



## APPENDIX C: COVERAGES

### C.1 SERVICE COVERAGE FOR STARLYNX™ SATELLITES

Figures C-1 and C-2 illustrate the fields-of-view (FOV) at 30° elevation angle contour for StarLynx™ MEO and GSO satellites, respectively. With 20 satellites, StarLynx™ MEO will provide virtually complete global coverage with a high percentage of dual satellite coverage.

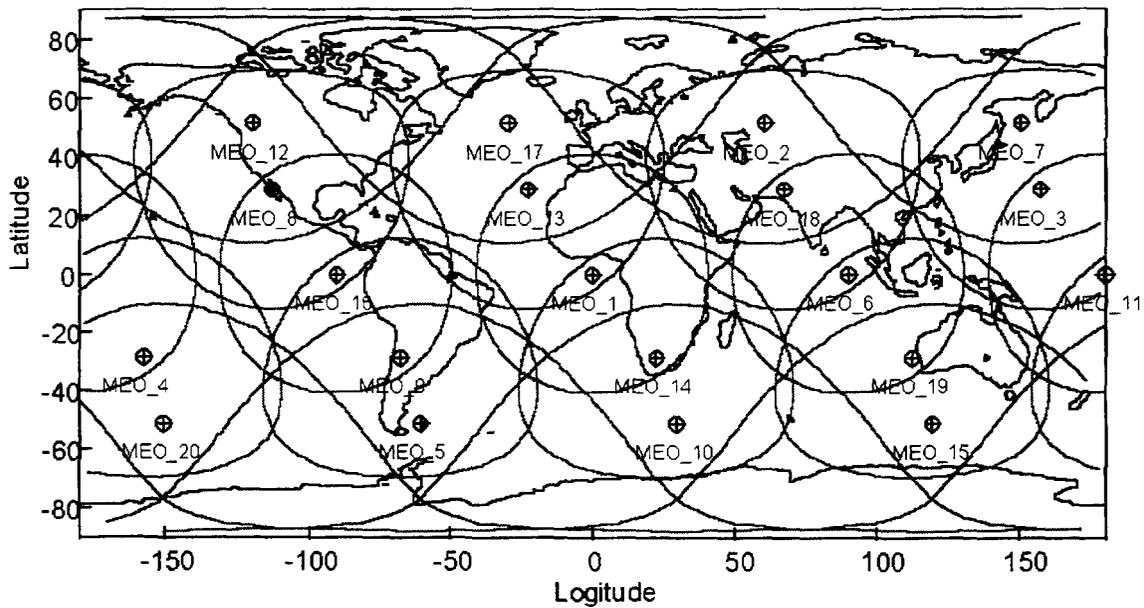


Figure C-1. Field of View for StarLynx™ MEO Satellites

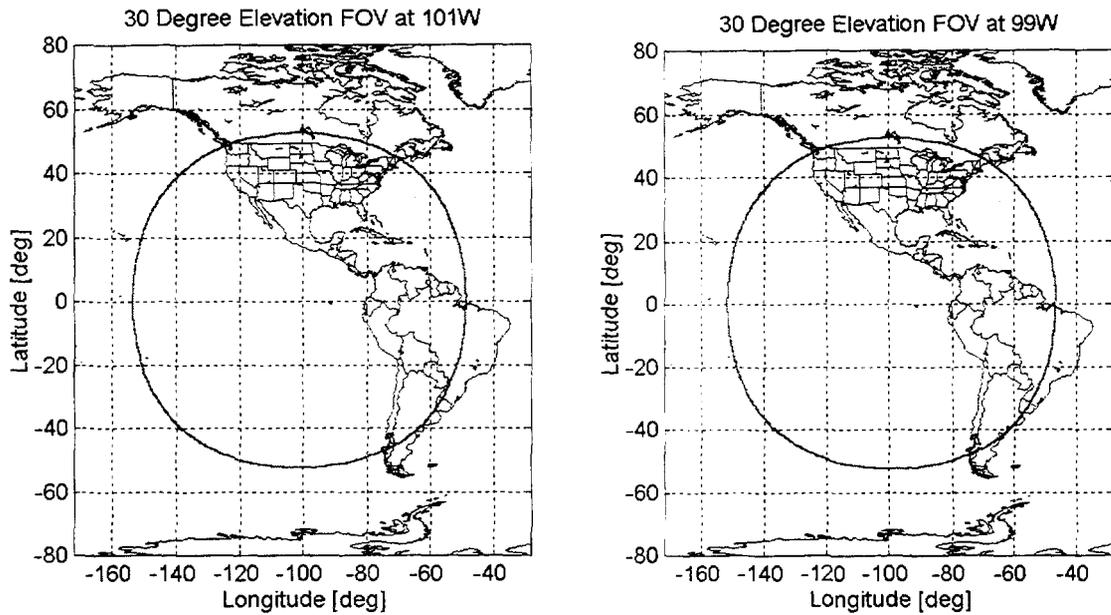
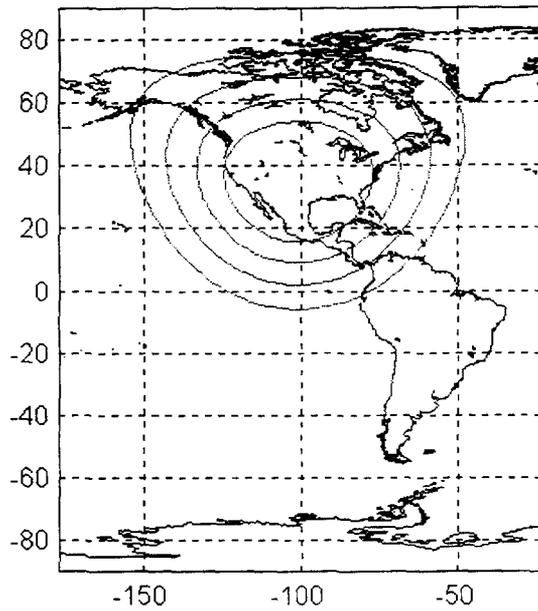


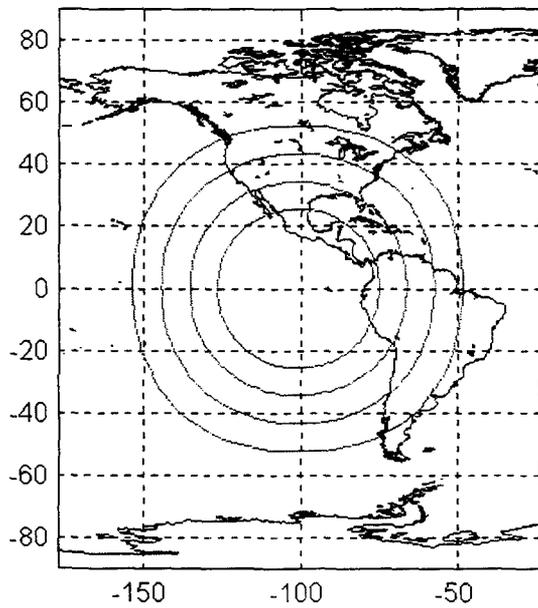
Figure C-2. Field of View for StarLynx™ GSO Satellites

## C.2 ELEVATION ANGLE CONTOURS FOR STARLYNX™ SATELLITES

Figure C-3 shows elevation angle contours for a StarLynx™ MEO satellite when it covers the continental United States (CONUS). Contours are shown in increments of 10° starting with 60° as the inner most contour, with a cutoff at the minimum 30° elevation angle. Figure C-4 shows elevation angle contours for the StarLynx™ GSO satellite at 101° W. As Figure C-3 and Figure C-4 indicate, both the MEO and GSO satellites cover all of CONUS when their subsatellite longitudes are near the center of CONUS.



**Figure C-3. Elevation Angle Contours for StarLynx™ MEO Satellite Over CONUS**



**Figure C-4. Elevation Angle Contours for StarLynx™ GSO Satellites**

### C.3 ANTENNA SPOT BEAM PATTERN FOR STARLYNX™ SATELLITES

Figure C-5 shows a plot of the antenna spot beam pattern for a StarLynx™ MEO satellite over CONUS. Figure C-6 shows the antenna spot beam pattern for a StarLynx™ GSO satellite over CONUS. At any one time, up to 40 spot beams per GSO satellite and 32 spot beams per MEO satellite will be illuminated. Because up to three MEO satellites and four GSO satellites can be in view over the U.S., a total of over 250 spot beams can be simultaneously utilized for U.S. service.

