

A

Business Plan

for a

Wireless Communications Products

Operation

1. Executive Summary

This Ball Wireless Communications business plan addresses market opportunities for multiple wireless communication systems and their associated demand for antenna products. The plan outlines the Wireless Communications major business strategies and details the requirements to continue Ball's growing business as a supplier to the wireless communication markets, on a global basis.

The going forward plan will be to leverage the new Ball Commercial Products & Technologies management team with the Wireless Communications management's experience to continue product development and grow market share within the North American and International mobile wireless, wireless local loop, and mobile satellite tracking and telemetry markets. The market for Ball Wireless Communications products is considered to be large and growing rapidly both domestically and globally. For example, global wireless base station deployments for mobile communications over the next 5 years is expected to grow in excess of a twenty five percent compounded annual rate. This would equate to a wireless market forecast of between 2.2 to 2.5 million base stations, each requiring a set of antenna products. Other wireless markets are coming on line and exhibit similar growth, and in many cases even larger opportunities.

It is intended that this Wireless Communications business plan act as a "yardstick" to anticipate the projected return on investment and serve as the operational document for the team executing it. This plan addresses the various wireless markets within North America and will be updated with the International market analysis by the end of the second quarter of FY'00.

The management team is confident that Ball Wireless Communications' extensive RF market and technology knowledge will enable Ball through the BATC Commercial Products & Technologies business unit to become a major supplier within the commercial worldwide telecommunications markets.

2. Company Description

Ball Wireless Communication Products

Ball Wireless Communication Products is a business operation within the Commercial Technologies and Products SBU of Ball Aerospace & Technologies Corp. Ball Aerospace & Technologies Corp. is a wholly owned subsidiary of Ball Corporation.

Company's Mission or Objectives

The Wireless Communication operation's mission is to become a premier supplier of high-performance antenna products. The market for these products is in wireless communications – the highest growth area of the global communications equipment market. Ball Wireless' products are predominantly sold in three major market segments: mobile telephony service, wireless local loop (WLL) customer located equipment (CLE) and the subtending cell sites, and the mobile satellite tracking and telemetry segment. The products are sold to carriers, service providers, and major equipment suppliers servicing each market segment. This marketplace is worldwide and will experience global shifting from country to country as infrastructure is built. The operation will attack the markets with specific strategies and tactics appropriate for each segment

The operation's overall commercial telecommunications business objectives are summarized as follows:

- Organize the operation with a culture consistent to the competitive commercial telecommunications market
- Establish R&D capabilities with very short product development cycle times
- Prepare for a global marketing strategy to be implemented in the second half of FY'00
- Leverage existing BATC technologies and Ball Packaging high volume manufacturing capabilities and knowledge

- Utilize Ball Corporation's size, reputation, and global presence as a competitive advantage
- Exceed customer expectations with reliable, quality products for the lowest total cost of ownership

The management team for this operation consists of a proven group of individuals with significant successful experience in BATC businesses as well as start-up and management of technology driven companies. Since this operation's inception in February 1997, this dedicated management team has:

- Developed and successfully is marketing and delivering its first antenna products for wireless services.
- Gained audiences and sold products to significant equipment providers and operators in the wireless market segments.
 - of extreme significance, been selected as the preferred supplier as delineated in a letter of understanding and agreement for one of the largest providers in the world.
- Developed a strong foundation for sales, marketing, engineering, and manufacturing of wireless antenna products for the market segments being served.

Company's Development Stage

The Wireless Communications business efforts have primarily been directed at the commercial telecommunications industry as originally planned. Initial product introductions have lead to sales and strategic relationships with large U. S. carriers such as AT&T, both for the Mobility and their Wireless Local Technologies groups, US WEST Wireless, Ericsson/Qualcomm, and others. The initial product launches were made in early 1998 with volume deliveries beginning in 1999.

From our product and market development efforts several significant accomplishments have been made relative to customer and market acceptance of Ball Wireless. The list of clients making early evaluation purchases has included most of the major carriers within the domestic market as well as significant equipment suppliers such as Lucent, AG Communication Systems, Repeater Technologies, etc. From the early pioneering Ball Wireless has captured industry leading clients ranging from AT&T Wireless, for both mobility and WLL markets, where we are included in the 5 largest antenna suppliers to US WEST Wireless where we have captured 80% of their antenna requirements. Other significant Wireless customers include the VAR channel requirements for the mobile satellite tracking and telemetry market of the Orbcomm LEO constellation.

During 2000 the Wireless Communications group will aggressively continue its attack on the domestic telecommunications antenna market and prepare for initial forays into the international markets in the later half of FY'00. Paramount to the sales strategies will be the refinement of market necessities as related to the development of products as well as: a) our own direct sales force; b) strategic OEM relationships with major carriers and/or equipment providers, and; c) use of Independent Sales Organizations, Distributors, and/or major Marketing Partners. While a) and b) are favorable channel development strategies to pursue for market penetration and acceptance, c) will be implemented on a case by case basis giving consideration to both business realities and geographical location. C is viewed as the most viable method of entering international markets, offering both lower costs and accelerated time to market factors.

Company Products or Services

Ball Wireless Communications products are for the telecommunications markets generally identified below. As indicated, the specific products we offer to these segments are antennas for wireless frequencies in the identified domestic telephony market. Additionally, in the specialized mobile tracking and telemetry market associated with the Orbcomm LEO constellation, we offer specific antenna solutions.

Market Segments:

Mobile Telephony Services (Base Station Antennas) – Mobile telephony services, particularly mobile voice service, has become a multi-billion dollar worldwide market. Operators are competing for pedestrians and vehicular based customers. For the purposes of this plan mobile service includes mobile-voice and data-plus paging or messaging services operating in cellular or PCS frequencies irrespective of the transport technology utilized. This segment of the infrastructure market is the main focus of the mobile base station antenna products. All references to base station sites in this market segment refers to those sites that link a mobile user to the wire-line-based public telephone network commonly referred to as the Public Switched Telephone Network (PSTN).

Wireless Local Loop – WLL, also identified as fixed wireless, is a new wireless network being deployed by some Inter Exchange Carrier (IXC) long distance providers as a means of provisioning local loop or residential services in competition with an LEC's (Local Exchange Carrier) twisted pair network wiring. This will enable those carriers to link businesses and homes offering local service via the PSTN through wireless means. Connections will be made through CLE like small base stations mounted on the sides of homes and business's which transmits and receives information from the WLL base stations, thereby bypassing the LEC. Alternatively, a LEC or CLEC (Competitive Local Exchange Carrier) could use their wireless infrastructure in combination with small antennas connected to CLE base station equipment, such as a wireless telephone system, as a alternative method of supporting local service. These networks will provide additional revenues to the LEC operator and enable them to differentiate themselves in the market. Generally, WLL markets have specific characteristics unique to each individual carrier's network plan. The RBOC's are also utilizing this new technology and mode of transportation as a more economical way of providing broadband services. The RF frequencies utilized include multiple spectrum areas from 700 MHz to 6 GHz.

