Satellite Radio: Coming of Age

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Yale SCHOOL *of* MANAGEMENT

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INDUSTRY RATING:
Hold

Industry Summary

- **2004 should be a year of tremendous subscription growth**, above most estimates. This growth will be fueled by the automotive race to offer satellite radio to customers. GM, in particular has a large financial stake in the industry and has embraced the technology.

- **We believe that the long-run offers a much bleaker picture**. Despite the short-run rise is OEM acceptance, the long-run will result in reduced OEM trial customer conversion rates from the 75% level achieved in 2003 to an estimated 50% by 2010. As the market begins to saturate with satellite radio, XM and SIRI will need to start "selling down" the ladder of automotive quality where consumers are less willing to pay.

- **Although the near-term valuation offers some upside as subscriber growth beats most estimates, the long-term subscription levels will be sufficiently lower than current industry projections**. We anticipate that it may be as long as 24 months before this these lower conversions will begin to be seen.

- **We expect the number of subscribers to reach 22 million by 2010 and nearly 31 million by 2014** from just over 1 million today.

- Therefore, we are initiating coverage of the satellite radio market with a Hold.

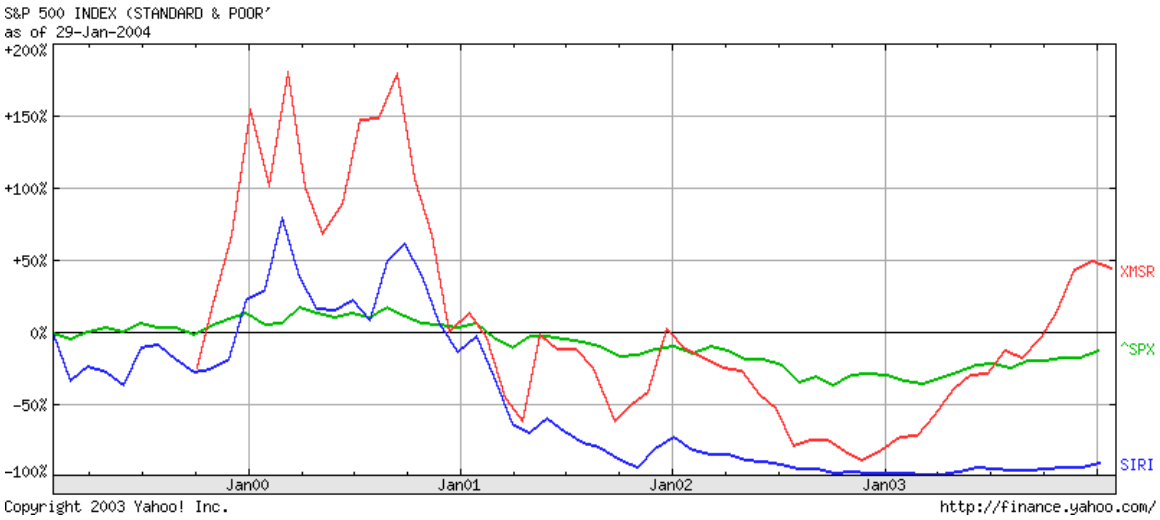
XM Satellite Radio:
XMSR Price: 23.58

Sirius Radio:
SIRI Price: 2.79

XM:
52 week Lo: 3.53
52 week Hi: 29.96
Market Cap: 3.47B
P/E: N/A
Profit Margin: N/A
EBIT Margin: N/A
ROA: -42.06%
ROE: -90.62%
EPS: -5.516
Beta: 3.727

SIRI:
52 week Lo: 0.39
52 week Hi: 4.20
Market Cap: 2.81B
P/E: N/A
Profit Margin: N/A
EBIT Margin: N/A
ROA: -15.10%
ROE: -32.18%
EPS: -0.209
Beta: 3.954

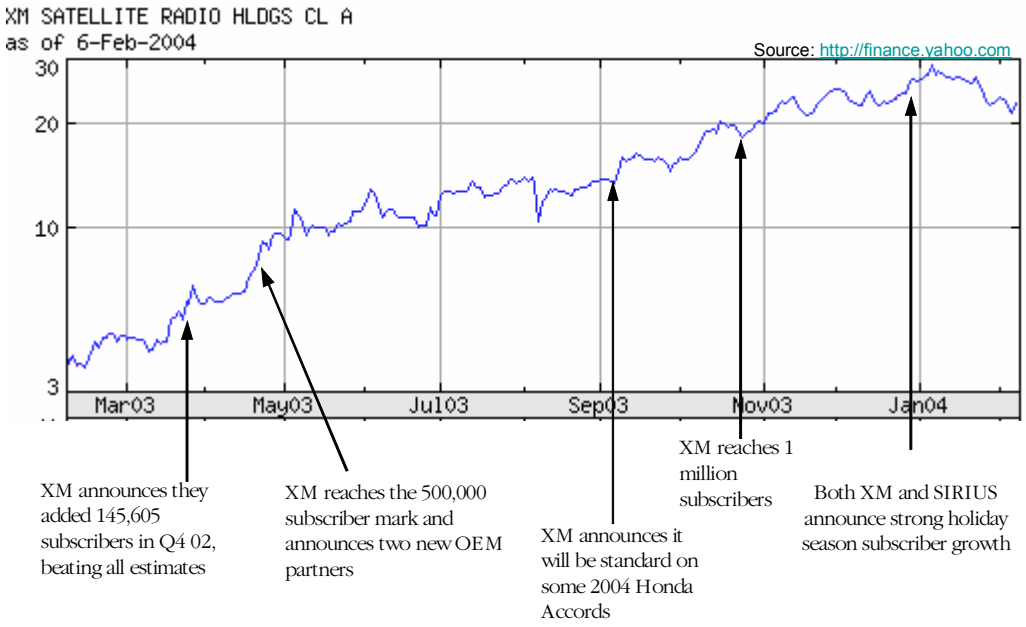
Outlook and Valuation



In 2004, we believe that XM will produce 2.95 million new subscribers, more than any other analyst. The primary reason is that we expect GM and other car manufacturers to come out on the high end of estimates for the number of cars with a factory installed of satellite radio. As evidence, several days ago on February 2nd, XM announced that GM's factory-installed model base had been increased from 44 to 50 of its 57 models for 2004[1]. Given the competitive nature of the automotive business we expect many other auto manufacturers to follow suit. Other reports have failed to take into account the ongoing growth in satellite technology adoption by auto-manufacturers. Because the market is still new, we do not anticipate that OEM trial customer conversion rates (OEM's give all new car buyers a free trial of satellite radio, as discussed later in the report) will reduce in 2004. As a result unit sales and revenues should come in above consensus estimates.

Because satellite radio is technology focused, and is a relatively nascent industry with no earnings and large revenue growth, it falls into the class of stocks that do not always trade on fundamentals such as revenue or earnings multiples. In fact, we believe that in the near term (6-9 months) XMSR and SIRI will trade on catalysts, most notably subscriber growth and partnerships with automotive OEMs. A historical chart of XM's stock price (see next page) shows that major company announcements at least appear to be a catalyst for price appreciation. As a result of this trend and our belief that both companies will beat subscriber estimates for at least the next two quarters, there is a potential that the near-term could yield some small upside.

[1] http://biz.yahoo.com/prnews/040202/dcm017_1.html



Sources for News Events: Company Press Releases and http://www.washingtonpost.com/wp-dyn/technology/washtech/companies/xmradio/

In the long-run, however, we anticipate subscriber growth will be slower than has been publicly estimated. While we anticipate the number of automobiles with satellite capability will trend above estimates, the retention of subscribers after the free trial period should decline as more mid and low priced cars are equipped with satellite radio. Since our long-run subscriber growth rates are lower than all consensus estimates, we anticipate that this will be recognized by the markets in 24 months, and we maintain a HOLD rating on the industry.

