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Iridium Global Satellite Phone System: Lost in Space?

Early in 1999, Dr. Ed Staiano, the hard-charging chief executive officer of Iridium LLC, prepared for a meeting with officials from Motorola, his previous employer. Motorola had spun off Iridium but was still its largest investor with an 18 percent stake. Iridium's \$5 billion global satellite phone system had made its debut in November 1998, with the goal of giving users "freedom to communicate anywhere, anytime." Staiano had been highly successful in leading the Motorola General Systems Sector to record growth levels, and now stood to make a small fortune on his 1,500,000 Iridium stock options and 387,400 Iridium shares, should the company thrive.¹

However, Iridium was having difficulty signing up customers. It had promised creditors that it would have 52,000 subscribers by mid-1999, and missing this target would cause the company to default on its loans. Staiano, an engineer by training, stuffed one of the brick-sized phones, along with its array of ungainly accessories and adapters, into his briefcase and headed to the meeting with Motorola. (An Iridium phone user needed to carry a bag full of attachments whose purpose was not always readily apparent.)

The meeting got testy in a hurry, as Staiano flung open his briefcase, scattering the phone and gadgets across a table, and yelled, "You really expect business travelers to carry all this @&*#¢?!"²

The Iridium Vision and Fit to the Motorola Culture

The idea for Iridium came about in 1985 when Karen Bertiger was unable to place a cellular phone call to the United States while vacationing in the Caribbean. She wondered whether her husband's company, Motorola, which was known for its technology leadership, could find a solution to such problems. Back home, Karen convinced her husband, Bary, of the need for a mobile wireless system that would allow people to place calls from any location in the world. Bary and his fellow Motorola engineers embraced the idea and envisioned a constellation of low-orbiting satellites encircling the globe. The new system would provide consumers with a single telecommunications system and a single wireless standard, allowing them to place and receive calls "at the ends of the earth." At the time, cellular service was spotty and globe-trotting travelers

¹ Iridium 10K Report, December 31, 1998.

² Leslie Cauley, "Losses in Space—Iridium's Downfall: The Marketing Took a Back Seat to Science," *Wall Street Journal*, August 18, 1999.

could not use their wireless phones when they traveled abroad. A potentially strong benefit of Iridium was that global travelers would no longer have to worry about whether their telephones were analog or digital, whether they had GSM (global system for mobile communications) technology, or if they could interface with foreign service providers.

Motorola, a company steeped in technology, has been described as a company with an engineering-driven culture. Founded in 1928 by Paul Galvin as Galvin Manufacturing Corporation, Motorola began by producing the first car radios. By 1947 the Motorola brand name was so widely recognized that the company changed its name to Motorola. (The company name was derived from a combination of motor and Victrola, an early radio company.) The son of the founder, Robert Galvin, transformed Motorola into a global powerhouse by the 1980s. For more than seventy-five years, Motorola had been a global leader in wireless, broadband, and automotive communications technologies and embedded electronic products.

When the idea for a global satellite phone system was proposed to Motorola top management, chairman Robert Galvin was intrigued. He viewed Iridium as a potential symbol of Motorola's technological prowess. Galvin was proud of the never-say-die engineering mentality at Motorola. He enjoyed pointing to the first car radio on display in the Motorola Museum at corporate headquarters and telling guests, "People said my father's invention would never work. They were wrong, of course."³ The belief that innovative technology would attract enough customers for the company to thrive was deeply ingrained in Motorola's culture.

Motorola had indeed created markets through the pursuit of innovative technology in the past. The first affordable car radio put the company on the map in the 1930s. The 1940s saw the development of the first handheld two-way radio, widely used by the U.S. Army in World War II. Motorola manufactured the first portable television sets in the 1950s. In 1969, Neil Armstrong's first words from the moon were sent to earth by a Motorola transponder. Motorola enjoyed success with microprocessors and cellular phones in the 1970s and 1980s.

This history of technological success and an almost blind faith in technology made Galvin a strong supporter of the Iridium project and he gave it the green light. Research and development began in 1987, launching an eleven-year program to make the vision a reality.

The Technology Behind Iridium

The Iridium network, with sixty-six satellites orbiting the earth, was soon recognized as a technological, logistical, and regulatory success. Motorola CEO Christopher Galvin, Robert's son, called the globe-girdling system the "eighth wonder of the world."⁴ Motorola engineers overcame NASA-level technical problems, as well as global politics and international regulatory challenges on all seven continents, to turn the satellite phone system into an engineering marvel. The satellites were a bold technological gamble, and were all launched and deployed within twelve months, creating a wireless communications network that spanned the globe.

The satellites received telephone signals from anywhere in the world and routed them to their destinations, bouncing calls off one another and to ground relay stations. Each satellite covered a

³ Ibid.