Mobile Satellite Tracking and Telemetry – This market segment of wireless communications utilizes Low Earth Satellites (LEO's) as the infrastructure to transfer data from a ground asset through the satellite constellation to a Network Control Center where it is redistributed back through the LEO system to the asset. Most commonly implemented as a store and forward packet data type network, it is widely used within the transportation and utility asset marketplaces. Information from and about a mobile and/or fixed asset is transmitted through the system via a subscriber communicator automating the specific market application segment within this market, i.e. mobile transportation or fixed asset. Outside of the fixed utility market, electric meters, HVC systems, water metering, etc., the largest part of this segment is associated with the addressable tractor trailer industry.

Product Definitions:

To the domestic telecommunications market segments being served by the Wireless Communications, we offer a family of high performance products segmented into antenna technology platforms for serving RF base stations for mobile telephony services and custom application antennas for the WLL or mobile tracking and telemetry services. The various technologies chosen for each antenna family is based on the required specifications of the particular radiation pattern desired for the specific market segment application in combination with our development times and cost ratios

Our base station product families for the mobile telephony services market currently consist of:

- AirBASE™ - vertical polarized configurations
- eXsite™ - dual slant polarized configurations
- DualBASE™ - multiple frequency configurations
- OminBASE™ - omni directional configurations

Accommodating the need for in-building RF support we refined a previously designed cellular frequency band antenna as our initial offering designated as the **Parity™** family. While this prospective antenna family is currently limited it is a prospective growth area that will be further exploited as product development time and resources become available.

Our products for the WLL market currently consist of custom application antennas developed to specific specifications for AT&T Wireless Services, Inc. Wireless Local Technologies Group. The specific antenna offered is a dual slant polarized configuration based on our AirBASE™ technology.

Additionally, we have developed and delivered a cellular based WLL antenna for the Ericsson/Qualcomm cellular WLL system.

Products for the Mobile Satellite Tracking and Telemetry market have been developed for a specific LEO constellation launched and managed by a business unit of Orbital Sciences Corporation, known as Orbcomm Global Data & Messaging.

3. Industry Analysis

Size and Growth Trends

Mobile Telephony Services (Base Station Antennas):

Despite recent slow downs in many markets during the past years, worldwide telecommunications infrastructure sales are projected to remain strong over the next five years. Although this market may not be as robust as all would like, there is little that can impede the growth of the wireless telecommunications marketplace.

The wireless link has created a worldwide growth market for those capable of providing anytime/anywhere communications. Competition will be intense throughout the supply chain and risks will have to be managed attentively and prudently. The investments we are recommending need to be committed if we are to evolve from a domestic supplier to a global supplier. Options such as licensing to a carrier or equipment supplier, foreign joint ventures, and alliances will be considered. These options have not been detailed herein, but we intend to examine them relative to Ball's risk vs. return criteria.

***Broadband PCS Antenna Market:
Unit Shipment and Revenue Forecasts (U.S.)
1995 - 2003***

Year	Unit Shipments (000)	Revenues (\$ Million)	Revenue Growth Rate (%)
1995	2.2	1.1	---
1996	39.6	19.8	1,716.5
1997	145.8	72.9	268.2
1998	224.4	112.2	53.9
1999	294.0	147.0	31.0
2000	263.4	131.7	(10.4)
2001	248.9	124.5	(5.5)
2002	247.0	123.5	(0.8)
2003	250.0	125.0	1.2

Compound Annual Growth Rate (1996 – 2003): 30.1%

As indicated within the above chart infrastructure orders and revenues are forecasted to decline somewhat as carriers add subscribers to fill the capacity. Shipments are anticipated to continue as smaller urban and rural networks are constructed. Revenues are projected to decline moderately from 2000 through 2002, however they are projected to reach \$2.16 Billion in 2002. Revenues are projected to rebound in 2003, signaling the start of the second round of network build-outs.

PCS will create a mass market for communications, not only anytime or anywhere, but also with the quality currently associated with the landlines of a Regional Bell Operating Company (RBOC). PCS is a communication network that provides:

- a) improved radio signal propagation.
- b) totally digital communications supporting the Advanced Intelligent Network.
- c) complete geographical coverage.
- d) increased communications capacity at lower cost.

- e) increased security of communications.
- f) economic benefits for developing countries.

The investments outlined in this plan are assumed to utilize the existing BATC business infrastructure for the initial entrance into the markets. This approach minimizes the near term financial impact associated with this new market push.

The table below details cell site deployments for most of the major U.S. and Canadian carriers, also including estimates of the cell sites involving tower structures and the breakdown of owned verses leased as developed in 1998 by Paul Kagan Associates, based on company data.

Major Wireless Carrier Cell Site & Tower Statistics 1998

Company	Subs @ 6/98	Census Pops	Approx. Cell Sites Deployed	Total Towers	# Towers Owned	% Towers Owned	# Towers Leased	% Towers Leased	Subs/ Tower	Pops Tower
Sprint PCS	1,370,000	108,000,000	9,500	4,800	1,000	21%	3,800	79%	144	11,368
AT&T Wireless Cell./PCS	6,484,000	79,448,5000	7,000	3,000	2,500	83%	500	17%	926	11,350
Nextel	2,042,100	187,000,000	5,800	4,000	2,000	50%	2,000	50%	352	32,241
AirTouch	7,290,000	66,565,500	4,500	2,640	2,300	87%	340	13%	1,620	14,792
ALL TEL	3,742,431	35,386,400	3,600	3,168	2,534	80%	634	20%	1,040	9,830
GTE Mobilnet	4,556,000	53,095,500	3,300	1,900	750	39%	1,150	61%	1,381	16,090
BellSouth	4,400,000	41,500,950	3,100	2,200	1,800	82%	400	18%	1,419	13,387
Omnipoint	255,000	30,000,000	3,000	200	150	75%	50	25%	85	10,000
Ameritech	3,462,000	26,200,000	2,600	2,080	1,872	90%	208	10%	1,332	10,077
Bell Atlantic Mobile	5,707,000	58,586,000	3,000	1,500	900	60%	600	40%	1,902	19,529
US Cellular	1,922,000	26,246,000	2,000	1,900	1,710	90%	190	10%	961	13,123
Powertel PCS	181,431	10,600,000	1,500	342	330	96%	12	4%	121	7,067
BellSouth Mob. DCS	205,000	8,200,000	1,350	700	400	57%	300	43%	152	6,074
BCE Mobile	1,288,000	16,800,000	1,150	690	621	90%	69	10%	1,120	14,609
CoreComm	234,400	3,869,000	994	994	230	23%	764	77%	236	3,892
Western Wireless Cell.	583,300	7,451,000	730	584	467	80%	117	20%	799	10,207
Microcell Telecom	149,846	15,600,000	559	277	135	49%	142	51%	268	27,907
Comcast	799,000	8,292,000	500	200	150	75%	50	25%	1,598	16,584
CommNet	320,476	4,323,000	434	411	324	79%	87	21%	738	9,961
Vanguard	692,000	7,984,000	405	405	285	70%	120	30%	1,709	19,714
Price Comm.	347,150	3,372,000	227	59	50	85%	9	15%	1,529	14,855
Airadigm	13,000	1,000,000	223	223	108	48%	115	52%	58	4,484
Dobson Cellular	151,249	2,581,000	218	218	131	60%	87	40%	694	11,839
US Unwired	10,000	900,000	200	88	88	100%	0	0%	50	4,500
Sygnel Wireless	157,220	2,284,000	190	190	120	63%	70	37%	827	12,021
Rural Cellular	91,814	1,167,000	184	192	127	66%	65	34%	499	6,342
CFW-VA PCS	6,500	900,000	180	88	88	100%	0	0%	36	5,000
Wireless North	2,500	300,000	101	59	31	53%	28	47%	25	2,970
Third Kentucky Cell.	1,600	100,000	6	6	1	17%	5	83%	267	16,667
TOTALS:	46,465,017	807,751,850	56,551	33,114	21,202	64%	11,912	36%	1,403	24,393

As currently projected by Paul Kagan Associates; between 1999 to 2008 over 70,000 new PCS cell sites could be built for wireless networks; more or less doubling the current wireless tower inventory. It is anticipated that implementations of WLL and wireless data will be one of the major influencing factors to this growth.