Risks:

As the satellite radio providers expand to lower income consumers, OEM trial customer renewal rates could drop significantly. Currently both XM and Sirius are experiencing OEM trial customer renewal rates in the range of 65-80%. We believe that this is because the market is still young, and as they penetrate further "down" market, these renewal rates will drop significantly. Given that most analysts do not anticipate a large drop in these rates over time, we feel that overly optimistic long term growth prospects are built into the share price. High Risk

Satellite radio's one disadvantage relative to AM/FM radio is that it has a limited local reach. Until recently, all stations on satellite radio were national. Listeners who preferred local news, sports, weather, traffic and other talk radio may not be interested in the product. However, XM Radio recently announced that in March 2004 they will launch "XM Instant Traffic & Weather." This service will offer in-depth, up-to-date road and weather conditions for 15 major metro areas. 6 more cities will be added later in 2004. Sirius will likely replicate this in the near future, and as a result we believe that the satellite radio providers have effectively addresses this risk. Low Risk

Currently the FCC prohibits XM and Sirius from offering local content, but XM has attempted to get around this by creating one station for each locale. We do not know how the FCC will react to this move. It is possible that they will forbid XM from offering this local content, or they could also decide to open up the market by granting local radio licenses. Obviously there is a possibility that the satellite providers will not be allowed to offer any local content, and if that is the case it will offset the efforts mentioned above. Medium Risk

As a new industry heavily dependent on auto-manufacturers to install hardware into their auto-lines, **the satellite radio industry has minimal leverage**. The mass population is not yet demanding the inclusion of satellite radio with their purchases of new automobiles. This gives the auto-manufacturers significant leverage to demand installation cost subsidies, force hardware prices down, and request revenue sharing, particularly in the short-term. We do not feel that this will result is any short-term pricing pressure, as the bargaining power will shift in favor of the satellite radio providers as consumer demand increases in the next few years. Medium Risk

The loss of a satellite would be very costly. This risk is more apparent for Sirius, who, due to their unique satellite arrangement, is likely to lose service for a few hours if one satellite goes down. In addition to customer defections and refunds, the cost to launch a new satellite is extremely high. As an example, the price of the XM-4 satellite and associated launch services is $186.5 million plus interest on deferred amounts[2]. In the event of space accident or some other issue these costs would be covered by insurance, but it will often take along to receive the cash payments, and insurance companies have a way of avoiding payment on large claims such as these. Low Risk

In addition, **the satellites may not last for as long as previously anticipated**. In fact, Boeing recently announced that XM's two satellites are already experiencing solar

[2] Form 10-Q for XM SATELLITE RADIO HOLDINGS INC, 12-Nov-2003, Quarterly Report: http://biz.yahoo.com/e/031112/xmsr10-q.html

array degradation that will reduce their expected lifespan from 17.5 years to 6.75 years[3]. The insurance company denied their claim, so XM is suing it for this loss of performance. We anticipate that XM will receive at least some cash compensation, because a court recently ruled that the insurer had to pay for 68% of the cost of the same defective Boeing model to a satellite mobile telephone provider. However, XM is already set to launch a new satellite, the XM3, by the end of 2004. In addition, a fourth satellite, the XM4, is due to be launched by the end of October 2005. It is possible they will need cash to cover the launch costs before a settlement with insurer is reached. Costs associated with repairs and operating are also somewhat volatile and unpredictable[4]. Medium Risk

Churn rates could climb unexpectedly. While the current levels of churn are impressively low, subscriptions are still at a very early stage, so churn levels are still somewhat unpredictable. We do not feel this offers significant risk as we anticipate the industry to have notably low churn levels in an ongoing basis. As a reference point we have listed churn rates for various industries in the chart below[5]. We can see that our predicted churn of close to 2% is higher than satellite TV and broadband internet, which are most comparable than the other industries listed. Low Risk

Exhibit 25. Churn Rates, Various Industries

	Internet Service Providers (ISPs)						Cable					
		Earthlink		United	Charter	Cox			Satellite	Wireless		
	AOL	Dial-Up	Broadband	Online	HSD	HSD	Basic	Digital	TV [1]	Telephone	Magazines	Newspapers
Monthly Churn Rate	3.8%	4.0%	1.6%	4.2%	3.0%	3.0%	2.7%	4.5%-5.0%	1.5%	2.8%	5.0%	5.8%
Annual Churn Rate	45%	48%	19%	50%	36%	36%	32%	55%-60%	18%	33%	60%	70%

(1) Satellite TV churn excludes churn attributed to moving, which we estimate is approximately 1.25% per month on average.

Source: Bear, Stearns & Co. Inc. estimates.

While it might seem impossible, **the potential for new entrants exists well into the future**. If XM and Sirius establish successful businesses, they will need to be careful to maintain a relatively competitive environment. The U.S. government has the ability to issue additional spectrum licenses to new players. Low Risk

Prices may be less stable then they appear. The various prices offered by both XM and Sirius of $9.99 and $12.99 can be reduced through family plans. In fact, XM already offers 62,015 family plan subscriptions are already included in the subscription figures at a multi-unit rate of $6.99 per radio per month. Sirius has yet to offer this deal. This could put downward pressure on rates.[6]

Another rate discount risk includes discounts offered to rental car vehicles. Currently, customers are charged $2.99 per day per vehicle for use of the XM satellite service. However, XM only receives a revenue share as part of this deal[7]. This may result in a

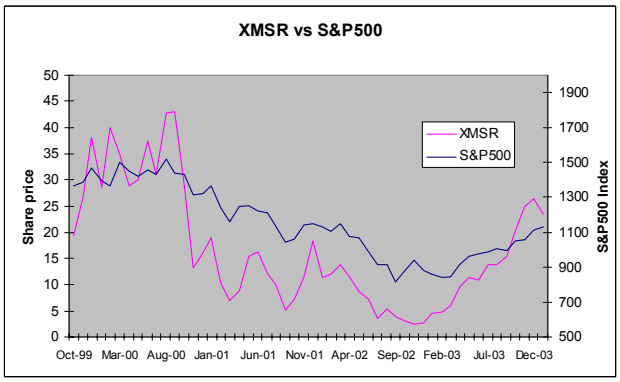
[3] Peter C. Friedland. XMSR: Initiating Coverage With a Hold Rating. WRHambrecht. October 21, 2003
[4] Stifel, Nicolaus & Company, Incorporated: XMSR, SIRI: Content is King. Get It Now! December 4, 2003
[5] Raymond Lee Katz, Bear Stearns and Co, "America Online: The Long and Winding Road" April 11, 2003
[6] Ibid.
[7] Ibid.

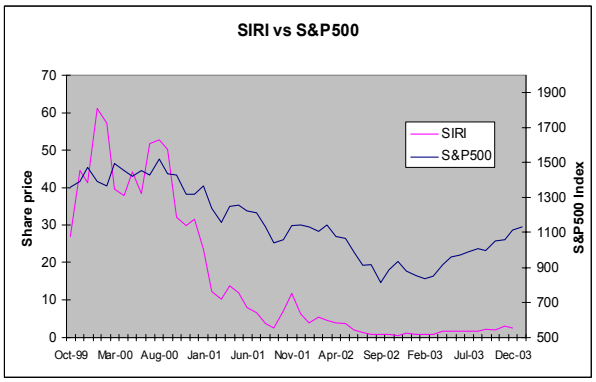
higher or lower average monthly rate, but will inevitably become less material as the percentage of rental cars with satellite hardware declines relative to the number of overall automobiles with satellite radio.

