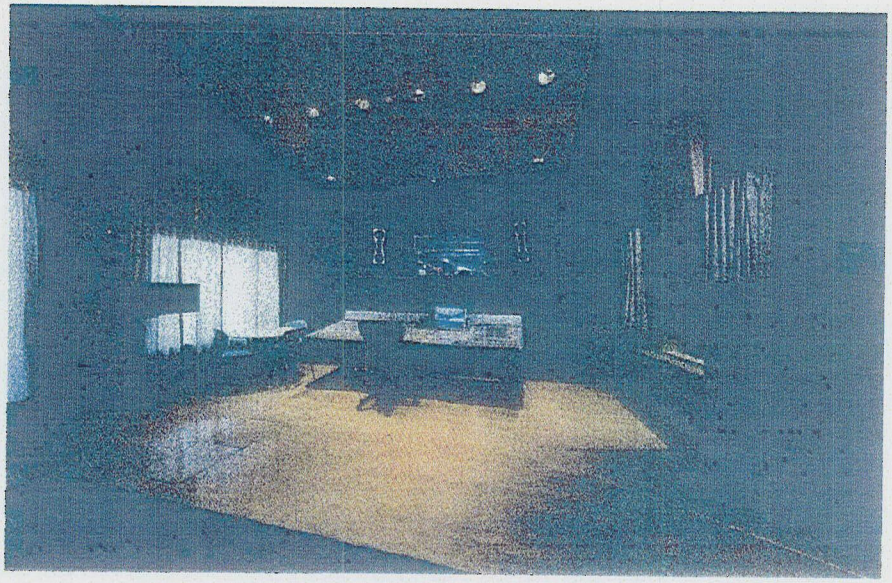
Exhibit 1	Restricted- Subject to Protective Order in Docket No. 2006-1 CRB DSTRA
Exhibit 2	Image: New York Studio
Exhibit 3	Image: Nashville Studio
Exhibit 4	Image: Chicago Studio
Exhibit 5	Image: Washington, DC Broadcast Center
Exhibit 6	Image: DC Control Center
Exhibit 7	Image: XM Satellite (XM Advanced Capabilities- Beyond Audio)
Exhibit 8	Image: XM Repeater (Typical Repeater Installation)
Exhibit 9	Image: XM Parabolic Satellite Dish (Satellite Uplink Dish)
Exhibit 10	Image: One of the First XM Radios
Exhibit 11	Image: One of the First XM Radio Antennas
Exhibit 12	Image: Sony Plug and Play
Exhibit 13	Image: XM SKYFi Radio
Exhibit 14	Image: XM2Go Radios
Exhibit 15	Image: XM MyFi Radio
Exhibit 16	Image: XM Mini-Tuner
Exhibit 17	Image: XM inno
Exhibit 18	Page from XM Website- XM WX Satellite Weather
Exhibit 19	Page from XM Website- XM NavTraffic