Historically, cellular operators have built their own networks, siting their antennas primarily on rooftops in urban areas, on a mix of existing structures and towers in suburban areas and primarily on standalone towers in the rural regions. PCS and ESMR carriers, arriving 2nd, 3rd, and 4th to market, in need of fast and vast network rollouts, and having limited capital to execute their build outs have tried to co-locate on existing structures and towers as much as possible. For the most part leasing far more space than they own during their initial build outs.

Wireless Local Loop – As a subset of the wireless market, Wireless Local Loop applications are more specific in that for the Wireless Communications business the specifics of the opportunities are directly tied to a customers chosen technology and or systems. Our major penetration into this key market presently is directly tied to the renowned Project Angel development of the Wireless Local Technologies Group of AT&T Wireless Services, Inc. While WLL systems may be just an alternative to wireline in the U.S., enabling competition against established wireline carriers for consumer voice services as well as data and voice services for small businesses, it is growing in popularity within the international community. When compared to wireline costs and deployment alternatives, WLL

technologies implementations are favored as the more desirable transport method, be that for a greenfield or existing telephony environment.

WLL technologies can be deployed quicker than a wireline system and in most cases can overcome difficult topography issues. Proprietary technologies are the most cost-efficient since they are designed for rather than adapted to a fixed environment. Per subscriber costs for these types of systems are estimated to be viable at a cost per subscriber of \$500 with an anticipated decrease through technology developments to under \$350 per subscriber.

Mobile Satellite Tracking and Telemetry – The needs of the mobile satellite tracking and telemetry products for the trucking industry can be divided between those who require a simple mobile communications service (45%) and those who require fleet management system solutions (55%). This market, while highly diversified and complex, offers numerous niche opportunities. The push of motor carriers adopting operation automation systems has gained greater momentum through technologies such as the ORBCOMM global data messaging offering.

Tracking of mobile assets is a relatively new technology. Low Earth Orbit satellites (LEO's) are used to transfer data from the ground through to a Network Control Center. Information from and about the mobile asset is processed and sent on to the customer who owns the asset. Information such as whereabouts, loaded or unloaded, fuel reserves, emergencies, specific location of the asset in real time, open door status, etc, is available to LEO system. We have secured a position in this industry having a functioning antenna that meets the very stringent height requirement associated specifically with trailers. In addition to truck trailers, cargo containers, heavy equipment, railroad cars, and even automobiles may now be offered with this tracking telemetry on-board.

As described, the telemetry industry is experiencing new growth for the LEO type tracking of mobile assets. Previously, items such as power meters on homes and offices, valve control for the pipeline industry and other FIXED assets have been monitored through terrestrial based technologies. Through various subscriber communicators in combination with the Ball Wireless Communications VLPA antenna, mobile assets are now being monitored.

ORBCOMM L.P., a subsidiary of Orbital Sciences, has created this specific market. Presently ORBCOMM has 35 LEO satellites in its constellation, with an additional launch planned in 2000 to enhance its coverage. Additionally, they have multiple Value Added Resellers (VAR's) relationships throughout the world. Their present count includes 140 VAR's with a projection to 250 by the end of 2000. Each of these VAR's will target different niches in this segment shown below.

Trailer tracking – In North America the top 10 trucking companies have a combined total of approximately 250,000 trailers. Current forecasts indicate these companies are planning purchases of new trailers in excess of 100,000 in 2000. In general, the ratio of tractors to trailers is 1:8. Most of the tractors in this segment have a limited data and positioning system marketed by QUALCOMM under the name OmniTRACS™. This system supports limited functions for the tractor with no support for the larger trailer requirements being addressed by the ORBCOMM system.

Container tracking – Worldwide there are over 7.5 million containers in use today. Testing for this industry is starting now with the expectation it will be utilized throughout the worldwide network of VAR's.

Rail road car industry – Many of the VAR's from Orbcomm are concentrating their efforts towards the tracking and telemetry requirement of this asset. Approximately 600,000 rail cars are in North America with each car requiring an antenna for this Orbcomm application.

Heavy equipment and other – Rental companies have expressed significant interest in telemetry for their rented vehicles and heavy equipment. Multiple OEM's are planning on put antennas and communicators on the newly built equipment. Auto manufacturers have expressed a willingness to install this system in new cars.

Vulnerability to Economic Factors

According to analysts at Alex Brown, domestically the eight largest local exchange carriers currently control virtually all of the local access telephone business and are investing over \$17 Billion per year

to expand and upgrade their networks. These companies expect to spend about \$500 Billion on their networks over the next 10 to 15 years. It is anticipated that the total annual expenditures will as much as double over the next several years driven by several factors.

Expenditure Category	(in Millions) Capital Expenditure
Inter-Office Transport & Trunking	\$ 825
Central Office Switching	\$3,840
Central Office – Other	\$3,075
Distribution (1/3 electronics)	\$4,200
Wireless	\$3,000
Non-Network Support	\$2,670
Other	<u>\$3,100</u>
	\$20,710

- New entrants can be expected to capture a 40% share of the local access market and will build new networks to carry their share of the traffic.
- LEC spending probably will not decline with shrinking market share because new services will be introduced to offset the expenses.
- Competitive pressures are likely to accelerate network modernization by all new and existing carriers.

If so, total spending could approach a trillion dollars in the U.S. alone. Since many of the forces at work in the U.S. have been set in motion elsewhere as well, global opportunities for U.S. telecom equipment companies will be substantially greater.

Internationally the recent enactment of the World Trade Organization accord spelling out global free trade in telecommunications will enable foreign investment and ownership in 69 countries representing almost 90% of the worlds current \$675 billion telecom business. From 1997 to 1998, the number of worldwide wireless subscribers grew from 151 million to 308 million. Allied Business analysts' moderate forecast for 2003 is for growth to 594 million subscribers, while their aggressive forecast is for growth to 667 million subscribers.

Technological Factors in Ball's favor

We are leveraging a rich heritage of advanced antenna innovation with an emphasis on reliability and product excellence. We are the planar antenna design experts having patented the micro strip antenna over 25 years ago. Acknowledging that operators must provide their customers with access to the best possible network we offer exceptional product values at a critical juncture in a wireless system. Our innovative designs and manufacturing processes insure long term reliability, high efficiencies and consistent performance.