Another risk is XM's revenue share agreement with GM. While XM will not disclose the amount of revenue they must share with GM on new customers acquired through purchased vehicles with XM pre-installed, they have said it is less than 50%. This amount could be material considering that as of June 30, 2003 GM accounted for nearly all of XM's OEM subscribers, and roughly 25% of overall subscribers.[8]

Finally, it is possible that the pricing environment will become more competitive between the two industry players. We do not feel that this is likely as the market is essentially a unique duopoly. Both Sirius and XM are aware that a price change by one is extremely likely to result in a price change by the other. The end result is that we are likely to see a very stable pricing environment. Low Risk

High Beta: Both XM and Sirius trade with betas nearly 4. While this is not a specific industry risk, it should be noted that the share price is particularly levered to the market in general. Note the volatility of both XM and SIRI with the S&P provided below. Low Risk





Source: http://finance.yahoo.com/q/hp?s=XMSR, http://finance.yahoo.com/q/hp?s=siri

Pricing: $9.99 or $12.99? A telephone survey was conducted by XM Satellite Radio in 1997 (included below) to evaluate the size of the satellite radio market and to help in the road show for funding[9]. The results are not so useful in estimating the likely demand, since this survey was done by XM partially to raise capital and is likely heavily biased. However, they are useful in establishing the optimal monthly price.

The blue box below demonstrates that $10 is the price point likely to generate the most recurring revenue, because the amounts are higher than any of the other monthly price points on either side. The key takeaway from this is that Sirius continues to charge $12.99, based on its own internal research. However, the risk exists that Sirius will cut its monthly fees to match XM, particularly now that XM has eliminated all advertising from its network and given the data below that $10 is a more optimal price. In fact, the

[8] Peter C. Friedland. XMSR: Initiating Coverage With a Hold Rating. WRHambrecht. October 21, 2003
[9] Godes, David B., and Elie Ofek. XM Satellite Radio (A). Harvard Business School Case N9-504-009. July 14, 2003

possibility of this price matching is substantial. Of course, any decrease in monthly rates would reduce valuation significantly[10]. Low Risk

Exhibit: Optimal Subscription Rates: Table from Harvard Business School Case N9-504-009. July 14, 2003

Demand at Various Car Radio	Subscription Price				
Radio Price	$ 12	$ 10	$ 8	$ 5	$ 2
$ 400	23,682,641	27,404,662	27,484,190	27,590,767	27,714,837
$ 300	24,781,778	28,526,070	28,685,126	28,898,280	29,146,420
$ 250	26,552,125	30,698,835	31,225,323	31,840,895	32,637,794
$ 200	31,470,304	36,515,712	37,829,543	40,490,651	42,806,598
$ 150	35,626,570	41,580,232	44,098,158	49,110,199	52,965,846
$ 100	45,726,942	54,026,759	58,682,464	68,262,745	77,771,435

Radio One-time revenue

Radio Price	$ 12	$ 10	$ 8	$ 5	$ 2
$ 400	9,473,056,400	10,961,864,800	10,993,676,000	11,036,306,800	11,085,934,800
$ 300	7,434,533,400	8,557,821,000	8,605,537,800	8,669,484,000	8,743,926,000
$ 250	6,638,031,250	7,674,708,750	7,806,330,750	7,960,223,750	8,159,448,500
$ 200	6,294,060,800	7,303,142,400	7,565,908,600	8,098,130,200	8,561,319,600
$ 150	5,343,985,500	6,237,034,800	6,614,723,700	7,366,529,850	7,944,876,900
$ 100	4,572,694,200	5,402,675,900	5,868,246,400	6,826,274,500	7,777,143,500

Recurring Monthly Revenue

Radio Price	$ 12	$ 10	$ 8	$ 5	$ 2
$ 400	284,191,692	274,046,620	219,873,520	137,953,835	55,429,674
$ 300	297,381,336	342,312,840	229,481,008	144,491,400	58,292,840
$ 250	318,625,500	368,386,020	249,802,584	159,204,475	65,275,588
$ 200	377,643,648	438,188,544	302,636,344	202,453,255	85,613,196
$ 150	427,518,840	498,962,784	352,785,264	245,550,995	105,931,692
$ 100	548,723,304	648,321,108	469,459,712	341,313,725	155,542,870

MP3's, Internet radio, and CD's have been publicly mentioned as risk factors of competition for satellite radio. However, radio has successfully grown despite the success of CD's. We believe that these technologies offer no material risk and will successfully operate along-side one another[11]. Low Risk

Cash could become difficult to raise. While both XM and Sirius have done an outstanding job of raising capital, additional funding could be necessary over the next several years in order to reach positive cash flow. As long as subscriber growth continues at a strong clip at or above expectations, this will not be an issue. However, if subscriber growth begins to meaningfully miss targets, it won't take long for the money to stop flowing. Currently, XM is funded enough to reach a cash-flow positive position. However, the aforementioned insurance claim from their satellites is still unresolved. If the decision is not in XM's favor, it is possible that they will need to raise an additional $200-$300 million. This would be about 3-4% dilutive to their market cap, but is not material to the long-run success or failure of the company. Sirius will also need an

[10] David Lieberman. Paper on XM Satellite Radio (A). David B. Godes, and Elie Ofek. Harvard Business School Case N9-504-009. July 14, 2003: Paper written November 30, 2004

[11] Stifel, Nicolaus & Company, Incorporated: XMSR, SIRI: Content is King. Get It Now! December 4, 2003

additional $200-$300 million in order to reach positive cash flow. However, in each case, this is not an overwhelming figure at current market capitalization levels. Medium Risk

Sirius has significant execution risk related to chipset manufacturing. Sirius had to delay the launch of their service by 12 months due to the failure of its chipset manufacturer to deliver as promised. It must work out their issues by the start of next year's NFL season (when we anticipate a big marketing push), or it could become a major stumbling block in their ability to recapture market share.

Potential Upside:

Advertising on music channels has recently been completely eliminated by XM as they matched the zero advertising level offered by Sirius. Previously, XM offered an average of 2 minutes of advertising on its music channels, far less than the industry norm.[12] Both companies still advertise on sports, news, and entertainment channels. Advertising was not a significant portion of revenue, even before XM eliminated it. For the three-month period ended September 30, 2003, subscription related revenues totaled nearly 95% of total revenues for XM.[13] However, it is possible that advertising revenue could return in a significant manner.

This can be better understood by evaluating the history of the U.S. radio market. FM radio emerged in the late 1960's and early 1970's and dramatically changed the radio industry. FM offered better quality sound and far less advertising. In fact, during this time FM radio stations only played 6 minutes of ads per hour (sounds a lot like satellite radio). By the 1980's and 1990's as FM popular soared, average advertising times on FM stations climbed to the levels seen today of approximately 15 minutes an hour.[14]

It is certainly possible, if not likely that satellite radio could follow the same path. In fact, satellite radio also has the unique opportunity to leverage GPS for highly targeted advertising. As an example, using the chipset in a person's car a computer could track where he/she is, and advertise a restaurant or gas station just down this road. This incredible targeting precision could yield advertising rates 10 or 20 times higher than current ones. While this opportunity lies well into the future of satellite radio, it is a factor that offers meaningful upside.

Satellite Radio offers no censorship of its content. The significance of this can be dramatic when a personality such as Howard Stern is introduced. Just as "The Sopranos" helped to drive substantial growth for HBO, a Howard Stern-like personality would do the same for satellite radio. This could serve to increase the rate of satellite radio acceptance and drive it to higher levels.

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[12] Associated Press, Satellite Radio Competition Heats Up. Friday January 30, 10:21 am ET: http://biz.yahoo.com/ap/040130/techbits_1.html

[13] Form 10-Q for XM SATELLITE RADIO HOLDINGS INC, 12-Nov-2003, Quarterly Report: http://biz.yahoo.com/e/031112/xmsr10-q.html

[14] David B. Godes, and Elie Ofek. XM Satellite Radio (A). Harvard Business School Case N9-504-009. July 14, 2003

In the long-run, the leverage that auto-manufacturers currently possess over the satellite industry should substantially soften. Once a meaningful percentage of the U.S. population demands this technology, auto-manufacturers will need to install the hardware or at least have it easily available in most automobiles, particularly anything in the mid to high price range. Still, the more price sensitive low-priced cars may avoid the option for an extended period of time, if not indefinitely.