RESTRICTED - Subject to Protective Order
in Docket No. 2006-1 CRB DSTRA

Studios

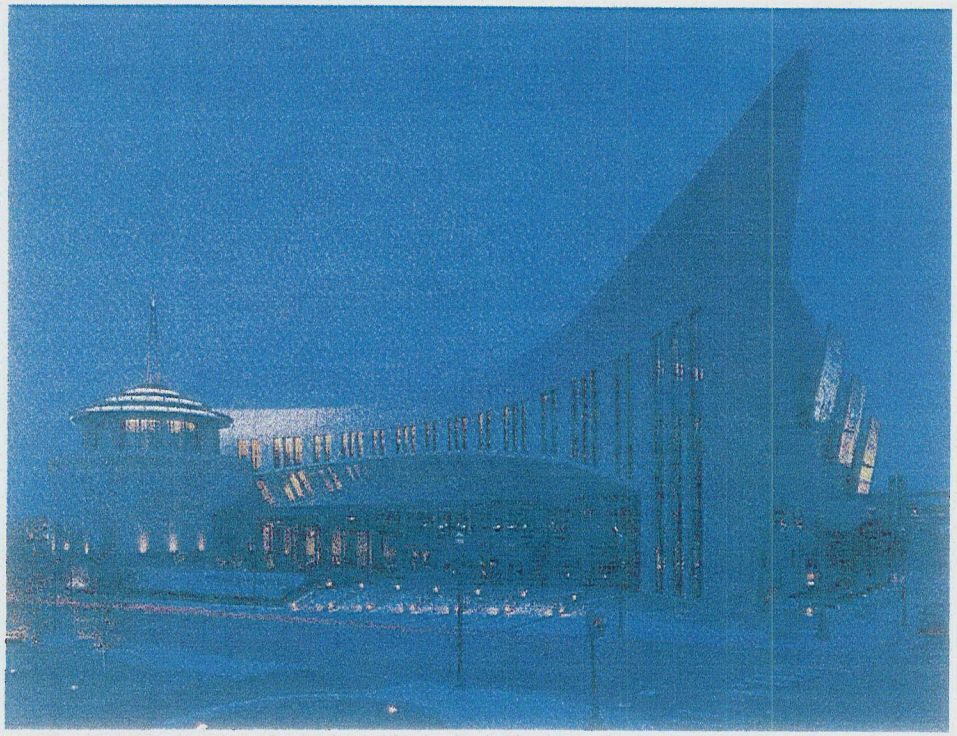
New York





Studio

Nashville – Country Music Hall of Fame

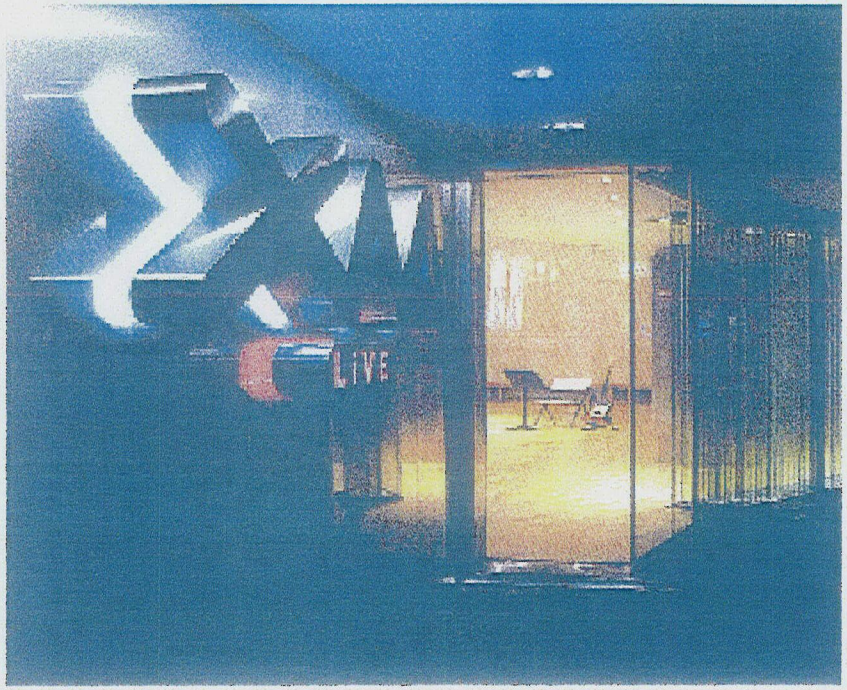


Studios

Chicago

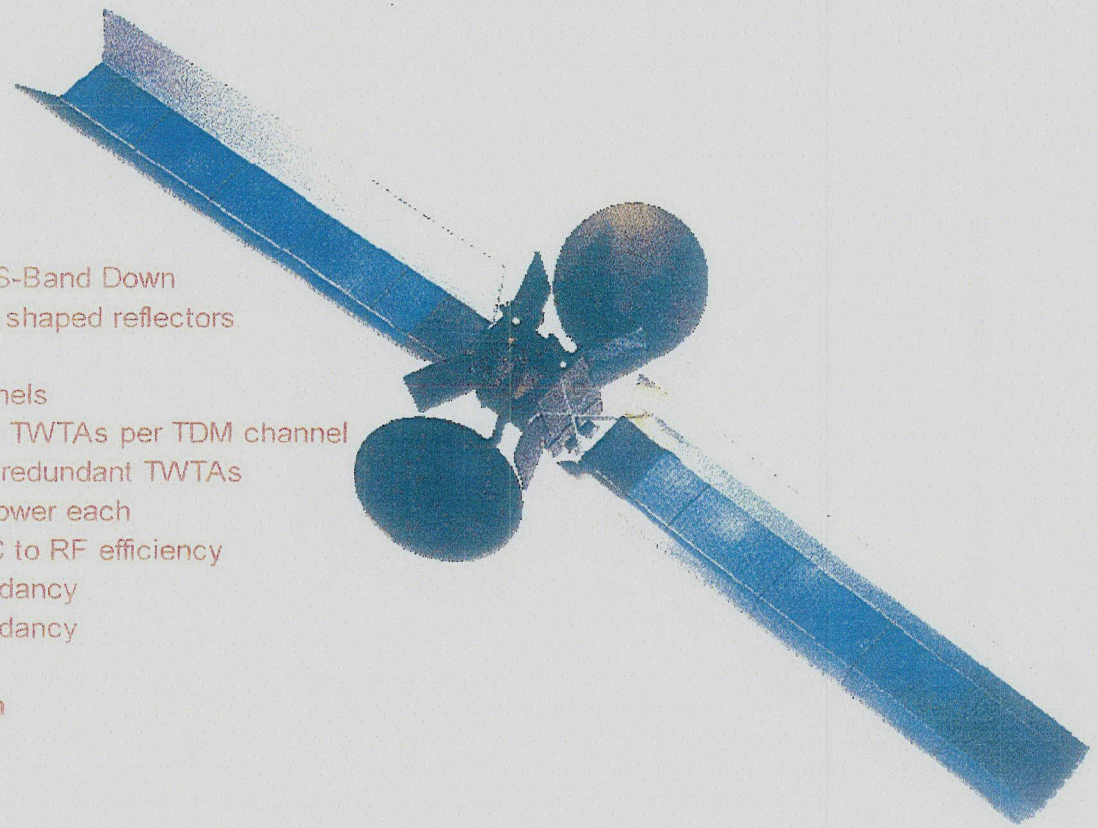
XM-MASIELLO Ex. 4

Washington, DC

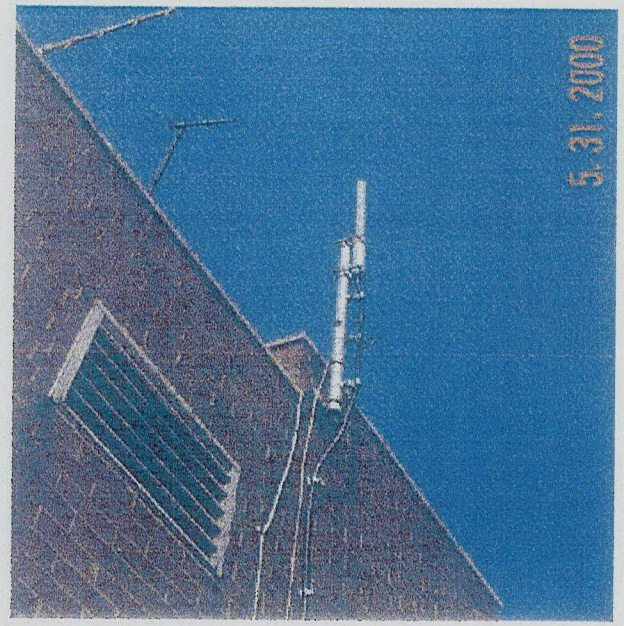


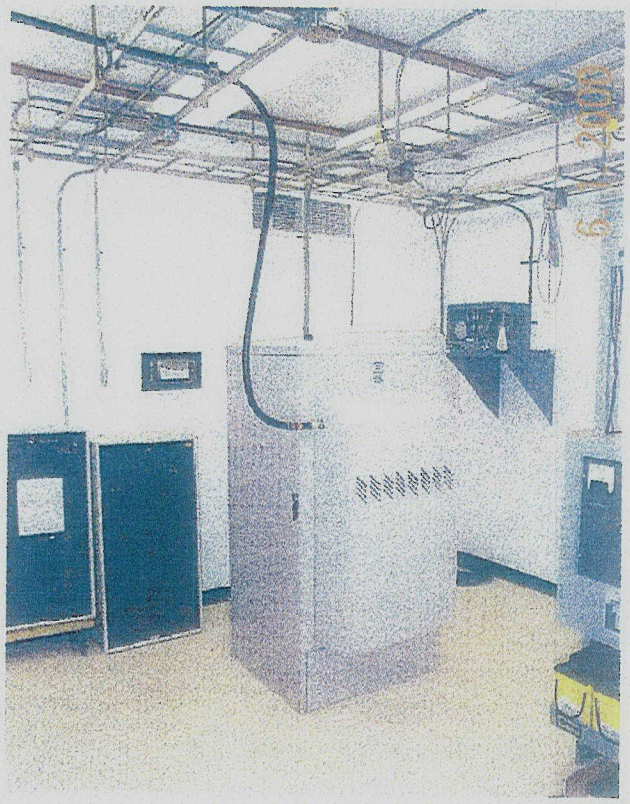
Control Centers

Prime Contractor	**Boeing**
Spacecraft Platform	HS-702
Orbital Locations	85°W and 115° W
Operational Life	15 years
Peak EIRP	68 dBW
End of Life Power	15 kW
Liftoff Mass	4650 kg
Payload Supplier	**Alcatel**
Payload DC Power	13.5 kW
Frequencies	X-Band Up, S-Band Down
Reflectors	Two 5 meter shaped reflectors
TWTA Power	220 W each
Channelization	2 TDM channels
TWTAs	16 paralelled TWTAs per TDM channel
	4 x 11 for 8 redundant TWTAs
	216 W RF power each
	over 55% DC to RF efficiency
Receivers	4 for 1 redundancy
IF Demultiplexers	4 for 2 redundancy
Launch Vehicle	**Sea Launch**