⁴ Roger O. Crockett, "Motorola: Can Chris Galvin Save His Family's Legacy?" *BusinessWeek*, July 16, 2001, 77.

portion of the earth and could pick up and transmit a signal for twenty minutes before vanishing over the horizon; the signal would then be picked up by the next satellite. Ground station “gateways” allowed the Iridium satellite constellation to interface with existing terrestrial telephone systems around the world. Thus, the Iridium phone could work as a typical cellular phone as well as a satellite phone. Iridium sold both phones and pagers, and the system was designed primarily for voice communications, although it could also handle low-transmission-rate data communications.

The Iridium system was announced to the world in 1990 at simultaneous press conferences in Beijing, London, Melbourne, and New York City. On June 14, 1991, Motorola spun Iridium off into a separate company to develop and deploy the satellite network. That same year the United States government reserved radio frequencies for the Iridium low-orbit satellites.

In 1992 Iridium signed a \$3.37 billion contract with Motorola for system development, construction, and delivery, making Motorola the primary contractor supplying satellites, gateways, and communications products. In 1993 Iridium completed the first round of equity financing, securing \$800 million. The following year it raised another \$800 million, bringing the total capital raised to \$1.6 billion. Investors included subcontractors of the Iridium project, such as Lockheed and Raytheon in the United States, and Sony and Mitsubishi in Japan.

On January 31, 1995, the U.S. Federal Communications Commission granted an operational license for the Iridium system. Additional authorizations and operating permits were required in all countries in which the Iridium service was offered. Eleven ground station gateway contracts were signed in 1995 with investor organizations around the globe. Iridium management then put a firm stake in the ground, setting 1998 as the target year for commercial activation.

The first Iridium satellite was completed and delivered by Motorola in 1996. Motorola had a contract with Iridium for \$3.37 billion to design and produce the initial constellation of sixty-six satellites plus six spares, as well as to design and construct the ground station gateways. It signed a second contract with Iridium for \$2.9 billion to operate and maintain the satellite system over a ten-year period. At the same time, Motorola was the largest investor in Iridium, with a 24 percent equity ownership stake.

Also in 1996, the first ground station gateway was inaugurated in Japan. That year, Dr. Staiano moved from Motorola to become vice chairman and CEO of Iridium. Satellite deployment began in 1997, when forty-seven satellites were successfully launched into orbit hundreds of miles above the earth’s surface. The initial public offering of Iridium stock raised an additional \$240 million and Iridium World Communications Ltd. (NASDAQ:IRID) was established. Debt financing raised another \$800 million, representing full funding through the beginning of commercial operations. Iridium board members in 1997 received the first Iridium pager message delivered by the orbiting satellites.

In early 1998 Iridium completed the constellation of the sixty-six satellites with 100 percent launch success. Each low-earth-orbit satellite had an altitude of 400–450 miles, and traveled at a speed of 17,000 miles per hour. The advantage of low-earth-orbit satellites was that they did not have the time delay problem of older, geostationary satellites, which had an altitude of 22,000 miles. Low-earth-orbit satellites were also much less expensive to produce and launch than the older satellites. A major disadvantage of the low-earth-orbit satellites, however, was their short lifespan, ranging from five to eight years, compared to fifteen years for geostationary satellites.

The computer software development for the Iridium system was one of the largest and most complex projects ever, involving hundreds of programmers writing more than fifteen million lines of code. The system was designed to provide signal strength for voice communication that averaged approximately 16dB with an unobstructed path to the satellite, with a transmission rate of 2.4 kilobits per second. Interchangeable cellular cassettes could be used with the Iridium handset as the traveler arrived in a country with a different cellular system.

The majority of Iridium's costs were incurred during the final years of the eleven-year project (1996–1999), as satellites were built and launched.

After extensive testing, the Iridium system was deemed ready for commercial launch on November 1, 1998, and Iridium executives looked forward to capturing the first-mover advantages in the global communications market.

The Business Proposition

In its registration statement with the Securities and Exchange Commission (SEC), filed on November 13, 1998, Iridium described the system as follows:

Iridium's communication system is designed to enable its customers to send and receive telephone calls virtually anywhere in the world—all with one phone, one phone number, and one customer bill. Iridium's system combines the convenience of traditional cellular phones with the global reach of Iridium's low-earth-orbit satellite constellation. Traditional cellular service is limited by the physical location of cellular service towers. Iridium, on the other hand, through the combination of satellite and cellular services, expects to provide service virtually anywhere in the world. This is because Iridium's satellites will act as "towers in the sky," providing satellite coverage in many areas where traditional cellular service is unavailable.

The Iridium system was designed to provide convenient, handheld voice communication and paging to 90 percent of the earth's surface (including oceans). The uncovered 10 percent of the earth was mostly countries where Iridium was unable to obtain system authorization. Building and launching sixty-six satellites involved a huge development investment of almost \$5 billion, and Iridium knew that it would have to charge premium prices to be a viable business. Iridium hoped to have 500,000 customers by the end of 1999. Eventually, it would need one million customers, each spending \$1,000 per year, to cover its \$1 billion annual operational expenses.