Industry Description:

Overview: The Satellite Radio industry was created in 1997 when XM Satellite Radio (then called the American Mobile Satellite Corporation) and SIRUS won the FCC auction for broadcasting licenses to provide Satellite Digital Audio Radio Services (SDARS), with bids of $89.9 million and $83.3 million, respectively. The two companies then set out to deploy their satellites and launch terrestrial repeater networks to enable the product to be sold to consumers. XM was first to market; it went live with its satellite radio service in November 2001. Sirius launched 9 months later in July 2002. As of 1/1/04 XM had 1.36M subscribers, and Sirius had 261K.[15]

The primary differentiation between satellite radio and traditional radio is the *service quality* and *breadth of content*.

Service Quality: Similar to the way satellite television tried to initially differentiate itself from cable television, both XM and Sirius claim that their service has a **clearer signal and better sound quality** than traditional radio. While this is definitely the case, and it may be important to people living in rural area where signal quality is poor, we do not view this as material to a consumer's choice to switch from free radio to a paid service. Similar to how cable television advanced to digital cable, it is also likely that as technology improves traditional radio will catch up to satellite radio in this area.

One aspect of quality that we do view as material to consumer choice is the **number of commercials** on a given station. Sirius has always been commercial free on its music stations, and XM recently announced that they are changing their format to completely commercial-free radio on all music stations (previously they had commercials on 50% of their music stations). They both have only a few minutes of commercials each hour on news, talk, and sports stations. In contrast traditional radio stations have an average of 20 minutes each hour of commercials on all broadcasts.[16]. We view this differentiation as material because similar to television, commercials are likely a major complaint of traditional radio listeners. A good example of consumers' willingness to pay a premium for no commercials is the success of premium TV networks such as HBO. In addition, an individual who commutes one hour each way to work has a limited amount of usage time, and therefore wants to maximize content and minimize commercials. In fact, anecdotal evidence from internet message boards indicates that this is a primary reason consumers are willing to pay for satellite radio.[17]

[15] Source: company press releases
[16] Godes, David B., and Elie Ofek. XM Satellite Radio (A). Harvard Business School Case N9-504-009. July 14, 2003, p.7
[17] http://www.hometheaterforum.com/htforum/showthread.php?pagenumber=1&threadid=170375

Another aspect of quality that is a key differentiator is **geographic reach.** Traditional radio can only be heard in a limited area, but XM and SIRUS have consistent signals across the US. They recognized early on that satellite radio could not have the same problems as satellite TV, specifically signal interruptions due to line-of-sight issues like foliage and buildings. As a result they requested and received permission from the FCC to install terrestrial repeater networks which replicate the signal, allowing it to get around obstructions in urban areas. The temporary FCC license expired in March 2002, but both companies applied for a permanent license and it is expected that the FCC will grant this license.[18] These repeaters allow XM to have a consistent, clear signal from Washington to Florida, across the entire continental US. We view this is a key differentiation for the 3 million truckers in the US, as well as rental car customers and long commuters.

Breadth of Content:

The second key differentiator between satellite and traditional radio is the breadth of content offered by the satellite radio providers. Both XM and Sirius offer 100 channels of music, news, sports, and entertainment. They have both engaged (and pay royalties to) well known content providers including ESPN, CNN, FOX, CNBC, MTV, Disney, Bloomberg, E!, Discovery and VH1. A listing of each company's primary content providers can be found below:

[18] Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 2003

Source: Company Websites

As is evidenced by the partnerships listed above, the variety of content available to a satellite radio listener is exponentially greater than that available to a traditional radio listener. There are countless examples of consumers being willing to pay for better (and broader) content, including cable television vs. network TV, pay internet sites (ESPN Insider and TheStreet.com), and HBO (broader selection of movies). As a result, we feel that the broader content offered by satellite radio will be a key driver in consumers' choosing to switch to a paid service from traditional, free, AM/FM radio.

It is interesting to note that while Sirius was second to market and lags well behind XM in subscribers, they have a much broader and higher quality selection of content. They have signed exclusive deals with the NFL and NHL, and they currently provide exclusive coverage of NBA Basketball. Since the NFL is the most popular sport in America and its exclusive contract with DirectTV has been the primary reason for DirectTV's survival, we believe that deal with the NFL will be a substantial aid in helping Sirius capture market share. XM has an exclusive deal with MLB, but they have chosen to focus most of their sports content on auto racing. Since the typical demographic that enjoys auto racing is in a lower income bracket that will be less willing to pay for a luxury item such as satellite radio, we feel that Sirius has a clear lead in the sports content area. In addition, with partners such as ABC and NPR, we believe Sirius has a clear lead in the race for premium content, which should help them capture some market share from XM.

How Satellite Radio Works:

Both XM and Sirius have land-based studios where they (and their partners) produce, mix, and make the content for their stations. A signal is then sent up to satellites orbiting the earth, and bounced back to the surface where it is replicated by the terrestrial repeaters and picked up by receptors on cars and in homes. XM and Sirius each employ different satellite configurations, each with their own advantages and shortcomings.

XM has two satellites in stationary orbit over the equator which offers a relatively low line-of-sight angle, and creates a need for more repeaters. In contrast, Sirius has three satellites directly above the continental US, so the line of sight is much better.[19] However, SIRUS's satellites travel in an inclined elliptical orbit, which means that two send a different signal at any point, and every eight hours one of the two satellites that is broadcasting must hand off that task to the third satellite that is not broadcasting. Not only has this proven to be a logistical challenge, but it also means that the loss of one Sirius satellite would result in a complete loss of service for several hours. In contrast, both of XM's satellites broadcast the same signal, and if one were to go down the signal might weaken, but there would be no risk of service interruption. [20]

Receiver Hardware and Components:

There are currently two types of receiver hardware: in-dash automotive and portable plug and play. Each company has partnerships with various automotive OEM and aftermarket radio manufacturers including Audiovox, Alpine, Blaupunkt, Clarion, Delphi, Jensen, JVC, Kenwood, Panasonic, Pioneer, Sanyo, Sony, and Visteon. The most successful hardware to date has been the Delphi plug and play device (see below) which

[19] Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 2003
[20] Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 2003

can be used in any car, and can be plugged into any home stereo system including the XM stereo pictured below:[21]

Source: Company Websites

We believe the reason this receiver type has been so successful is that satellite radio penetration is very low, and early-adopters who want the product have no choice but to purchase the plug and play devices. Over time more and more cars have the radios pre-installed and consumers will have more choices. As a result, we believe that demand will shift from the plug and play to the in-dash hardware. Another reason for this shift is because it is much easier to acquire new customers when they are given the product and can try it for free (e.g. AOL coming pre-installed on a PC), than when they have to make a conscious decision to purchase the hardware (e.g. calling the cable company to install it on your television). A chart listing how fast various industries reached 1 million subscribers below illustrates this point. We can see that industries where the consumer must take proactive action grow slower than those with a "try and buy" approach.

Number of Years to 1 Million – Comparative Products
Internet Users< 1 year*
XM Satellite Radio 1.9
Radio 3.3
Television 3.3
Digital Video Recorders (TIVO) 4.5
VCRs 4.8
Online Subscription Services 9.5
Cable Television 12
Satellite Television 12
Source: Media - Satellite Radio. Stifel, Nicolaus & Company, Incorporated. Satellite R
Based on 1990, when browsers and internet service became boradly available

Chipsets decode the satellite signal, and are the key component of the receiver. XM currently gets its chipsets from STMicroelectronics, while Sirius receives its Chipsets from Agere.[22] The reason Sirius was second to market is because Agere had problems due to Sirius's satellite configuration, and had to delay shipment by a year. Both XM and Sirius pay subsidies to the chipset manufacturers for each radio sold (included in the subscriber acquisitions costs), but these costs have decreased substantially over time.[23] As the technology improves and the chipsets become cheaper we anticipate increased competition in the market resulting in the elimination of these subsidy payments. As such, we do not view them as a material risk to industry profitability.