Mobile Telephony Services (Base Station Antennas): – Recently the Corporate Engineering Management team from VoiceStream, a large service provider, conducted visits to our top antenna competitors. VoiceStream is planning to deploy over 15,000 base station antennas during 2000 and the same amount in 2001. Ball did not have any of the antennas that the VoiceStream RFP requested but we still made their list of technically approved antenna vendors which we believe is less than 4. They are urgently requesting that we develop antennas for them because we are technically number one on their list. In the past Ball has heard these same comments from other service providers, but this is significant news because VoiceStream has recently seen the latest and greatest of our competitor's best technologies and we are still on top. Some of the reasons they believe we are technically superior include:

- Ball has the most simplistic and clean antenna designs in the industry.
- Our antennas provide the most gain per antenna size and volume.
- Ball is the leader in passive intermodulation (PIM) performance.

- Excellent RF performance across the frequency band.
- Antenna size provides user with less weight and wind load on the tower.
- Our performance remains consistent over extreme environmental conditions.
- Our products are designed for low cost manufacturing.

Because of these and other base station antenna characteristics several service providers are asking Ball to participate in their infrastructure build-outs.

Wireless Local Loop – A wireless local loop network requires base station and subscriber antennas. For most applications our standard base station antenna approach is used here. The subscriber antenna must have high performance and very low cost. It must also be low profile and as small as possible which is one of Ball's core antenna competencies. This is the reason AT&T Wireless Local Technologies Group has chosen us as a sole source provider for their antenna requirement. This is the same reason why Sprint and US West are currently talking with us about their wireless local loop activities.

Mobile Satellite Tracking and Telemetry – Our Very Low Profile Array (VLPA) used with the Orbcomm satellite system is currently the only antenna that meets the performance requirements for this application. There have been several competitors that have pursued this product but no one has been able to succeed either yet because of performance or cost. Recently Panasonic terminated all efforts to develop their own antenna and has contacted Ball for our antenna.

Regulatory Issues

Domestically – Of all the infrastructure segments affected by regulatory trends, the antenna is clearly the most salient. Antennas are the most visible part of a wireless network, and many communities are concerned that the horizon will become polluted with antenna towers. As a result, a “not in my backyard” attitude has taken hold at the community level. Municipal governments are slowing or halting network deployments until a resolution is found.

Tower siting is at the crux of the antenna problem. Innovative antenna designs, such as disguising the antenna to blend into the background are gaining in popularity. Antenna manufacturers, such as Ball Wireless, are also making smaller antennas. The sacrifice in gain may mean that more antennas are needed to provide sufficient coverage.

Carriers and network integrators are pursuing options in conjunction with local business organizations and governmental regulators to blend the antennas into existing structures such as church steeples and billboards. Flat panel antennas that can be attached to a structure's exterior wall are also a popular response to the siting challenge.

The federal government's E911 regulations also affect antenna manufacturers. The pinpoint location requirements of the service may result in a large number of antennas being deployed to complement an increased number of base stations. Smart antennas may also receive a boost from the siting challenges.

In our opinion the dynamics of this process have created an environment in which consolidation within the industry will be inevitable. Therefore, our marketing strategy includes targeting the largest carriers and equipment providers first while utilizing the reputation and size of Ball Corporation as a competitive advantage over smaller antenna suppliers

Internationally – Internationally, regulation and protective legislation have inhibited the development of the wireless market. Local Ministry of Post Telegraph and Telephones (MPTT) have maintained a monopoly over all phases of the telecommunications industry. However, these inhibitors to an open market are gradually being eased which is resulting in increased subscriber counts. Gradual is the operative work. Currently 80% of the telecom market is held by governmental MPTT's. Many of these have either begun or have plans to begin issuing wireless spectrum licenses.

Financial Considerations

Our domestic market financial projections for the next 5 years will be predicated on the following:

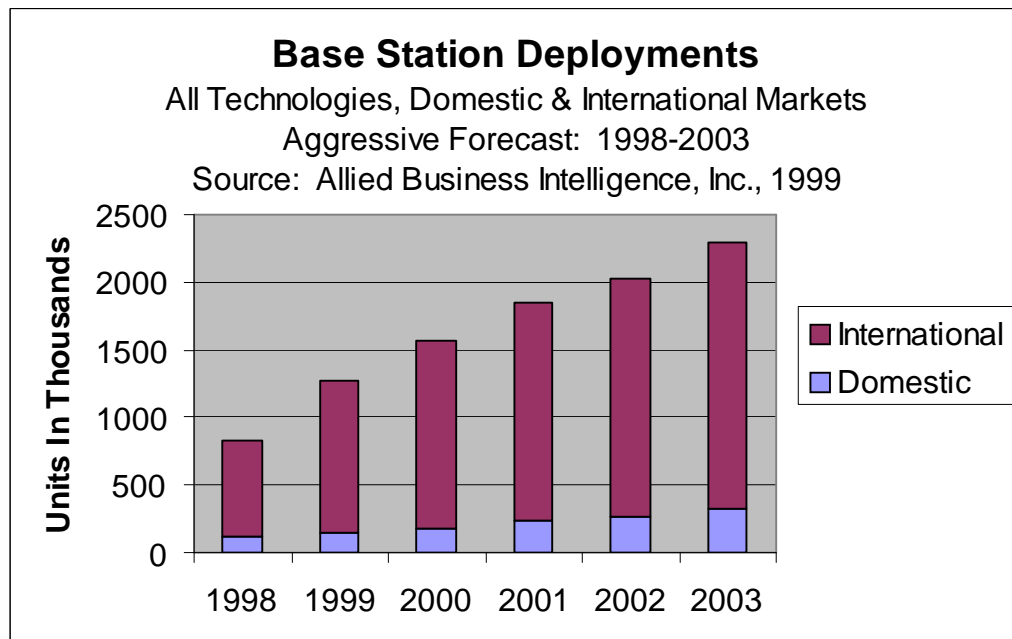
- Completing and negotiating a definitive agreement with AT&T Wireless Services (AT&T represents approximately 50% of the sales contained in the projections)
- Penetrating other major PCS carriers like Sprint, PrimeCo, Western Wireless, etc.
- These markets are expected to be very competitive and as a result our pricing assumptions indicate reductions over the time frame of the financial projections.
- Inventories are calculated at approximately 6 turns per year and Accounts Receivables at 42 days.
- Several major customers have informed us that participation in the domestic PCS market segments is a necessary prerequisite for entry into the international markets.

4. The Target Market

Demographics/Geographic's

While there will be continued growth in the domestic cellular market both in terms of new builds and replacement equipment, the PCS infrastructure build will make up the lions share of opportunities. This infrastructure boom in the U.S. is greatly influenced by the \$18 Billion worth of licenses sold by the Federal Communication Commission (FCC) PCS carriers in recent years. The FCC structured their auction to ensure at least three competitors per market area with the possibility of up to six competitors, which increases to 8 when considering there are two additional competitors offering cellular service as an alternative.