Iridium hoped that it could identify and capture this number of customers from travelers who urgently needed to stay in touch when they ventured out of the relatively small portion of the globe where cellular service existed in the early 1990s. In its 1997 bank line of credit for \$800 million, Iridium agreed to a covenant that required it to have at least 52,000 total subscribers by the end of March 1999 or risk defaulting on the debt.

A key service limitation identified by Iridium in the same SEC filing of November 13, 1998, was the lack of phone service availability in places where obstructions such as buildings and other natural and man-made obstacles were positioned between a satellite and the user. These adverse effects on satellite calls would increase as the obstacles became larger and more closely spaced. For this reason, the system would not function well in urban areas, inside buildings constructed with steel, and inside moving automobiles.

Another key issue involved the value provided to customers relative to the cost of obtaining the global “in-touch” benefit. Was the Iridium cost structure too high to offer competitive prices attractive to a sufficient number of customers?

The Product and Service

In 1997 Iridium signed a contract with Japanese manufacturer Kyocera to develop the initial wireless phone handsets for the system. Kyocera was one of the world’s leading producers of wireless phones and other telecommunications equipment. Weighing in fully loaded at about a pound (500 g) and the size of a small brick (seven inches long), the phone required special training to use and came accompanied by a bag of attachments whose functions were difficult to understand. The user manual for the Iridium phone was more than two hundred pages long.

Some critics felt that the never-say-die engineering spirit of Iridium and its largest investor led to disconnects between the engineers and market realities. A Bell Telephone Company executive, whose company declined to invest in Iridium, recalled sitting through a Motorola Iridium presentation in the early 1990s and being startled by one slide. It said that user “dexterity” was important in using the service.⁵ In other words, customers had to position themselves so that nothing blocked the path between the phone’s large antenna and the orbiting satellites. Otherwise, it would not work.

The Iridium phones and service would be marketed by the ground station gateway partners in their respective countries, mostly through existing cellular suppliers’ networks of distributors and dealers. Thus, Iridium delegated much of the global tactical marketing work to its global partners. These gateway partners were also initially responsible for arranging the necessary regulatory approvals for the use of the Iridium service in their territories, as well as for local marketing and advertising activities. The sole role of Iridium Ltd. would be to provide high-quality satellite capacity to its twelve ground station gateway partners.

Pricing

Iridium phones were launched at a suggested retail price of approximately \$3,000. Many competitive smaller cell phones were priced near \$100 at the time. In some competitive markets, phones were given away free to attract customers.

Global Iridium service charges ranged from \$4 to \$9 a minute. Charges for many competitive wireless calls, though not global, were as low as ten cents a minute.

Trade-Offs

Iridium had a unique selling proposition that no one else could deliver at the time: a system that would enable subscribers to send and receive telephone calls virtually anywhere in the

⁵ Cauley, “Losses in Space.”

world—all with one phone, one phone number, and one customer bill. But would there be enough customer prospects willing to make the trade-offs involved in becoming a subscriber?

Cell phones and rate plans were available at a fraction of the Iridium prices. The Iridium phone, conceived in the late 1980s when mobile phones were cumbersome and expensive, was three to four times larger and heavier than newer cell phones. Training on the use of the Iridium phone and its many attachments was required to understand how to operate the system. Lastly, call clarity and service reliability were poor in the early stages of the Iridium launch.

Targeting, Positioning, and Advertising

International business travelers were the target segment Iridium decided to pursue. This target segment was large, estimated at eight million customers, and judged to have a strong need to keep in touch when traveling to remote areas where cellular phone service was not available. “No place on earth can bring relaxation unless you know there’s peace at the office” was the headline of the Iridium ad that appeared in *Fortune* in August 1998. The ad pictured a remote mountain scene and continued: “Introducing the world’s first handheld global satellite phone and paging network. Now your wireless service can cover the earth.” The tagline on the ad was simply “Calling Planet Earth.”

One television advertisement showed a man in a heavy parka pulling a sled across what looked to be Antarctica. As he huffed and puffed his way across the barren landscape, a telephone suddenly began ringing. He quickly searched inside his parka, retrieved his Iridium phone, and engaged in a conversation.⁶ Naturally, no large buildings were nearby to interfere with the satellite signal.

The advertising campaign was developed by Interpublic Group’s Ammirati Puris Lintas and was targeted at a broad audience of international business travelers. The advertising budget of \$145 million produced one of the biggest global advertising blitzes ever for a consumer product, with ads on television and radio and in print in forty-five countries. Ads were placed in leading business publications, such as the *Wall Street Journal* and *Fortune*, and in airline magazines around the world. Direct mail was translated into thirteen languages, and television ads ran on seventeen airlines. At airports, Iridium set up booths in executive lounges so travelers could test the telephones.