[21] Ibid.
[22] Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 2003
[23] Ibid.

It is important to note that XM and Sirius receivers are currently incompatible, although the FCC has mandated that they correct this immediately. In Feb of 2000 they signed an interoperability agreement, but it took a very long time for the companies to take action. SIRIUS announced on February 3rd, 2004 that their service was now interoperable with XM's in GM and Honda cars. [24] We believe that as interoperability becomes more widespread it will open the market (similar to what is happening with cell phones because of number portability), resulting in an increased importance on content relationships, and potential downward price pressure. As such we see this is a risk – although small - to the industry's success.

Distribution:

There are two primary methods of distributing satellite radios: aftermarket and automotive OEM.

Aftermarket: Aftermarket products include all of those "plug and play" devices mentioned in the Receiver Hardware section above. Both XM and Sirius sell these products through mass market retailers and specialty automotive stores, including Best Buy, Circuit City, and Sears. XM also sells through Wal*Mart. Despite the bargaining power these retailers have and their potential to drive down prices, we believe that this channel is insignificant. The only products sold through this channel are plug and play hardware, and as mentioned above we believe that this market will diminish in importance over time.

Automotive OEMs: Both XM and Sirius have exclusive distribution relationships with various automotive manufactures. Below is a chart listing the exclusive and non-exclusive partnerships each company has, and their 2002 unit sales.

SIRIUS Exclusive	2002 Unit Sales (mm)	2002 % share	Non-Exclusive	2002 Unit Sales (mm)	2002 % share
DaimlerChrysler	2.418	14.4%	Nissan	.526	4.6%
Ford	3.623	21.5%	Volkswagen	.424	2.5%
BMW	.256	1.5%	Isuzu	.053	.3%
Mazda	.258	1.5%	Porsche	.021	.1%
SIRIUS Total	**6.556**	**38.9%**	**Non-Exclusive Total**	**6.556**	**7.3%**

[24] http://biz.yahoo.com/prnews/040203/nytu193_1.html

XM Exclusive	2002 Unit Sales (mm)	2002 % share
GM	4.820	28.6%
HONDA	1.247	7.4%
TOYOTA	1.756	10.4%
XM Total	**7.824**	**46.4%**

TOTAL UNITS: 15.618MM
TOTAL SHARE: 92.7%

Source: Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 2003

As you can see from the data, XM has a slight advantage based on its partnerships, but both companies have an equal chance to gain significant market share by leveraging this distribution channel. As we will discuss later, XM has already seen significant traction from the GM channel, and expects to gain further sales from Honda and Toyota in 2004.[25] Sirius has not disclosed any information on its expected or historical unit sales through partnerships.

We believe one of the key drivers of the OEM relationships is whether or not the radio is offered as a standard feature. If the consumer has to choose satellite radio as a specific option or part of high priced luxury package, then he/she is much less likely to try it. Thus we believe that if XM and/or Sirius can make the radio standard it will have a material effect on unit sales, and ultimately subscriber growth. Currently XM and Sirius are offered across a span of packages – from standard in the Honda Accord LX and UAG Vehicles, to an option on the Toyota Camry or Chevy Impala.[26] If either company can push for more standard installations, there is potential upside for subscriber growth.

GM Deal: XM and GM have a unique strategic relationship. XM has a 12 year exclusive distribution agreement with GM across all of its brands, and GM made a $50M investment in XM in 1999. XM is required to pay GM $400M over the course of the agreement, but in Jan 2003 GM allowed XM to make at least some of these payments in the form of equity, making GM a cashless distribution channel through 2004. Other aspects of the arrangement include XM's requirement to subsidize a portion of the radio installation costs, make incentive payments for GM vehicle buyer that subscribe, and share the revenues from XM-equipped GM subscribers. [27] Obviously the GM relationship is extremely critical to XM's success. Any time a company has so much riding on one relationship there is some risk, and that is certainly the case here.

Car Rental: Both XM and Sirius have entered into agreements with rental car companies to provide satellite radio to their customers. These deals (XM with Avis and Sirius with Hertz) typically involve the radio provider covering installation costs and sharing in the revenue ($5/ day for Hertz and $2.99/day for Avis).[28] While we do view the rental car market as a good fit due to typically longer trips and unfamiliar local radio stations, we

[25] Source: GM, Honda, and XM Company Press Releases
[26] Source: www.toyota.com , www.honda.com , and XM Press Releases
[27] Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 200
[28] Source: XM and SIRIUS press releases and Peter C. Friedland. XMSR: Initiating Coverage of Satellite Radio. WRHambrecht. October 21, 200

do not expect this to have a material impact on revenue and we have not built it into our projects.

Analysis and Commentary of U.S. Satellite Radio Subscribers:

We believe the primary market for satellite radio is automotive listeners. We do not believe home users are a good potential market because there are so many alternative means for entertainment in the home (TV, DVDs, video games, traditional radio, internet, MP3s, stereo). As such, satellite radio does not have enough unique differentiation to incent home listeners to pay for it

For automotive listeners, the only other entertainment alternative is traditional radio. In addition, many of these listeners are in the car for a long time. Over 35MM people in the US commute one hour or more to work (US Census) and there are 3MM truckers in the US (department of transportation). Because of the amount of time these people spend in their car they will value higher quality, broader content-based, commercial free radio more, and will therefore be willing to pay for it.

US light vehicle sales are a mature industry and are growing at a relatively predictable rate, particularly for this industry report. As a result, fluctuations in light vehicle sales are insignificant and are unlikely to materially impact our estimates for new satellite subscribers.

The percentage of new autos with the capacity for satellite radio installed is a substantial factor in the potential success or failure of this medium (see risk factors). It is one of the two most critical variables in the success of satellite radio. In the base case used, penetration by 2014 was nearly 100% of all light vehicle sales. The significance of this cannot be overstated. It is possible that lower end or even mid-priced range models of automobiles will not include the satellite hardware with all of their lines.

The retention of satellite OEM offers of new autos is the second of the two critical variables. Impressively, the number of subscribers that have chosen to continue paying for and receiving the XM service beyond the initial OEM promotional period, has ranged from 65% - 80% during the past year and has averaged 75% from July 2003 through September 2003. However, it must be emphasized that the installed base that currently exists includes nearly all high-end auto-lines where the monthly fee would be an insignificant additional cost for the consumer. Once mid and low-priced models start carrying the hardware, this conversion rate will decline. During the next 5 years, the decline in this figure should be more dramatic. Furthermore, new cars are typically only bought by those that can afford new cars. Once these cars are sold, the subscription rates are likely to decline dramatically. This indicates that churn levels could be quite high in 4 to 5 years.

The after-market subscribers are the number of subscribers that purchase the hardware and subscriptions for vehicles that do not already have it installed. This figure should climb slightly as the price of the after-market hardware declines in the next year or two. As was mentioned above, prices should continue to decline for the hardware, particularly as demand climbs. However, after that time, as the installed base continues to grow, the aftermarket purchasing will decline to a very small percentage. Assuming a 100%

installation, this figure would reach near zero, unless a new "upgraded" or "premium" version was distributed.

The last key driver is the monthly churn rate. The current monthly churn rate is 1.3% (1% for XMSR and 1.5% for SIRI)[29], a pretty low figure. By comparison, Verizon has a 2.1% monthly churn rate, the best in the cellular phone market.[30] However, cellular customers have a few competitive disadvantages that will lead to a higher level of churn. These include problems with quality, substantial competition (at least 6 major player), and significant variance from offer to offer. As such, the churn rate in the cellular market should serve as a high side estimate. For a chart of other industry churn rates see the "risks" section above.

For satellite radio, the churn rate should increase some in the short-run as the product is purchased by less 'tech hungry" personalities and the product matures. This is common for all new products. A conflicting pressure will develop over the next 5 years as consumers sell their cars. When this happens, churn rates may climb slightly as some consumers will chose not to renew their subscriptions.