Allied Business Intelligence projects wireless subscribers will continue to grow at a rapid pace equating to a 17% compounded annual average growth rate (CAAG) through 2003. To keep up with this rapidly growing subscriber base, infrastructure will be added accordingly. Projections indicate that there will be 2.3 million base stations deployed by year-end 2003. This represents a 21% CAAG. While voice services will remain the strongest part of a wireless operator's business, the addition of wireless data services will further the utilization and expectations of wireless networks.



Purchasing Patterns

Generally the buying patterns associated with infrastructure builds follows seasonal trends. The majority of builds occurs within the late spring through late fall months. Carriers attempt to avoid hockey stick purchasing patterns, however, the inevitability of funding availability for antennas does influence purchasing patterns with order placements occasional occurring in the forth quarter of a carriers' fiscal year. The actual shipment of products, in Balls case resulting in movement from a booking to a sales transaction, will be in accordance with the build schedules.

Both the WLL and the tracking and telemetry market are not affected by seasonal purchasing patterns. As these are subscriber based applications they are only influenced by the specific audience targeted.

5. Competition

Competitive Position

In the interest of time and due to the fact that the domestic market is the most developed with the highest level of technology available, this section will only address the U.S. market situation.

The market for antenna products is extremely competitive. The PCS market will be the target for virtually all antenna manufacturers, so this business operation's approach must be driven by every commercially available competitive advantage we can create and implement. The expected rapid roll-out and hype over the U.S. PCS auctions combined with anticipated expenditures for telecommunications infrastructure on a global basis will bring in many new players. As PCS is a relatively new technology, the forecast is for a rapid increase in the products servicing this market.

Market Share Distribution

Allied Business Intelligence suggested that The Allen Group, Celwave RF, and Radio Systems Mark (Comsat RSI) may be the major suppliers in the domestic PCS market. These three are presently the primary suppliers in the domestic cellular market with 25%, 23%, and 23% market shares respectively. However, in their view it is difficult to predict who the significant PCS suppliers may be. This is due primarily to the fact that many non-traditional companies such as Ball are transferring technology to enter the wireless communications marketplace. An example of this phenomenon is illustrated by the Lockheed Martin Sanders operation STARS PCS system. This system is designed for CATV systems in which the cable plant becomes the backbone for transmissions to and from centrally located base stations. Omni-directional antennas are distributed over the cable plant according to coverage needs functioning in a pico cell manner covering approximately 300-ft radiuses.

Reviewing present competitive market conditions reveals that there are more than 30 different competitors contending for mind and market share among the PCS carriers. These competitors range from small start-up businesses to Fortune 500 companies. The following is an overview of the primary competitors that we face.

Mobile Telephony Services (Base Station Antennas):

EMS – Norcross, GA. This competitor has been the leader in the dual slant antennas with their DualPole products. From the beginning EMS has and currently remains as a formidable competitor for dual slant technologies. They have the necessary contacts and contracts to continue this market presence for the next few years.

CSA – Chicago, IL. This is the old Comsat RSI organization and product lines which are still made in Rochester, UK. A new management in Chicago has shaken up the previous organization and as a result they have drastically lost market share as well as industry respect. They do have one of the fullest complements of product offerings and as such have the potential of still being one of the top BTS providers in the marketplace. They have long-term contracts for a number of international systems and remain widely used within the domestic market through their channel organizations,

however; it remains to be seen if they can through the recent reorganization continue to be a force in the market.

Scala/Kathrein – Rosenheim, Germany. This German and US alliance manufacturer, Scala Corp., has proved successful in its breadth of product and low cost solutions. With manufacturing facilities on two continents and a diverse product line, they not only are a contender, but also are one of the largest suppliers of antennas to the wireless industry.

Celwave – Marlboro, NJ. As a recent acquisition by Alcatel, the number one switch manufacturer in the world, Celwave has significant market presence. Having recently made the decision to consolidate the sales force between the two companies, their people will have access to a full product line of cable, accessories and antennas for their customer's. The antennas products are viewed as lacking in many respects by many significant carriers, however, they do win projects on both cost and the fact that the Alcatel name and products are so entrenched in many telecommunications markets.

Decibel – Dallas, TX. Decibel is a business unit of Allen Telecom, Inc. Decibel had a huge marketshare of the 800 MHz products for the US Cellular bands. As the industry moved to the PCS markets they had an established engineering relationship with many of the "new" providers. Recently it was announced that they would discontinue efforts on their Smartcell wireless local loop products, as this offering was not as successful as originally anticipated.

Dapa – This French company holds its own as a cheap solution and will continue to do so.

Andrew Corp. – Orland Park, IL. This huge giant has had problems in obtaining marketshare having both entered and exited antenna markets and having difficulty in developing acceptable products. Getting into the market late has proven the downfall for them. They can still be a formidable foe when they "combine" their cable and accessories with an antenna in a bid.

Allgon – Taby, Sverige Sweden & Dallas, TX. Allgon product ranges include antennas, repeaters, tower top amplifiers and other RF equipment. Allgon invests heavily in R&D, approximately 10% of revenues, for new products. They are a very formidable competitor both internationally and domestically and are one of the top providers of antenna products to the industry through multiple channels.

Wireless Local Loop – Wireless local loop antennas are generally incorporated as part of an overall system or solution. Multiple competitors exist within this market segment as generally identified within the base station markets. This type of sale generally results in an OEM type relationship.

Mobile Satellite Tracking and Telemetry – Within the specific application we are addressing with our VLPA products there is no present direct competition for the application our products are serving. Of recent interest to us is the possibility that Scientific Atlantic will be offering a competitive product to ours. While we have not seen this offering, through our contacts at various VAR's and ORBCOMM itself, the reality of this competitor seems to be real. They may have an edge that will be difficult to overcome as a provider of communicators for the system; they have the potential of bundling their antenna as part of an overall solution.

The tracking and telemetry industry will become very crowded with antenna suppliers after the 2000 year. Ball Wireless will be in a position to support 100% of the market need for the first two years, and then we will face very stiff competition to drop the price levels.

6. Marketing and Sales Strategy

Our vision: *"To be the leading provider of standard and custom antennas for wireless base stations, wireless local loop and mobile satellite tracking services industries."*

Marketing Vehicles

Public Relations – A focused Public Relations campaign will be used to further broaden awareness of our products and enhance our credibility in the commercial wireless telephony market. PR efforts need to be targeted at the audiences of:

- Wireless communications publications
- consideration give to both horizontal and vertical industry publications
- Telephony business and technology publications

During the calendar year a press/analysis tour needs to be planned to reach a predetermined group of influential editors, such as Rikki Lee with Wireless Week, and market influencing analysis within the wireless marketplace. The intent of this tour is to introduce Ball Wireless Communications and our product offerings as part of our ongoing awareness efforts. An International press tour should be conducted by the end of the second quarter to establish a rapport with the international editorial and consultant communities.

The establishment and maintenance of relationships with key editors is critical to maximize forthcoming press opportunities. These press opportunities include:

Near-term

- Inclusion in Industry round-up articles
- Management interview articles
- Contributed technology articles

Longer-term

- Customer Application Stories
- photo application series
- Major Relationship press releases, i.e. OEM, system integrators.
- Major Contract/Sales press releases
- Product Announcements and/or Enhancement press releases

Speaking opportunities will be pursued at trade show seminars as well as industry influencing forms and conferences.