The advertising campaign was a huge success, generating high awareness and interest in the product. It produced over 1.5 million inquiries about the product in three months, indicating that the public interest for a use-anywhere phone had been ignited. The excitement at Iridium’s Washington, D.C., headquarters was high. This high initial interest in the concept was undoubtedly an important factor in Iridium’s committing to its creditors to have 52,000 subscribers by the end of March 1999.

⁶ Eric Olson, Stanley Slater, and Andrew Scaplewski, “The Iridium Story: A Marketing Disconnect?” *Marketing Management*, Summer 2000.

Distribution

Iridium decided to distribute its phone service through two hundred regional service partners who were responsible for marketing Iridium's phones and service in their areas of the world. These service partners covered 138 countries and territories across the world, and were mostly existing cellular operators. They invested in Iridium and were selected by the twelve gateway ground station partners. Only the gateway partners, however, shared in the revenue generated by the Iridium calls in their countries.

Unfortunately, many of these regional service partners had minimal background in the marketing of high-technology telephone equipment. In Venezuela, for example, the Iridium partner's chief business was dairy goods. In countries like China and Russia, where professional marketing and sales managers were in short supply, the critical selling and promotion tasks were simply too important to be left to government officials.⁷

As the launch date neared in 1998, many Iridium insiders became concerned about the lackluster performance of their far-flung marketing partners. These service partners failed to build sales teams, create marketing plans, or set up distribution channels for their individual countries. Iridium felt that market education was critical for this new and different product and service, and that its partners lacked educated, trained, and motivated point-of-purchase sales personnel. Further, the mechanisms for promptly responding to a customer inquiry with follow-up calls or visits were never established by many service partners.

Gateway and service partners had their concerns about Iridium as well. As the launch date neared, they needed to demonstrate how the phone system worked. However, phone supply problems caused by software problems meant that only a limited number of phones were available to demonstrate at retail outlets. Thus, prospective customers were unable to try the product prior to purchase. Thorny technical problems plagued the early phones: dropped calls were common, completion rates were dismal, and other network functions were unreliable. The partners complained that the Iridium coverage was advertised as global, but in fact excluded many countries in Europe and Asia, including Poland, Hungary, and North Korea, that elected to deny Iridium an operating permit.

By its target launch date of November 1, 1998, Iridium had solved many of these technical problems, but distribution issues remained. Phones were still in short supply, and distributors, unable to test the system themselves, were reluctant to sell the phones to important customers. Many of the 1.5 million customer inquiries generated by the ad campaign that were forwarded to gateway partners went unanswered because many of them had no established marketing channels and precious few salespeople. The numerous hot sales leads generated by the advertising campaign soon went cold.

Customer Response at Launch

In the eleven years since the conception of Iridium, the mobile phone market had changed radically. Handsets had become smaller, sleeker, and cheaper, and call rates had tumbled. The build-out of land-based telephone networks had proceeded at a much faster rate than expected.

⁷ Ibid.

Europe had launched a cellular standard called GSM (global system for mobile communications) that enabled international roaming with cell phones. GSM phones operated in more than one hundred countries for pennies a minute. The number of GSM subscribers had increased from 1.3 million in 1994 to 150 million in 1999 (see **Exhibit 1**), a rapid adoption that took Motorola by surprise.⁸ Areas not served by mobile phones had disappeared faster than forecasted.

Iridium launched its service into this changed market on November 1, 1998, hoping to attract a good portion of its target market: the eight million business executives who frequently traveled internationally. However, customer response to the system was weak. High expectations from the strong response to the advertising campaign quickly dropped as subscriber acceptance lagged well behind targets. The minimum target of 52,000 subscribers by March 31, 1999, that had been called for in Iridium's line of credit was missed badly; only 10,294 subscribers were signed up worldwide five months after launch⁹ (see **Exhibit 2**). This was just 10 percent of the company's prediction of 100,000 subscribers. Further, Iridium had badly overestimated how often subscribers would use their Iridium phones. Four months after launch, the average subscriber was generating \$89 in annualized revenue, well below the \$1,000 Iridium had hoped for (see **Exhibit 3**).

Iridium believed that its slower than expected subscriber ramp-up was due to problems with the initial distribution of subscriber equipment, a shortage of fully trained service providers and sales personnel, and a lack of effective marketing and distribution by Iridium, its gateways, and its service providers. Kyocera had experienced software development problems and was not achieving Iridium's quality standards; it was unable to ship significant quantities of phones in the first four months after launch. Users complained about complex calling plans with rates up to \$9.00 per minute, as well as big, clunky phones (see **Exhibit 4**) that were in short supply and confusing to operate. Some Iridium service providers accused Iridium of producing the wrong product at the wrong price.

Initial technical problems made it hard to satisfy early adopters of the Iridium service. Dropped calls and poor connections were common problems. A graduate student told of being on a three-day seminar on a cruise ship off the coast of California. Equipped with a rented Iridium phone, the student felt confident she would be among the few at the seminar who would be able to communicate with colleagues in the United States. However, fog at sea made it impossible for her to use her phone at all during the seminar.