The MEO satellites have steerable beams, which can serve any area within a satellite's field of view. The beam areas can be maintained during satellite motion or adjusted at any time. Accordingly, the MEO satellites can provide service to any area desired. The GSO satellites also have scanning beam capabilities to ensure ubiquitous U.S. service.

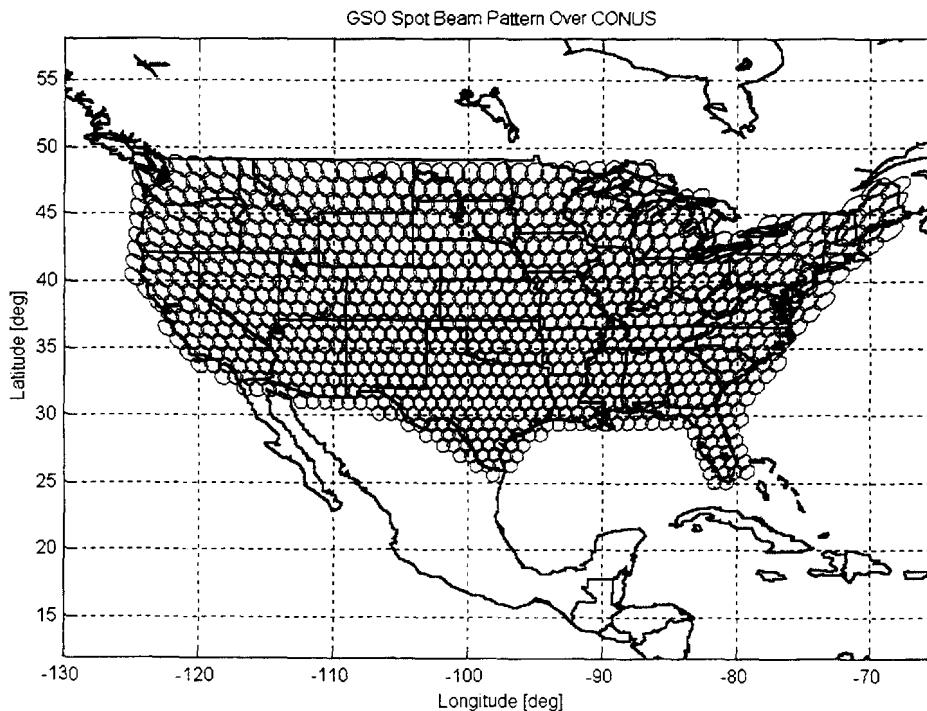
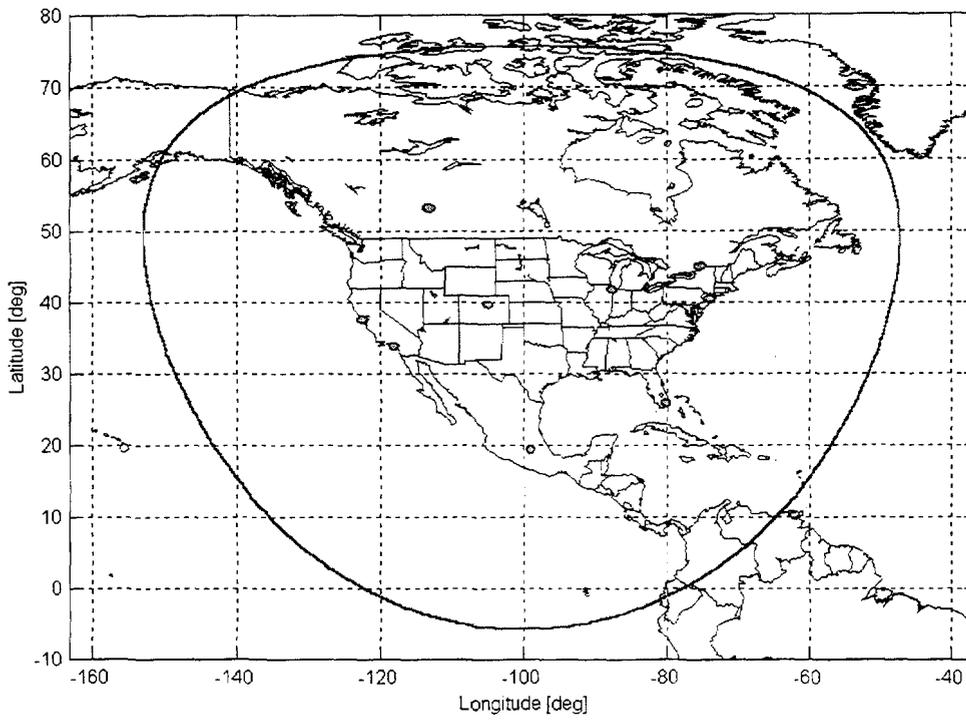
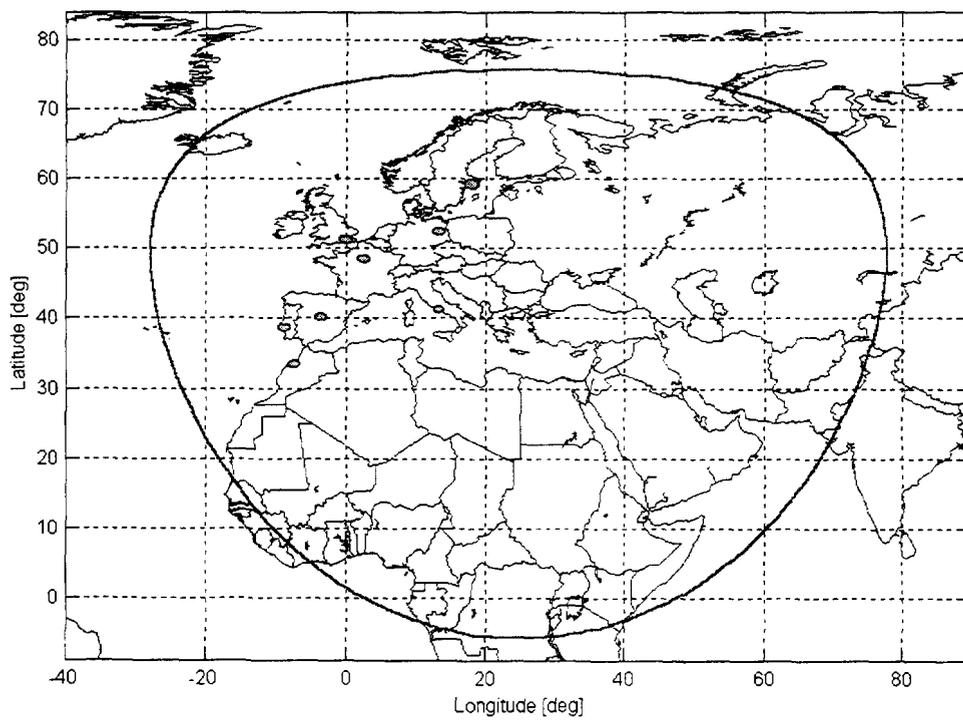