Advertising – An advertising campaign will be developed during the fourth quarter of the calendar year and launched in conjunction with the CTIA trade show. As conceived, the new campaign will interleave product specific advertising to the ongoing corporate awareness campaign. This advertisement strategy will run with messages developed and refined from our product strategy differentiation distinguishing Ball Wireless Communications products and services.

Insertions will be targeted at the audiences of key wireless industry publications that reach mid to senior level operating companies management “decision makers” and technical “specifiers” as well as system integrators. The targeted publications that are to be considered need to be outlined as indicated below from subscription data gathered from Beacons, Standard Rate and Data, or similar books and/or web sites:

Communications Publication	Primary Audience
publication and descriptive (generation of prospects verses suspects)	descriptive of the audience, and general industry

Trade Shows – The currently scheduled trade show for this year is wireless communications specific. This show offers a pre-qualified audience with a need for or interest in wireless network products. The show is:

<i>Show Information</i>	<i>Primary Audience</i>
Wireless 2000 hosted by CTIA New Orleans, LA Feb 28 th – Mar 1 st , 2000	The target audience for WIRELESS 2000 includes all professionals who are currently in or interested in becoming involved with the wireless industry: Presidents & CEOs,

	all levels of management, business development professionals, marketing & sales professionals, engineers, financial analysts, consultants, venture capitalists and media.
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It is anticipated that a combination of targeted industry trade shows will generate a cross section of wireless prospects, operators, system integrators, along with prospective OEM potentials that maximize our breadth of reach.

- Horizontal and vertical industry trade shows
- Potential American Transport Association, tracking and telemetry applications
- Joint participation in vertical industry trade shows with strategic product partners

Strategic Partnerships

AT&T Wireless Services

During 1999 and continuing into 2000 and beyond we will continue to focus a majority of our attention on the opportunities presented by AT&T Wireless Services. This will be a two pronged effort in that we will be supporting the Wireless Local Technologies Group with their needs for the Wireless Local Loop system (PWAN) and the Mobile Services group for PCS and cellular base station antennas sites. We have multiple key contacts include with their Wireless Local Technologies Group and their Mobile Services Group.

US WEST Wireless

Multiple efforts were rewarded through the implementation of a purchasing agreement for US WEST Wireless operations. This agreement will provide to Ball Wireless a majority of the antenna purchases for all of the 14 state markets of US WEST. While non-specific in the actual numbers of antennas anticipated to be purchased by the various markets it has been generally acknowledged that we should expect approximately 80% of all the new builds and rebuilds planned. Current plans indicate that we will capture in excess of 500 new build sites. At a 20 percent dual slant and 80 percent spatial diversity build rate this will equate to approximately 3900 antennas.

Sprint PCS

Conversations are currently underway with the Sprint PCS organization at their headquarters in Kansas City. As a major PCS provider in the domestic market Sprint is a targeted account for penetration by Ball. We have made entries that will be continued during the year. The current opportunity revolves around their anticipated entrance into the WLL market with a MMDS system. As with AT&T, all products purchased by Sprint is controlled and approved by their Corporate Engineering and Purchasing groups with whom we have established relationships.

ORBCOMM, L.P.

Multiple conversations are underway with both ORBCOMM, as the system provider to approximately 140 worldwide Value Added Resellers, as well as many of these VAR's. The business goal of this effort is to finalize through a mutual agreement a significant guarantee of volume for the production of our VLPA antenna serving this critical market. Once accomplished this will enable the individual VAR's to participate in a cost reduction program targeted at lowering the end user pricing associated with the complete system, by significantly reducing the price paid for our VLPA products. This as well as other tactical and technology advancements will allow Ball to remain the vendor of choice to this market.

Other Marketing Tactics

Seminars – Seminars may provide an ideal vehicle through which Ball Wireless Communications can assert its industry leadership position. Through specific technology tutorials and product reviews a

series of seminars can establish awareness and credibility with new prospects, while converting existing prospects to customers.

It is envisioned the seminars will be conducted at least once quarterly rotating from major region to major region within the United States. Attendee base for a seminar, by invitation only, will comprise of qualified prospects, consultants and editors from our own database in-combination with targeted regional mailing lists. Alternatively, customer specific seminars can be arranged with our major customers by working through their Corporate RF group management enabling us to be a presenting participant at their regularly scheduled engineering staff meetings.

Direct Mail – As an activity under a promotions budget, along with seminars, direct mail campaigns can be used to pre-announce new products or technology developments. This type of effort can be highly effective as a lead generation methodology and further support our market awareness promotion.

Direct mailers, based on the advertising campaigns, will be developed and mailed over the calendar years '00 and '01. Dependent on the objectives/budget established for the mailings, one of the following two approaches will be employed:

- Multi-tier mailings to a single large horizontal universe of wireless network management within large operator organizations - to strengthen awareness and qualify prospects.
- Individual targeted vertical market mailings to the wireless network management of large telco and supporting organizations. Each mailer would directly correspond to the nature of the recipient's application - to generate prospects.

In addition to our own database as a source for mailings, additional list(s) would need to be selected and qualified. There are multiple prospective databases available including: trade show attendee lists, subscription lists, association lists or lists available from the many commercial list management companies.

Technical Advisory Board

Consistent with refining our product strategies and their fit within future technological requirements, a Technology Advisory Board (TAB) will be established during 2000. It is envisioned the TAB will be staffed with industry experts and users to provide guidance and direction on a wide range of strategic marketing and product development questions. Initial activities for the TAB will include evaluation of new technologies, such as 'smart antennas' and new frequency usage such as LMDS, ISM, etc., related to this growing market. Also, recommendations for resolution of major market issues that might be taken such as concealment ("stealth") requirements and/or coverage issues related to signaling transport protocols and network capacity concerns.

Product Marketing

The primary responsibilities of this individual will be the management of ongoing product development and roll-out strategies within a product calendar approach. Having primary responsibility for product definition and launch, the function will refine our existing product development processes and procedures for products to be offered. This will include the initial product planning development considering all phases and requirements such as international, competitive, promotions, Beta testing, along with risk and reward analysis as well as market segment forecasts and life cycle projections. A typical Product Development Process schedule outline is attached within the appendix of this plan for reference. Product Marketing does not have any direct line of authority over Engineering, Manufacturing, or Sales. However, it is responsible for effecting coordination among these business operations for setting our overall wireless product marketing strategy. Additionally, product marketing will be chartered with being the senior member on the TAB. Other directly related functions such as our Applications Engineer group are envisioned to be incorporated into the day to day business of Product Marketing.

Web Site

The Internet is a critical resource for Ball Wireless Communications both externally and internally. The existing Wireless home page has the advantage of its own url and is linked to the BATC home page. Through this link access is provided for BATC employment opportunities, Wireless Locations, various local area maps, etc. As currently implemented it provides basic information only at this time. During the course of the first quarter of 2000 a complete site map will be developed for management consideration and approval. Upon this management approval a development timeline will be created and our web site will be greatly enhanced to at least maintain the fundamentals of competitive sites. The update will reflect the main marketing messages adopted and will match the look and feel of all print materials and other collateral's. The product family site will be greatly enhanced to reflect many of the customer requests for access as well as having a place to offer white papers, etc. A full study of outside link possibilities will be conducted and subsequently implemented.