David Greising, a reporter for the *Chicago Tribune*, paid a visit to Iridium headquarters in Washington, D.C., and found that the phone was unreliable indoors as well. He asked for a demonstration of the Iridium phone and was taken to the roof of the building. The Iridium marketing manager tried to connect a call to the system from the roof, but was unsuccessful until the eighth try.¹⁰ Designing a satellite system with sufficient signal strength to penetrate buildings would have increased the Iridium market by a factor of ten.¹¹

Although Iridium was proud to be the pioneer in the satellite telephony market, three competitors waited in the wings. Globalstar, ICO Global Communications, and Ellipso hoped to enter the market shortly after Iridium. These innovative "fast followers" hoped to learn from

⁸ Andrew Inkpen, "The Rise and Fall of Iridium," Case #A07-00-0025 (Thunderbird School of International Management, 2001).

⁹ Iridium Annual Report, March 31, 1999.

¹⁰ David Greising, "Faith Wasn't Enough to Keep Iridium Afloat," *Chicago Tribune*, March 22, 2000.

¹¹ Inkpen, "The Rise and Fall of Iridium."

Iridium's experience, and used more powerful second-generation technology. Both Globalstar and ICO declared third world villages to be among their key targets. Another company, Teledesic, which was backed by Craig McCaw and Bill Gates, was attempting to develop a \$9 billion satellite-based "Internet in the sky."¹² Many potential Iridium customers may have taken a wait-and-see approach as these new global telecommunication services launched their publicity campaigns.

Management and Marketing Mix Modifications

At the end of first quarter 1999, many Iridium partners remained optimistic that a market would materialize. However, they knew that building a loyal customer base would require far more time than they had originally thought—and had promised their banks. Staiano was under tremendous pressure after missing many critical deadlines, and began to cut Iridium's costs to the bone; for example, all vacation time was cancelled. Staiano also issued Motorola an ultimatum: cut its lucrative multibillion dollar service contract by half or he would resign.¹³

Motorola refused to cut further, but by then Staiano's fate was already sealed. At a cocktail party the night before Iridium's April board meeting, Staiano was informed that the board planned to dismiss him the next day. He sent the board a brief letter of resignation and failed to appear at the meeting for the final vote.¹⁴ John Richardson, CEO of Iridium Africa Corporation, was appointed interim CEO and vice chairman. One of his first acts as interim CEO was to oust the senior vice president of marketing, Mauro Sentinelli, perhaps signaling where a good deal of blame for the poor system performance belonged. Richardson summed up Iridium's problem as "the launch of the wrong product at the wrong time."¹⁵ Iridium spokeswoman Michelle Lyle added: "We still think there is a market for the service; we just didn't do it right."¹⁶

Motorola, with billions of dollars sunk in the Iridium venture, remained supportive. CEO Chris Galvin believed in the business model and hoped Iridium would find a way through this venture. His father, Robert, now retired from Motorola, also remained a believer: "We just congenitally did and do believe in this market."¹⁷

Richardson dismissed 15 percent of Iridium's staff of 550 in early June, including most of the top marketing staff. A new management team was put in place, one that said it would concentrate more on what customers really needed, rather than on the technological challenge of establishing the system. Many of the new marketing executives had worked at the gateways. A more focused strategy was announced in June to zero in on more narrowly defined markets, such as the military and governments, utilities, the oil industry, mining companies, pipeline inspectors, and disaster relief organizations. The total number of potential users was about one million, according to Iridium. Another target segment was the five million yacht owners worldwide. Richardson said Iridium had not given up on the broader market, but would wait until the company had a smaller

¹² Scott Thurm and Jeff Cole, "Telecommunications: The Business—Head in the Clouds?" *Wall Street Journal*, September 20, 1999.

¹³ Cauley, "Losses in Space."

¹⁴ Ibid.

¹⁵ Christopher Price, "\$5 Billion Venture Was Wrong Product at Wrong Time," *Financial Times*, October 8, 1999, 39.

¹⁶ Quentin Hardy, "Iridium, in Bid to Bolster Ailing Service, Cuts Staff and Prices, Shifts Marketing," *Wall Street Journal*, June 14, 1999.

¹⁷ Cauley, "Losses in Space."

phone that was more effective around buildings. The new marketing chief, Sue Kennedy, said, "We've got these magnificent satellites in the sky; now we need to understand how to provide the right solutions to customers."¹⁸

Motorola was asked to develop a sleeker, smaller phone than the Kyocera version.