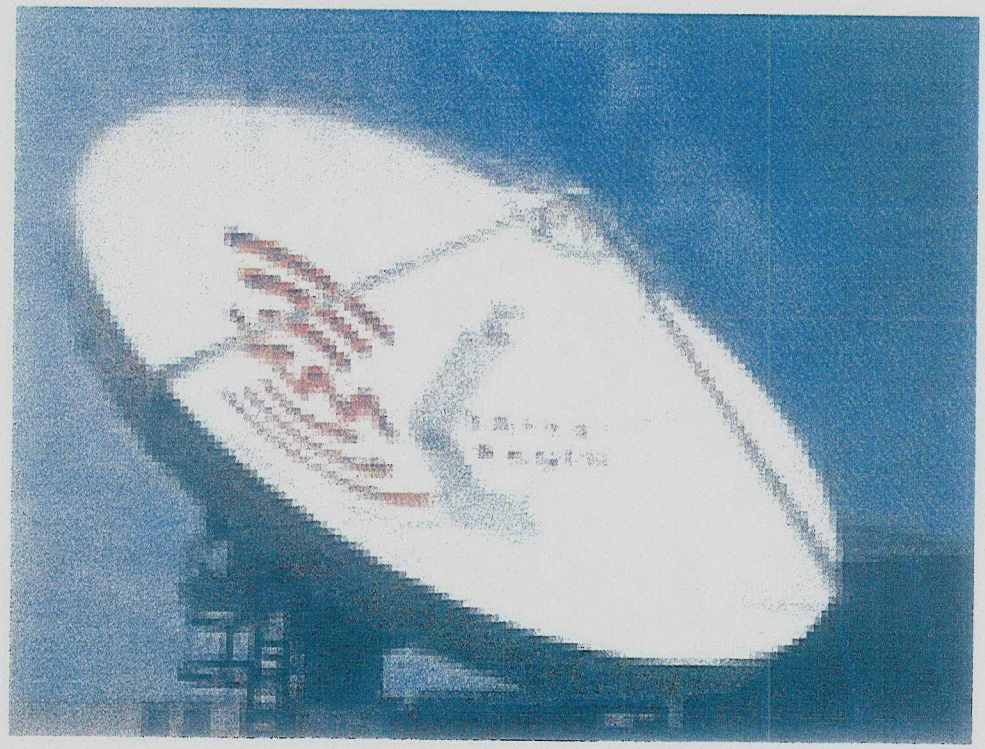


Typical Repeater Installation





Satellite Uplink Dish



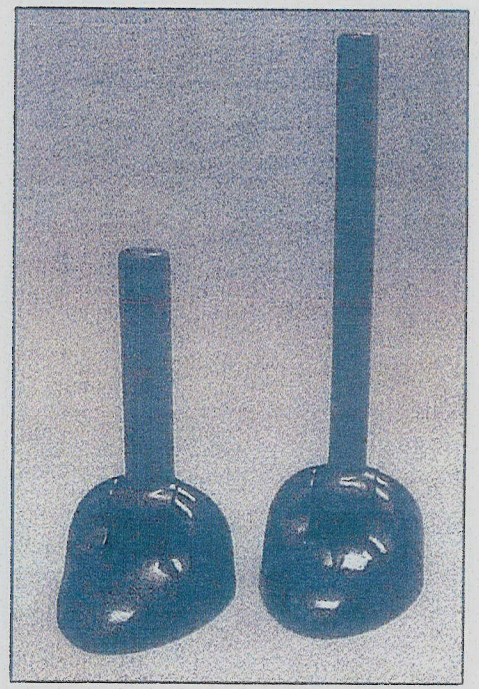
XM-MASIELLO Ex. 9

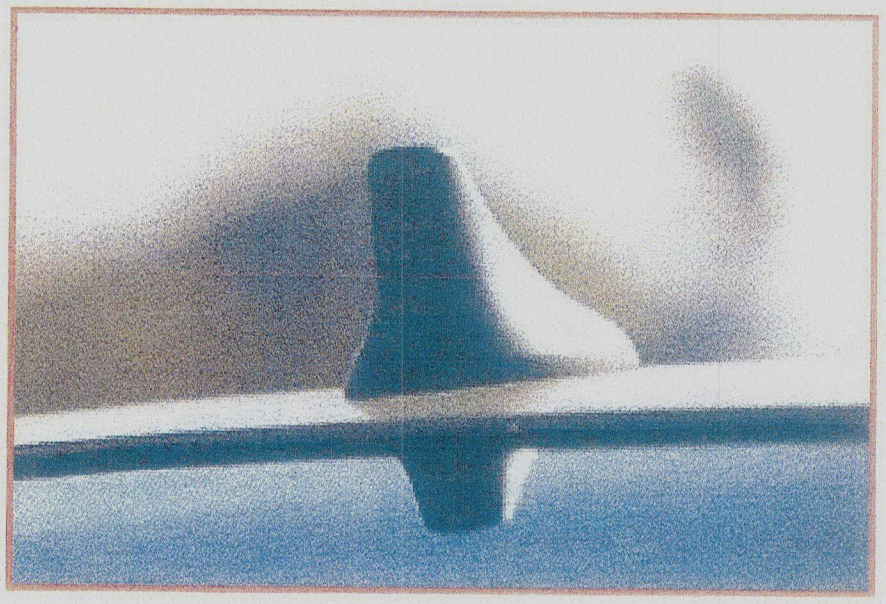
One of First XM Radios

Pioneer Head Unit

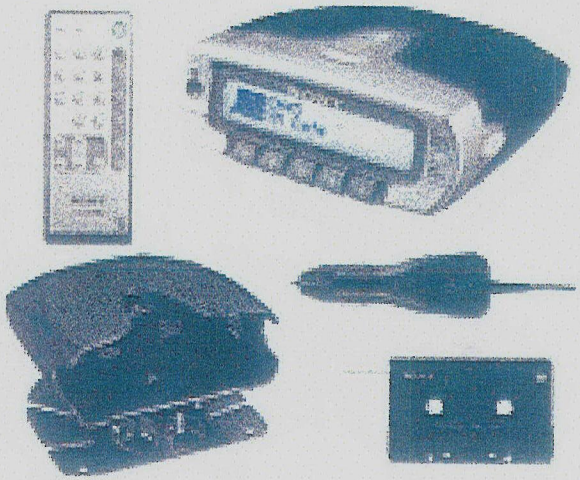
Pioneer XM Tuner Box

One of First XM Radio Antennas





Sony Plug and Play



Sony Plug & Play
(Car Cassette or Home)
Product discontinued

XM SKYFi Radio

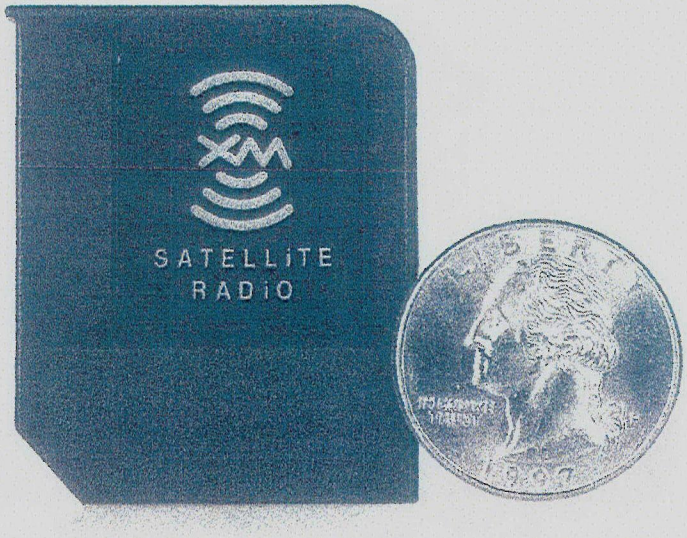
XM2Go Radios

SATELLITE RADIO

XM-MASIELLO Ex. 14

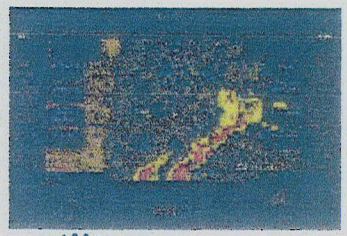