Sales Force and Structure

Staffing for the direct sales group is currently underway and has been done with great care. We have soliciting personnel having regional or national sales management backgrounds with a strong emphasis in selling large ticket accounts in the telephony or data marketplace for 10 years or more. Our preference remains for individuals who have worked for big companies as well as start-up operations offering RF related products. This level of experience is highly desirable to launching of a new business particularly considering the general adoption cycle of new products by the purchasing audience.

Developing and maintaining a direct field sales force is expensive and represents largely a fixed cost independent of sales volume. However, by comparison with independent sales organizations a direct force is better trained and has a single mission: *to sell our products and capture profits that could otherwise flow to other channels*. This is particularly true when considering the increased sales efforts required as the complexity of product offerings grow within the overall system being addressed. Considering major accounts and OEM sales, where a majority of our efforts will be expended, our experience to date has shown this type of sale requires significant up-front investment of company resources. We expect the direct sales force to be the primary interface between all major accounts and OEM customers. The gestation period for a major account or OEM contract averages between six to nine months. In some instances, typically in the OEM arena, custom development will be required to meet the customer's specifications. The amount of customization required will be one of the qualification factors in determining the viability of the specific prospect. However, our focus will be on those opportunities and prospects that can be realized with standard products.

Primary prospects to be pursued will include wireless operations in the Regional Bell Operating Companies, i.e. Bell Atlantic, Bell South, Southwestern Bell, U S West, Ameritech, GTE, etc., major long distance carriers, i.e. Sprint, MCI, AT&T, etc., and significant wireless operators, i.e. VoiceStream, PrimeCo, Western Wireless, etc. Additionally OEM type relationships will be sought with major equipment suppliers, i.e. Lucent, Nortel, Harris, Siemens, Ericsson, Motorola, etc.

Sales Assumptions

This plan seeks to arrange incentive guidelines for the positions covered in accordance with comparable industry practices. Base salaries are determined using the job knowledge and maturity of the employee involved in combination with past employment experience in comparable companies as well as performance in the Wireless Communications business within Ball Telecommunication Products Division.

7. Operations

Manufacturing/Production Plan

Manufacturing Strategy – Our manufacturing strategy is to assist in the development of reliable products that meet or exceed customer, market, and our business requirements. These

manufacturing objectives will be achieved through participation in integrated product teams (IPT) for the development of new technologies and products. These product teams will also include key vendors, customers as well as any out source manufacturers as determined necessary.

As designs are completed and base-lined, they will move into the internal Ball Wireless low volume assembly group. This stage of production will be used as the "proving ground" for the product. The intent of this is to systematically debug the design and develop the processes required to enable the manufacture of the antenna either internally within Ball Wireless or by a out-source contractor.

Mobile Telephony Services (Base Station Antennas) – As the reliability of a base station assembly is understood and demonstrated, decisions will be made relative to whether or not the specific antenna will remain within Ball Wireless manufacturing as a low volume requirement or moved to an out source contractor. Within our current plan, we will be utilizing both resources, internal manufacturing and out source contracting. This will enable us to continually review for process and design improvements leading to minimizing costs in labor and materials.

Wireless Local Loop – For the volume requirements associated with wireless local loop antennas our relationship with the Ball Canning operation will be exploited. As a significantly high volume manufacturing entity, with a worldwide presence, the Ball Canning operation will provide us with the process manufacturing capabilities necessary to support this type of business. During the fiscal year 2000 Ball Wireless will utilize our own internal manufacturing capabilities to meet the projected needs. In concert with our own manufacturing efforts we will be consulting with Ball Canning in preparation for the follow on years.

Mobile Satellite Tracking and Telemetry – The antenna products planned for this market segment will be initially built within the Ball Wireless manufacturing to insure product integrity and manufacturability with a significant volume out-source partner.

Tooling and Special Test Equipment

Tooling for this operation will be established commensurate with the volume of product required. All tooling shall be developed to meet the performance and quality standards defined on the engineering documents. However, in low or pre-production volumes, tooling may include varied manual operations. As the deliverable quantities rise, the tooling to assemble the units will become semi-automated or fully automated as economically justified. All tooling will be documented appropriately so replication can be accomplished if required. Equipment required to determine the performance and repeatability of a product may not be limited to the tooling for manufacturing. It could also include testing equipment and facilities such as anechoic chambers, network analyzers, and proprietary verification software.

Inventory Management

The key to success of the antenna deliveries resides in the inbound and outbound logistics. High quality materials must be supplied on time meet the goal of 10 days of finished goods inventory. The inbound flow of raw materials must be JIT. The WIP inventory will be kept to a minimum through the demand flow (kanban) quantities, and the quantity of materials in a stores facility will be based upon the replenishment time.

Specific piece parts will require long-term subcontract agreements with our suppliers. These subcontracts will allow the suppliers to procure the raw materials such as the coils of sheet metal for the elements or plastic for the clips in the most favorable economic manner for Ball. However, this method does have some risk and liability should the product not meet the market demand forecast.

All other parts which do not necessitate long-term agreements will reflect the requirements of the SOW or purchasing contract. The operations plan will outline the details of this requirement.

If determined economically justified, subcontractors may also build the final assembly. In this case the SOW and contract would depict the level of shared risk and liability. Each would be determined on a case-by-case basis.

Supply and Distribution

Manufacturing Strategy – Our strategy is to manufacture within the current operation to prove the manufacturability of the designs and development of the processes. Assembly equipment and test facilities are currently in place to meet these requirements. Procurement of materials and services from outside sources will be used until independent capabilities are in place. A specific manufacturing strategy that takes into account the economics and volume requirements will be applied to each new product developed. Overall, this operation envisions the use of outside as well as internal capabilities to accomplish its goals. Exhaustive testing ensures high quality levels which are an important sales tool and key to high customer satisfaction.

Concurrently, products with high volume potential will be perfected until the design, equipment, tooling, and processes required are satisfactory. The manufacturing process envisioned for the very high volume WLL product converts aluminum to product components. Ball Packaging has provided us with excellent support in high volume product planning and customer relations relative to selling Ball Corp. capabilities.

Research and Development and Sustaining Engineering

Our engineering strategy is to develop reliable products that meet or exceed customer performance requirements. Additionally, products will be designed to meet cost and manufacturing objectives. These engineering objectives will be achieved through participation in integrated product teams (IPT) for the development of new technologies and products. The IPT includes our internal development team as well as key vendors, customers and out source manufacturers.

The engineering and development work will focus on design solutions that provide escalating antenna technology advantages. For example, service providers are being pressured by zoning boards to reduce the visibility of wireless infrastructure components such as antennas, cables, or entire towers. Ball has addressed these issues by developing superior antenna technologies. The wireless industry is a very high pace competitive market that requires that we continue to push the state-of-the-art in technological advances to keep ahead of our competitors. This will be accomplished by commitment to future product R&D efforts, product improvements, participation with industry standards setting bodies and influencers, as well as strategic customer relationships. Some of the areas of focus for each market focus are discussed below.