The churn loss is the anticipated number of subscribers lost per year. This is calculated by the following equation: (beginning subscribers*churn rate*12 months)+(new subscribers*churn rate*6 months). The reason the new subscribers are only multiplied by 6 months is due to the fact that the average new subscriber is only with satellite radio for half the year, on average.

The average monthly subscription rate is calculated using a weighted average of the number of subscribers based on the market share for each company. This is done since the two companies charge different prices and will allow for flexibility in the event that their prices change.

Short-term vs. Long-term:

For the 2004 fiscal year, we have estimated that XM would produce 2.95 million new subscribers, more than any other analyst. GM is one of XM's primary partners in satellite radio.
By October of 2003, GM had plans to offer XM radios as a factory-installed option on 44 of its 57 vehicles and was targeting installation of 700,000 - 800,000 vehicles. XM estimates that the conversion of these installations will be about 70% (down from 75% this year), resulting in 525,000 new subscribers. However, several days ago on February 2nd, XM announced that the factory-installed base had been increased from 44 to 50 of its 57 models for 2004. This increase of approximately 13.5% would result in an additional 75,000 new subscribers bringing the total from GM to 600,000

Honda is also a significant player and has an exclusive deal with XM. In 2004, the Honda Accord, Honda Pilot, and Acura will have a dealer-installed option of adding the radio. XM and Honda have estimated that this will produce approximately 200,000 additional subscribers.

[29] Tom Jacobs. XM and Sirius Get Busy.
http://www.fool.com/news/commentary/2003/commentary030812tj.htm
[30] Alison Bass. Customer Care: Making CRM Work For You. http://comment.cio.com/crm/061703.html

In 2004, we have estimated the number of after-market subscribers to be 1.5 million. This figure is slightly below other sell-side reports by an average of 100,000 to 200,000, but as a more unpredictable figure, we aired on the side of caution. Still, by the end of 2004, we've estimated that XM will have 73% of the market share or approximately 1.1 million of the after-market sales.

All told, this brings XM's 2004 new subscribers to:
600,000 GM's + 200,000 Honda's + 1,100,000 aftermarket = 1.9 million

Ongoing customers from 2003 and before will consist of 1.6 million subscribers, of which 480,000 will be lost in monthly churn. This leaves 1.12 million subscribers of which XM should retain 84% of the total since they had 84% of the market share from 2003. This provides an additional 940,000 subscribers bringing the total to 2.84 million subscribers. This leaves plenty of room for additional partners to add subscribers throughout the year. Essentially, any additional agreement throughout 2004 will likely bring XM's subscription numbers above our estimate of 2.95 million. The odds of this are extremely likely. We feel that other reports have failed to take into account the ongoing growth in auto-manufacturers that will continue to adopt satellite technology. They are merely using XM's published estimates which have not, in our opinion, taken into account these deals before they happen. In fact, Toyota also recently announced that XM's satellite radio is now available as a dealer-installed option on all new 2004 Camry Solara Coup's, so this trend of has been reinforced[31]. Although no figures have been provided, it is clear that this will add yet additional subscribers.
The growth of the adoption rate is very similar to the CD player when it arrived in the early 1990's. The CD player quickly became a standard option in most mid to high-range cars. In fact, it quickly became standard in some of the basic models for high-end cars. Clearly, satellite radio has some differences, but the principle of offering a unique "special" option is the same. Auto dealers want to offer something unique with their cars and satellite radio provides this opportunity, particularly in the short-run. This will lead to a very rapid adoption period and should benefit subscription rates in the short-run.

[31] http://www.xmradio.com/newsroom/screen/pr_2003_07_21.html

U.S. Satellite Radio Subscribers (millions)	2002A	2003E	2004E	2005E	2006E	2007E	2008E	2009E	2010E	2011E	2012E	2013E	2014E
US light vehicle sales	16.4	16.6	16.7	16.9	17.0	17.2	17.4	17.5	17.7	17.9	18.1	18.3	18.5
Automobiles produced with satellite installed		0.86	2.00	3.04	4.93	7.74	10.27	11.73	13.28	14.86	16.29	17.39	17.95
Percentage of new autos with satellite installed		5%	12%	18%	29%	45%	59%	67%	75%	83%	90%	95%	97%
Retention of satellite OEM offer in new autos		75%	70%	65%	59%	55%	53%	52%	51%	50%	50%	50%	50%
Additional subscribers from new auto sales		0.6	1.4	2.0	2.9	4.3	5.4	6.1	6.8	7.4	8.1	8.7	9.0
After-market subscribers		0.8	1.5	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.0
Total new subscribers		1.4	2.9	3.5	4.3	5.6	6.6	7.3	8.0	8.6	9.2	9.8	10.0
Total US autos	216.0	216.0	220.0	222.0	224.1	226.1	228.2	230.3	232.4	232.4	232.4	232.4	232.4
Beginning Subscribers		0.3	1.6	4.0	6.5	9.0	12.2	15.5	18.6	21.7	24.4	27.0	29.2
New Subscribers		1.4	2.9	3.5	4.3	5.6	6.6	7.3	8.0	8.6	9.2	9.8	10.0
Monthly Churn		1.1%	1.3%	1.5%	1.7%	1.7%	1.8%	1.8%	1.8%	1.9%	1.9%	2.0%	2.0%
Churn loss		-0.14	-0.48	-1.04	-1.76	-2.41	-3.35	-4.13	-4.89	-5.94	-6.62	-7.66	-8.20
Final Subscribers		1.61	4.04	6.47	9.02	12.17	15.47	18.64	21.72	24.41	27.04	29.17	30.94
Net Subscribers		1.31	2.42	2.44	2.55	3.15	3.29	3.17	3.08	2.69	2.63	2.13	1.78
Subscribers by Company													
XM Satellite Radio		1.36	2.95	4.40	5.59	7.06	8.35	9.69	11.08	12.21	13.52	14.58	15.47
		84%	73%	68%	62%	58%	54%	52%	51%	50%	50%	50%	50%
Sirius Satellite Radio		0.26	1.09	2.07	3.43	5.11	7.11	8.94	10.64	12.21	13.52	14.58	15.47
		16%	27%	32%	38%	42%	46%	48%	49%	50%	50%	50%	50%
Subscription Revenue (millions)		$178	$319	$634	$963	$1,337	$1,772	$2,214	$2,638	$3,032	$3,388	$3,706	$3,972
Average Monthly Subscription Rate		$9.19	$9.77	$10.23	$10.46	$10.69	$10.80	$10.92	$11.03	$11.15	$11.26	$11.38	$11.38
Percentage not receiving promotion or trial offer		80%	85%	89%	91%	93%	94%	95%	96%	97%	98%	99%	99%

<---------- Historical Explicit ---------->

XM Satellite Radio Monthly Price	$9.99
Sirius Satellite Radio Monthly Price	$12.99

[32]