Iridium cut prices on both its phone and rates by as much as 65 percent, and introduced a simplified rate structure. Under the new pricing structure, international calls would cost about \$3 a minute, calls within Europe or within a single country would cost about \$2 a minute, and calls between Iridium users would be \$1.50 a minute. The Iridium phone could be purchased for \$1,500. One Wall Street analyst felt that Iridium still did not understand how serious its problem was, however, and argued the company should consider giving away the phones. "They need users, they need good buzz," said Thomas Watts of Merrill Lynch. "We still haven't seen if there is a market for this."¹⁹

The advertising budget was cut drastically and the advertising agency fired. The \$145 million spent on advertising in 1998 shrunk to \$12 million in 1999. Ammirati Puris Lintas, whose initial advertising campaign had generated 1.5 million product inquiries, was a victim of the general housecleaning.

Some good news arrived in May 1999 when the U.S. government awarded Iridium a \$72 million contract to provide global phone service to selected government agencies, such as the Pentagon. Iridium provided a unique benefit to this market segment, freeing the military from dependence on overseas authorities for telephone connectivity. Iridium was the only company that offered encrypted wireless service worldwide, allowing Defense Department officials to discuss classified information anywhere in the world. The interest was so high that the Pentagon built its own ground station.

However, Wall Street had lost faith in Iridium. The company had lost \$1.25 billion in 1998 and analysts forecasted a similar loss in 1999. The stock price, which had reached a high of \$72 per share in June 1998, dropped to \$6 per share in June 1999. Iridium bonds traded at 19 cents on the dollar. The worries on Wall Street were partly due to ongoing talks between Iridium and its creditors, attempting to restructure its \$800 million line of credit before the June 30 deadline.

Paul Krugman of M.I.T. felt that satellite phone systems were an idea whose time had passed. Because population and economic activity were increasingly concentrated in dense metropolitan areas easily served by terrestrial cell phones, the market for a go-anywhere phone system was small. Krugman pointed out in *Fortune* that one of Iridium's big new target market segments, workers on offshore oil rigs, had only a couple of hundred crews worldwide.²⁰

In its financial filings, Iridium said it was experiencing substantial difficulties transitioning from a development stage company to an operating company. Iridium said it would be necessary to revise its business plan to increase subscriber demand and reduce its relatively high current fixed costs.²¹ It believed its strategy for marketing and distribution, including its method for implementing its business strategy with its gateways and service providers, needed to be revised.

¹⁸ William J. Holstein, "Will Satellite Phones Ever Catch On?" *U.S. News & World Report* 126, no. 24 (June 21, 1999).

¹⁹ Hardy, "Iridium, in Bid to Bolster Ailing Service, Cuts Staff and Prices."

²⁰ Paul Krugman, "When Did the Future Get So Boring?" *Fortune*, September 27, 1999, 46.

²¹ Iridium Annual Report, March 31, 1999.

Its efforts to date had attracted only 15,000 customers worldwide. In short, Iridium needed to start over with its creditors breathing down its neck.

Bankruptcy

In a two-paragraph statement released on August 11, 1999, Iridium announced “an event of default ha[d] occurred,” under bank terms related to its \$800 million line of credit. The company had failed to reach a new resolution with its patient creditors to again extend terms of the loan. Two days later, Iridium filed for bankruptcy under Chapter 11 in a Delaware court. Iridium stock dropped to \$3.06 a share Friday before the NASDAQ stock market halted trading. “Vulture” bond investors began accumulating Iridium debt in August at 19 percent of its initial value, hoping that Motorola would resuscitate the company and give them an ownership slice in the company.

In October 1999 Motorola took a pretax charge against third quarter earnings of \$994 million as a result of the Iridium bankruptcy. In total, Motorola wrote off \$2.6 billion on Iridium.

In a letter published in the *Wall Street Journal* in September 1999, Richardson remained hopeful that Iridium would survive. He wrote, “Iridium will succeed by becoming an essential telecom solution for people who need to communicate from the world’s remote areas: ranchers, foresters, miners, pipeline workers, boaters, commercial fisherman, and, yes, business executives who regularly travel to developing regions. Notwithstanding our initial missteps in marketing our service, we believe that there are more than enough of them around the world to make Iridium a success.”²²

He believed this, but how well did he know it?

The Next Chapter

Despite numerous attempts to find a buyer for the satellite system in late 1999 and early 2000, Iridium told a bankruptcy court on Friday, March 17, 2000, that no buyer could be found. Billionaire investor Craig McCaw had shown interest in the Iridium system, but after months of probing Iridium’s technology and finances, he determined there were no synergies between Iridium and his Teledesic “Internet in the sky” project. McCaw planned to focus on moving computer traffic, rather than telephone calls, through space.

Castle Harlan, a New York investment bank, had planned to buy Iridium’s assets for \$50 million, but in a press release announcing that the deal would not make financial sense, it stated, “Our due diligence and marketing studies were unable to confirm Iridium would generate even low levels of revenue with a high degree of certainty.”²³

Finally, on November 15, 2000, a U.S. bankruptcy court judge approved the sale of the Iridium satellite system for \$25 million, about a half cent on the dollar, to a group led by former airline executive Dan Colussy. Operational control was handed over from Motorola to Boeing

²² John Richardson, “Non-Terrestrial Way to Phone Home,” Letters to the Editor, *Wall Street Journal*, September 2, 1999.