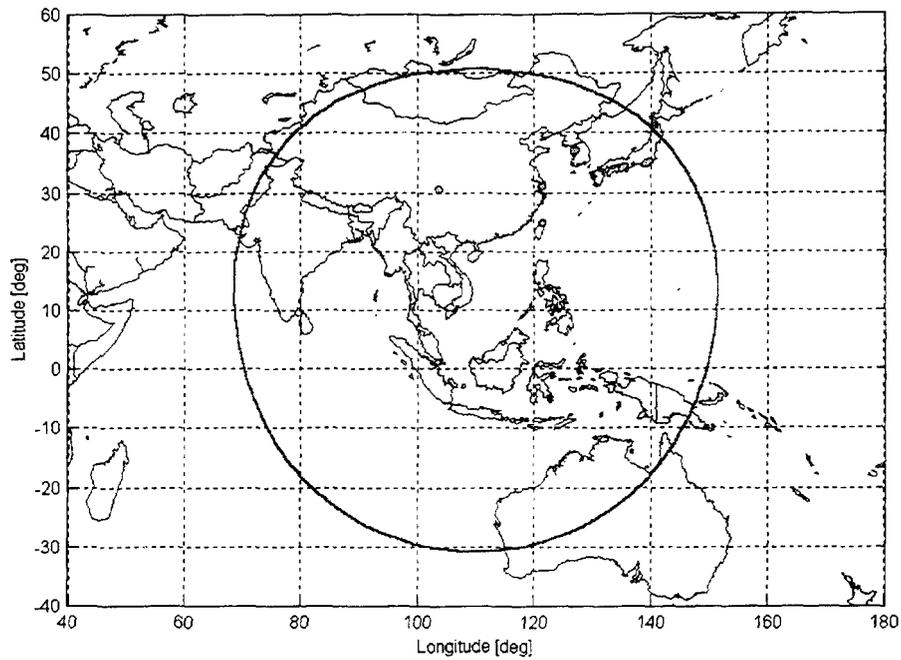
Figure C-5. Illustrative Spot Beam Pattern for a StarLynx™ MEO Satellite