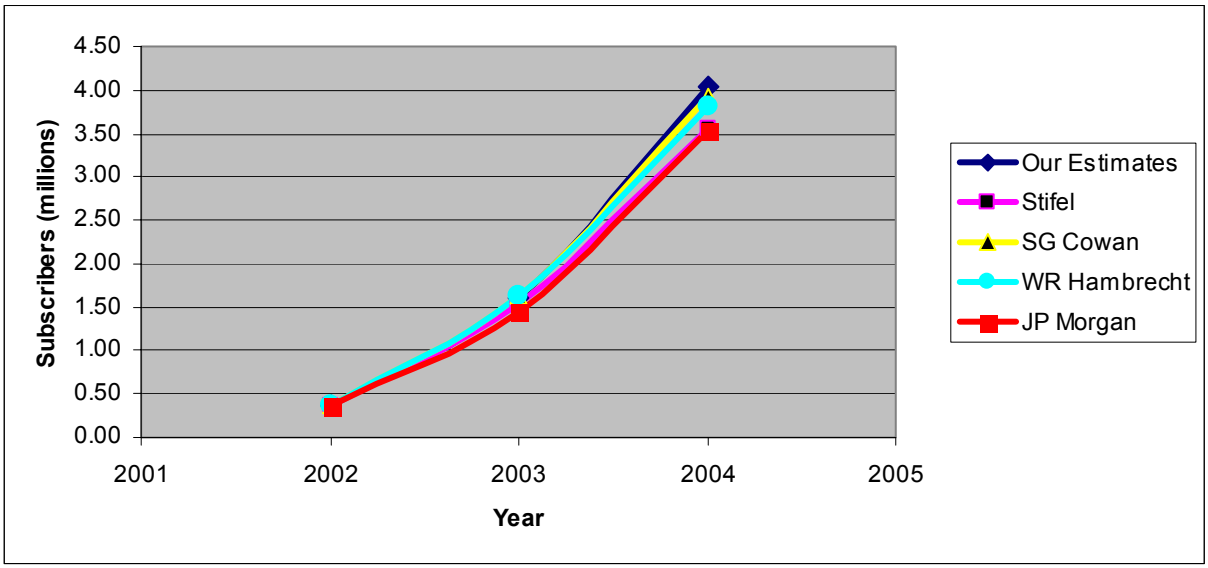
[32] Stifel, Nicolaus & Company, Incorporated: XMSR, SIRI: Content is King. Get It Now! December 4, 2003 was used as a source to plot some of the structure of the above table

<-------- Historical Explicit -------->													
U.S. Satellite Radio Subscribers (millions)													
Industry Subscriber Projections	**2002A**	**2003E**	**2004E**	**2005E**	**2006E**	**2007E**	**2008E**	**2009E**	**2010E**	**2011E**	**2012E**	**2013E**	**2014E**
Our Estimates		1.61	4.04	6.47	9.02	12.17	15.47	18.64	21.72	24.41	27.04	29.17	30.94
Stifel, Nicolaus & Company SIRI estimates		0.24	0.95	2.05	3.25	4.79	6.70	8.46	9.91				
Stifel, Nicolaus & Company XM estimates		1.29	2.61	4.26	5.98	8.00	10.66	12.89	14.68				
Stifel, Nicolaus & Company subscriber estimates		1.53	3.56	6.30	9.23	12.79	17.36	21.34	24.59				
SG Cowan - XM	0.35	1.36	3.07	6.11	7.31	9.82	12.53						
SG Cowan - SIRI	0.03	0.26	0.86	1.86	3.11	4.60	6.35						
SG Cowan subscriber estimates	0.38	1.62	3.93	7.97	10.42	14.42	18.88						
WR Hambrecht XM	0.35	1.36	2.94	6.08									
WR Hambrecht SIRI	0.03	0.28	0.87	1.95									
WR Hambrecht subscriber estimates	0.38	1.64	3.82	8.04									
JP Morgan XM	0.35	1.23	2.59						14.30				
JP Morgan SIRI	0.03	0.22	0.94						9.10				
JP Morgan subscriber estimates	0.38	1.45	3.53						23.40				

U.S. Satellite Radio Subscribers (millions)													
Industry Subscriber Projections	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Our Estimates	0.38	1.61	4.04	6.47	9.02	12.17	15.47	18.64	21.72	24.41	27.04	29.17	30.94
Stifel	0.38	1.53	3.56	6.30	9.23	12.79	17.36	21.34	24.59				
SG Cowan	0.38	1.62	3.93	7.97	10.42	14.42	18.88						
WR Hambrecht	0.38	1.64	3.82	8.04									
JP Morgan	0.38	1.45	3.53						23.40				

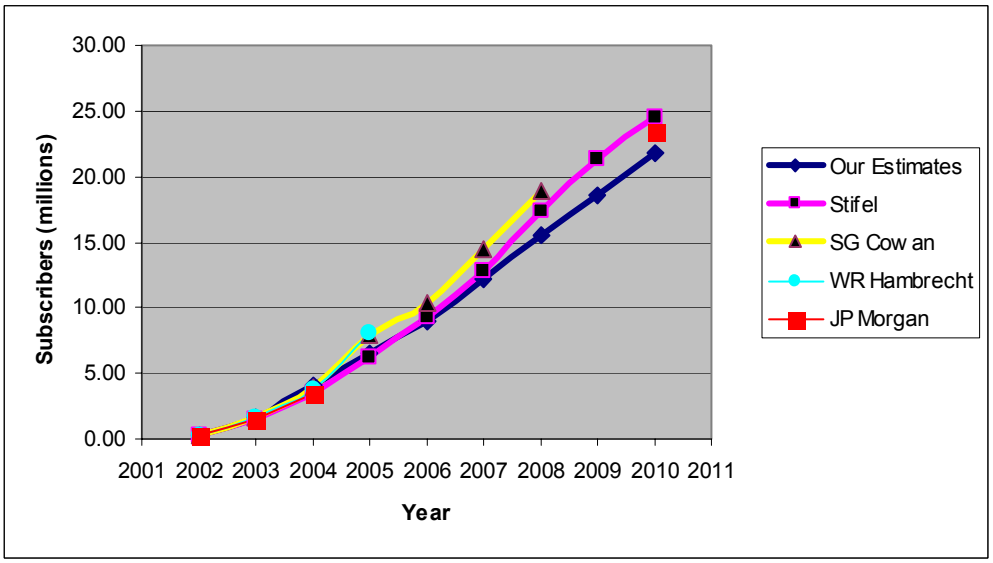
Source: SG Cowan, SIRI: Raising Out-Year Subs, Valuation Shows Upside: Sirius Satellite Radio Satellite/Broadband Services. January 14, 2004
Source: SG Cowan, XMSR: XMSR: Raising Sub Projections, Deal to Build Cash Reserve: Sirius Satellite Radio Satellite/Broadband Services. January 14, 2004
Source: HR Hambrecht, XMSR: Analyst Meeting Positive; Raising Subscriber Ests. January 12, 2004
Source: HR Hambrecht, SIRI, SIRI: Q4:03 Below Estimates; Subscriber Outlook Intact. January 30, 2004
Source: JP Morgan, XMSR, XM Satellite Radio Holdings : Blasting Off With A Little Help From Its Friends. December 22, 2003
Source: JP Morgan, SIRI, Sirius Satellite Radio : Playing Catch-Up; Initiating Coverage With A Neutral. December 22, 2003
Source: Stifel, Nicolaus & Company, Incorporated: XMSR, SIRI: Content is King. Get It Now! December 4, 2003

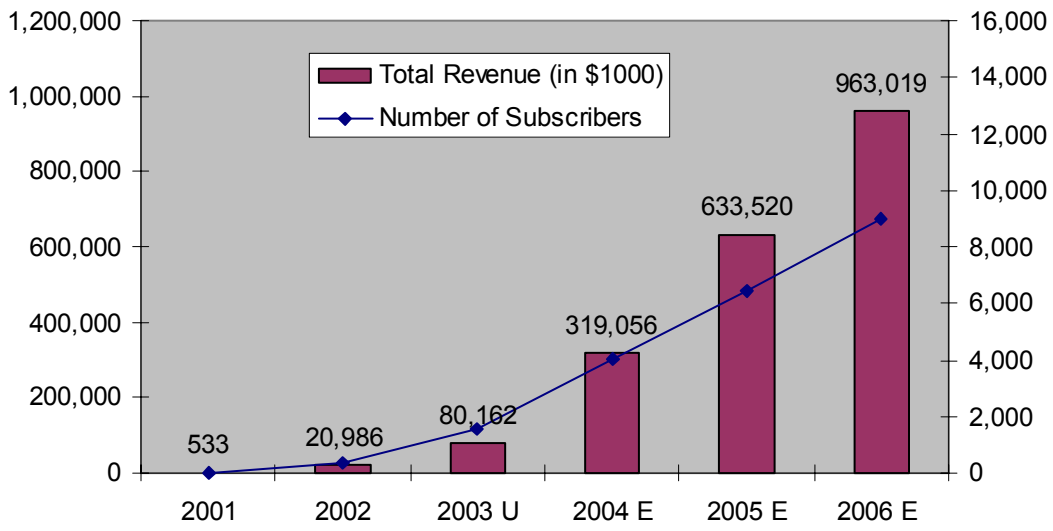
Industry short-run subscriber growth



In the long-run, however, we anticipate subscriber growth will be slower than has been publicly estimated. While we anticipate the number of automobiles with satellite capability will trend above estimates, the retention of subscribers after the free trial period should decline. As mentioned earlier, 75% of the current satellite listeners continue service after the free period. We feel that this number is likely to dramatically decline as the mid and low priced cars get into the mix. These rates will decline further as the new cars are resold as used cars. Used car buyers are certainly less likely to continue with the service as they are in the lowest financial position. It's impossible to quantify the precise level that will convert in the future, but this figure is much more likely to be below the 65% figure that other analysts have touted.