²³ Rob Kaiser, “Bank Firm Decides Not to Buy Iridium,” *Chicago Tribune*, July 29, 2000.

Company, which operated other satellite systems. The new company, called Iridium Satellite LLC, planned to relaunch affordable satellite communication services in March 2001. Colussy, a former Iridium user, said that the new Iridium's operating costs were just one-tenth those of its predecessor and the company could break even with as few as 40,000 commercial customers in addition to its Defense Department business.²⁴ "We're going to be a niche player," he said. "We don't have to be huge. We don't have to be a company like Iridium planned to be with one million customers."²⁵ The two-year contract with the Defense Department, which called for the provision of unlimited service to 20,000 government employees for \$72 million, provided an excellent stepping stone to survival for the new Iridium Satellite LLC.

Exhibit 5 provides a summary of Iridium milestones by year.

²⁴ Barnaby Feder, "Iridium Satellite System Is About to Be Revived," *New York Times* on the Web, March 28, 2001.

²⁵ Corey Grice, "Iridium Owners Optimistic About New Satellite Focus," CNET News.com, December 12, 2000.

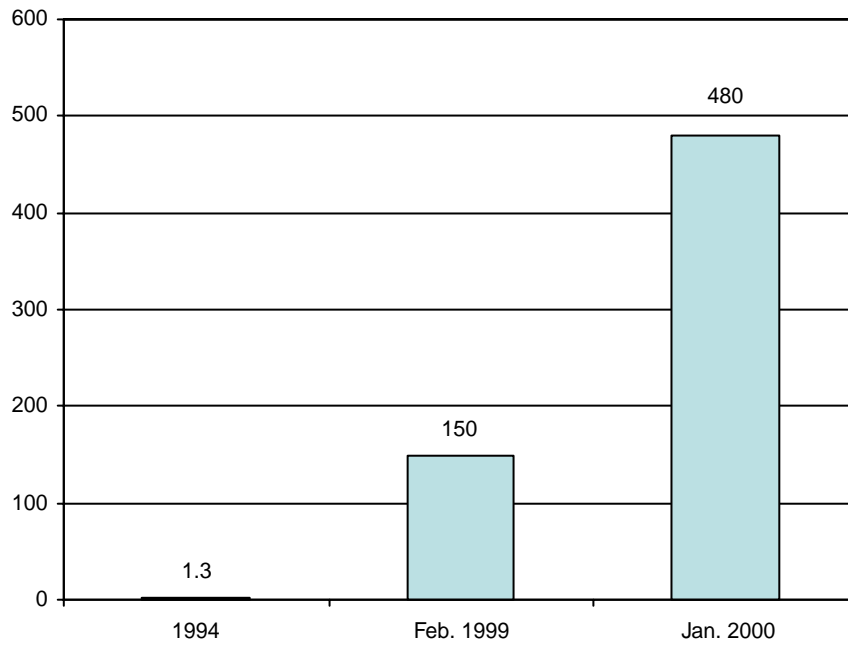
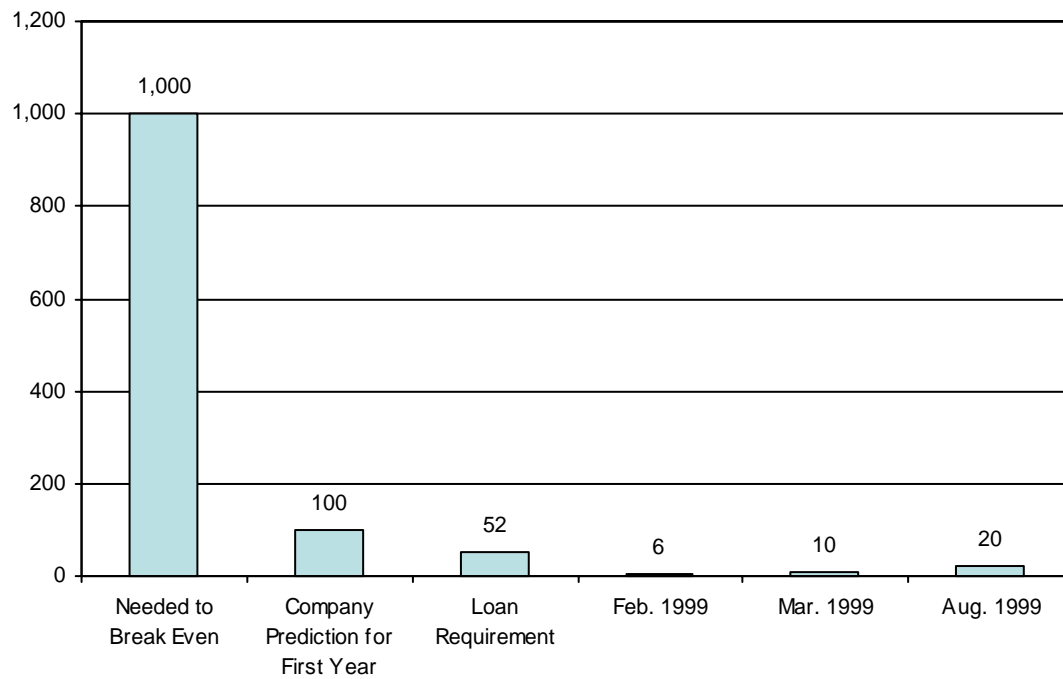
Exhibit 1: GSM Subscriber History (in millions)**Exhibit 2: Iridium Subscriber History (in thousands)**