Mobile Telephony Services (Base Station Antennas) – We have been told by several service providers including AT&T, US West, and VoiceStream to name a few that we are currently the leader in base station antenna technology. Some of the key reasons are as follows:

Ball has the most simplistic and clean antenna designs in the industry. Typically, in the engineering world, difficult problems are solved using complex solutions. One of the most difficult design challenges that an engineer can accomplish is to create a design that achieves difficult performance requirements using a simple approach. We have accomplished this task which has resulted in antenna designs that can be low cost, are easy to produce and are highly reliable. This is an area that we will continue to refine as we move forward.

Ball antennas provide the most gain per antenna size and volume. Antenna gain is an important performance parameter to most wireless infrastructure system designers. Typically the larger the antenna is the more gain it can exhibit given some RF characteristics remains comparable. The reason for Ball's superiority in gain versus size is the air-loaded element and feed network approach referred to as our AirBASE™ product family. Using this technology provides an extremely low loss product, which means that very little signal is dissipated in the antenna.

Leader in Passive intermodulation (PIM) performance – Our antenna designs have set a new standard for PIM performance. Poor PIM performance is typically generated by inferior RF transitions, dissimilar metal-to-metal joints, or poor workmanship during the manufacturer of the antenna. PIM performance is critical to an operator because when it is generated it adds a noise factor that can effect the systems' overall capacity and performance. Today networks are beginning to be capacity

limited. This is furthering an antenna's PIM performance being a major concern to the system operator.

These and several other performance criteria are design areas that Ball Wireless has achieved to be the technical antenna leader in the market today. In these and other areas that are important, Ball Wireless will continue to be the industry leader through our research and development process.

During the next year there will be several activities in the smart antenna arena. Smart antennas will be used in many cases as networks become capacity limited. We are currently participating in initial discussions with Lucent Technologies on a smart antenna approach.

Wireless Local Loop – A wireless local loop antenna requirement is usually very specific to the specific system design. Therefore, to be involved in this market segment we must be involved with the system and network designers from the beginning. It requires a close technical working relationship with the customer. At times this can occupy our development manpower; however, once we are designed into the system we have the opportunity to be a sole source supplier of the antenna.

Mobile Satellite Tracking and Telemetry – Asset tracking is rapidly becoming a very big market. All sorts of assets are wireless tracked such as heavy equipment, trailers, containers, pipelines, etc. Many of these applications require a conformal, covert, or integrated antenna. This need falls inline with Ball's core competencies which therefore can be an area that will difficult for our competition to overcome. However, it will require very low cost high volume designs.

The biggest challenge of research and development will not be the technical ability to meet a low cost reliable design requirement in any of the market segments listed above. It will be a management challenge in prioritizing which opportunities we pursue.

Quality Control

The Ball Commercial Products & Technologies Quality Assurance group is being utilized to insure both the consistent product quality as well as compliance with our ISO procedures. As a standard practice all key process variables are identified and documented. As a critical member of the product development team Quality Assurance will participate in the development of statistical techniques relevant to the specific product design requirements.

Additionally, Quality Assurance works with Ball Wireless business operation to determine the appropriate level of statistical techniques to qualify suppliers. Quality Assurance will maintain and review the supplier list as appropriate. For out source manufacturing Quality Assurance will review and qualify piece part suppliers and processes utilized.

Management Information Systems

An information management system data base will be developed to support the sales effort. It is anticipated an "off the shelf" software program, i.e. ACT or similar, will be used for this purpose. A key factor of the database program will be a requirement for multiple users and remote access.

The data base will consist of leads aggregated by the direct sales staff from their own experience, previous employment contacts, as well as from marketing driven programs including direct mailings, trade show activities, and general inquiries generated by our web site, telephone inquiries, and similar. The data base will be updated monthly to insure accuracy. The individual sales representatives will have unlimited read and limited write capability as needed for territory and Account management purposes.

At a most fundamental level the data base should consist of:

- Account Name, led by identifying keys such as Targeted Account, In Process Account, Account to be removed from the data base, Future activity anticipated at the Account
- Account address, including City, State, and Zip Code
- Contact Name, e-mail address

- Contact Telephone and Fax Number
- Lead Origin
- Sales Person assigned to the Account
- Channel firm Account referred to
- Date of first contact
- Last date Account was contacted
- Indication of probability of closure, High (30 days), Medium (90 days), Low (180 days)
- Proposal made, by date and value of proposal
- General Comments

Customer Service

Customer Service and support of these antenna families are engineered to be minimal. The antenna products are designed as passive devices that require very little servicing. Most potential failure modes have been predetermined and corrected through the qualification tests and subsequent modifications of the product design. There may be a very small percentage of units returned which will primarily be due to customer-related damage in material handling and or shipping. We anticipate these will be replaced per the contractual or warranty requirements.

Additional customer support will discuss and debug system-related problems. When the system performs poorly, the first culprit has traditionally been the antenna. Engineers and technicians will need to be available to support customers and find solutions. However, should this operation become a supplier of products that include circuit card assemblies, power supplies, other related electro-mechanical assemblies, and system assembly, then a full servicing department would need to be added.

8. Risk Evaluation

Risks

There are multiple risks associated with the entrance of the Wireless Communications group into the wireless communications market. These range from the manpower resource concerns to the amount of time to needed to close an account. While a "rifle shot" approach to the market is desirable and necessary at the initial stages of our planned growth, we must never-the-less be cognizant of the market window and realities of competition both domestically and internationally.

1. Product Development - Of significant concern to our successful penetration and market position is the amount of time necessary to develop our initial product offerings. Recognizing that this concern is being addressed with a goal of reaching product launch times of 8 to 12 weeks, the sales effort today is greatly hampered by the time it is taking us to finalize products. Should there be any slippage of the current product plan significant adjustments to our projected forecast will be required. As the need for other frequencies, supporting international requirements, and types (i.e. physical forms such as Omni's, Yaggies, incorporation of LNA's, etc.) are solicited by the market greater pressure will be put on the development efforts to insure success.
2. Time to close - Our experience to date has shown the sales effort for our products requires significant up-front investment of company resources and a long period to close. This is due in large part because of our lack of available offerings that can be evaluated by prospects. Additionally the type of account we are soliciting is generally viewed as a "significant" player in the wireless market whether carrier or equipment provider.
3. Market window - As indicated in the Wireless Communication Business Plan there is a substantial risk associated with the existing market window. Wireless networks are rapidly being deployed on

a global basis which is creating a definite market window. Recent visits to South Korea resulted in finding that this market had already closed for all intent and purposes. This rapid build-out of wireless infrastructure indicates we are faced with a critical time frame for entering this market.

4. Referral Accounts - Because we are late in providing our initial products we do not have the ability to offer "success stories and/or reference type accounts". This will become a major issue if we are not fully successful with the current accounts we are working with, namely AT&T Wireless Services and AG Communication Systems.
5. Manpower Resources - As we enter into the next phase of the development of the Wireless Communication business manpower resources will become critical. Within the Sales operation the need for qualified individuals is very strong. We cannot reach the forecasted business levels without addressing this as soon as possible. At the present time we are encountering difficulties in finding appropriate people to meet our need.