Long-run Subscriber Growth





Costs:

Costs: The major operating costs associated with both XM and Sirius include marketing, advertising costs, depreciation costs, and satellite operating costs. As the number of subscribers increases, we expect that advertising costs will climb dramatically, as both companies try to build awareness around the product. Depreciation costs are expected to stabilize once the major satellite launches are completed by the end of 2005. Finally, costs related to operating the satellites are unlikely to increase since the average maintenance per satellite will remain stable over time.

Clearly, operating costs per subscriber will decline significantly as the number of subscribers grows. Net income and margins will grow significantly in the future.

Sirius Revenue and Costs:

	FOR THE YEAR ENDED DECEMBER 31,		
	2002	2001	2000
Revenue:			
Subscriber revenue, net of mail-in rebates.....	$ 623	$ -	$ -
Advertising revenue, net of agency fees.....	146	-	-
Other revenue.....	36	-	-
Total revenue.....	805	-	-
Operating expenses:			
Cost of services (excludes depreciation expense shown separately below):			
Satellite and transmission.....	39,308	31,056	12,486
Programming and content.....	22,728	9,836	4,848
Customer service and billing.....	7,862	6,572	1,027
Sales and marketing.....	108,385	21,566	13,992
General and administrative.....	30,682	28,536	19,262
Research and development.....	30,087	47,794	64,489
Depreciation expense.....	82,747	9,052	2,352
Non-cash stock compensation (benefit)/expense (1).....	(7,867)	14,044	7,178
Total operating expenses.....	313,932	168,456	125,634
Loss from operations.....	(313,127)	(168,456)	(125,634)

Satellite and transmission expenses: These costs consist of personnel, insurance regarding the satellites, operations and maintenance, and transmission systems. These costs are expected to be constant over time.

Programming and content: Payment for production of music and non-music programming (in-house and third party). These costs are expected to increase as the number of channels increases.

Customer service and Billing costs: These include all costs related to the customer service center and the subscriber management system. These costs are expected to increase in the beginning with the number of subscribers, but will stabilize once this number becomes significantly larger and reaches meaningful scale.

Sales and Marketing Expenses: These expenses were very significant in 2002 due to the national launch. These include expenses regarding promotional activity and subscriber acquisition costs (incentives to auto manufacturers and retailers). These costs will increase as the company builds brand awareness through advertising and provides incentives to manufacturers and retailers. However, Sirius expects subsidizing costs of radios to decrease with economies of scale.

General and Administrative expenses: These include rent and occupancy, overhead, and G&A personnel costs. This cost should stabilize in the future and is quite fixed.

Research and development: These costs are related to the development of chip sets to be used in Sirius radios. It also includes expenses regarding agreements with radio manufacturers. The level of expenses will vary according to different versions of chip sets and radios that come out. This year expenses decreased because the new versions of chip sets and radio were ready to go.

Depreciation expense: Depreciation regarding the satellite that was put in place in 2002. It should be stable.

Non-cash stock compensation: Refers mainly to the re-pricing of some employee stock compensation.

XM Revenues and Costs:

	Years Ended December 31,		
	2002	2001	2000
	(In thousands, except subscriber and share amounts)		
Consolidated Statements of Operations Data:			
Revenue:			
Subscriber revenue	$ 17,585	$ 246	$
Net ad sales revenue	2,333	251	
Royalties & other	263	36	
Total revenue	20,181	533	
Operating expenses:			
Cost of revenue (excludes depreciation & amortization, shown below):			
Revenue share & royalties	12,954	687	
Customer care & billing	15,627	5,720	699
Satellite & terrestrial	44,818	62,641	8,104
Broadcast & operations	19,851	21,041	19,570
Programming & content	25,379	17,649	4,025
Cost of revenue	118,629	107,738	32,398
Research & development (excludes depreciation & amortization, shown below)	10,843	13,689	11,948
General & administrative (excludes depreciation & amortization, shown below)	26,448	21,168	17,312
Marketing & ad sales (excludes depreciation & amortization, shown below)	172,992	96,884	14,248
Impairment of goodwill	11,461		
Depreciation & amortization	118,588	42,660	3,573
Total operating expenses	458,961	282,139	79,479
Operating Loss	(438,780)	(281,606)	(79,479)

Cost of equipment: Costs related to radios sold and promoted to customers. This will increase with the number of subscribers.

Revenue share & Royalties: Payments to radio technology providers, revenue share payments to content providers, and performance rights. The revenue share costs could increase over time, but as discussed above there is the potential for content provider royalties to decrease.

Customer Care & Billing: These costs will increase as the number of subscribers climbs, however at a diminishing rate. Although these are the most variable of all costs, it is possible that through technology and process efficiency these costs could become less variable.

Satellite and Terrestrial: All costs related to the two satellites including maintenance, control, insurance, etc. These costs are expected to be stable barring any unforeseen accidents.

Broadcast: Costs associated with the management and maintenance of systems, software, hardware, production and performance studios used in the creation and distribution of XM–original and third party content. These costs are expected to stabilize, but could go up in the future if XM or SIRIUS increase the number of channels they offer to their customers.

Operations: Facilities and information technology expenses. These costs are expected to be stable.

Programming and content: Includes creative and production costs related to XM's 101 channels. These include payment to programming staff and fixed payments to third party staff. These costs will be stable next year, but should increase as additional channels are added.

Research and development: Costs of new product development, chip set design, and engineering. These costs will increase next year due to the development of telematics applications and new products. This will vary with the speed of product launch.

General and Administrative: These costs are expected to be stable in 2003 and increase slightly in the future.

Marketing and Ad sales: Includes costs of Retention & Support (personnel for the corporate website), Subsidies & Distribution, Advertising & Marketing, and the amortization of a liability to GM. These expenses increase dramatically and are expected to grow with revenue.

Depreciation and Amortization: Depreciation will be much higher in 2003 due to the reduction of useful lives of satellites. It is expected that there after these costs will be stable once XM and SIRI reach their standard level of satellites.

Competition:

As an industry, satellite radio competes on two fronts: at home and in automobiles. As we mentioned above, at home satellite radio competes with TV, DVDs, video games, traditional radio, Internet, MP3s, and home stereos, and we do not believe it will succeed on this front.

On the automotive front satellite radio competes with traditional radio, as well as Tape/CD/MP3 players. Much of this write up has been spent discussing the differentiation between satellite and traditional radio. Ultimately the success of this product will come down to one question: Will the average consumer be willing to pay for the additional benefits (broader content, no commercials, etc.) that satellite radio offers over traditional radio? As far as Tape/CD/MP3 players go, traditional radio has competed successfully with this medium for decades, and we have no reason to think that will change for this new form of radio.

Another potential competitive threat is piracy. The satellite TV industry has been very successful in dealing with this threat over the years, and we have no reason to think it will be any different for this industry. In fact, satellite radio should be able to capitalize on the new technologies and methods that have come out of the satellite TV industry, making piracy even less of an issue.

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