XM MyFi Radio

XM Mini-Tuner

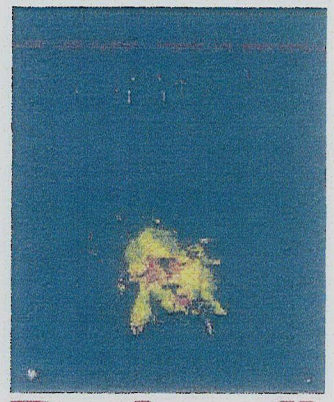


XM inno

XM WX Satellite Weather

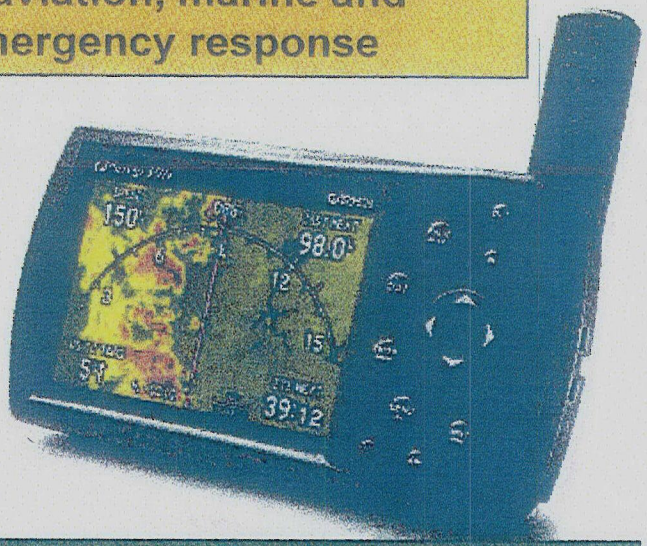


AVIDYNE



Rockwell Collins

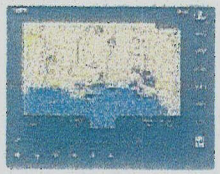
XM WX has been widely adopted by leading avionics and navigation manufacturers as the new industry standard for aviation, marine and emergency response



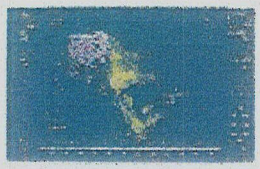
Flying Magazine Editors' Choice Award 2005

SATELLITE WEATHER

GNS 530



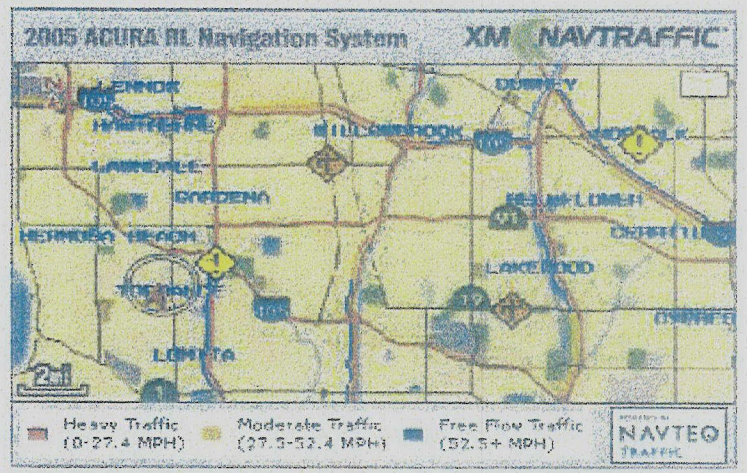
MX 20



G1000

GARMIN

XM WX is now factory-specified on over 80% of all new General Aviation aircraft

XM NavTraffic

- The nation's first satellite traffic data information service, enhancing the vehicle's navigation system with continuously updated traffic data
- Enables on-board navigation systems to provide personalized traffic information for each driver's needs
- The best available traffic information, aggregated from multiple government and commercial sources
- Adds daily relevance to navigation and helps congestion mitigation
- Widely adopted by leading automotive manufacturers and aftermarket navigation systems providers