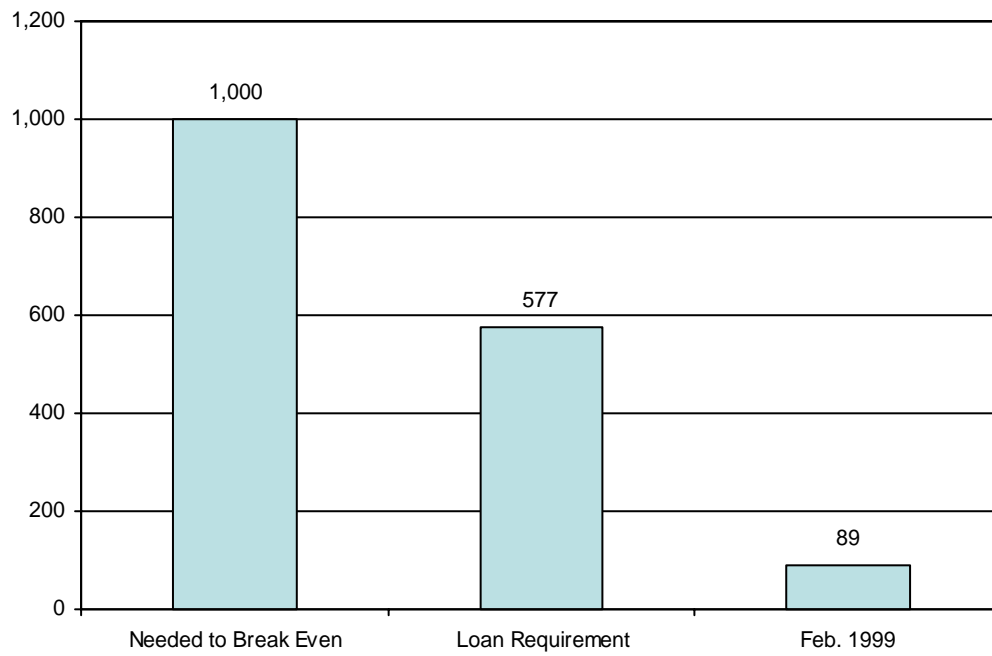
Exhibit 3: Iridium Service Revenue Per Subscriber (\$ in thousands)

Exhibit 4: Iridium Satellite Telephone



Exhibit 5: Iridium Annual Milestones

1985

- Karen Bertiger conceives of Iridium while vacationing in the Caribbean
- Initial patents awarded

1987

- Motorola executives give the green light to Iridium idea
- Research and development begins

1988

- Iridium gateway concept is developed; satellites will operate in cooperation with ground station gateways, allowing them to connect to existing telephone systems

1990

- Iridium is formally announced to the world

1991

- Iridium splits from Motorola and is incorporated

1992

- Iridium signs major contract with Motorola for system development, construction, and delivery

1993

- First round of equity financing secures \$800 million

1994

- Second round of equity financing secures another \$800 million

1995

- United States Federal Communication Commission grants operational license
- Contracts for ground station gateways are signed with eleven investor organizations

1996

- First Iridium satellite completed and delivered by Motorola
- Motorola executive Dr. Edward Staiano appointed Iridium CEO

1997

- First forty-seven satellites launched into orbit
- Kyocera agrees to develop wireless phones for the Iridium system
- Initial public offering of Iridium stock for \$20 per share raises \$240 million, and Iridium World Communications Ltd. is established

1998

- Constellation of sixty-six satellites completed with 100 percent launch success
- Advertising blitz with \$145 million budget begins
- System deemed ready for commercialization and goes live in November
- Iridium losses total \$1.25 billion for the year

1999

- Subscribers total only 10,294 on March 31, missing target of 52,000
- CEO Staiano resigns abruptly in April
- John Richardson appointed interim CEO
- Iridium staffing slashed by 15 percent, Iridium pricing slashed by up to 65 percent
- Defense Department awards Iridium \$72 million contract in May
- Iridium defaults on bank loans and declares bankruptcy in August

2000

- Satellite system sold for \$25 million