(a) North America



(b) Europe



(c) Asia

Figure C-6. Example StarLynx™ MEO Spot Beam Coverage Over (a) North America, (b) Europe, and (c) Asia

#### C.4. ANTENNA CONTOUR PLOTS FOR STARLYNX™ SATELLITES

Figure C-7 shows antenna contours for StarLynx™ GSO satellites.

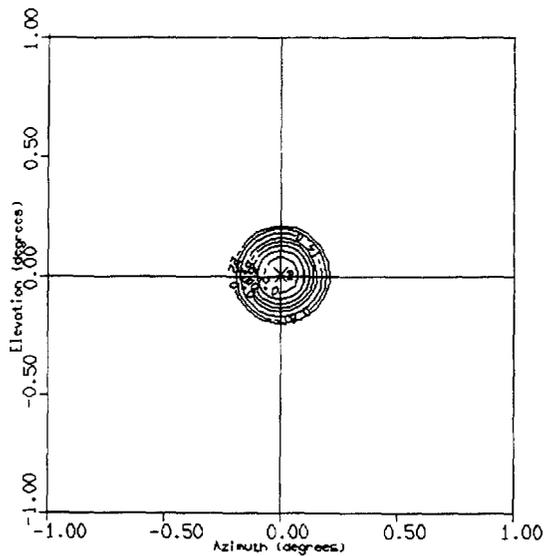
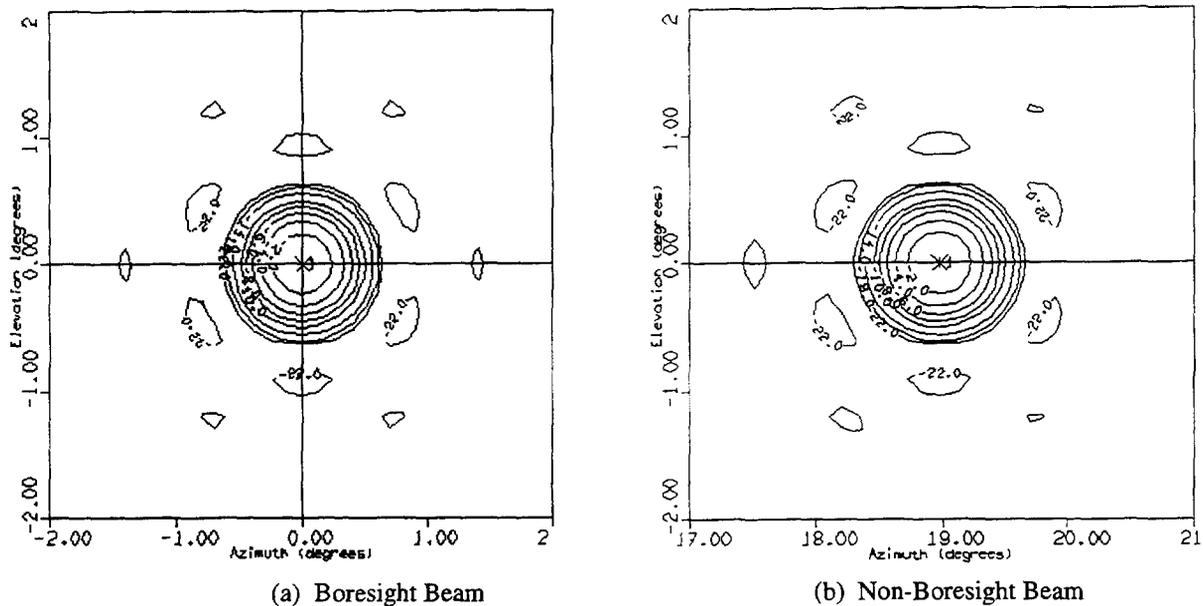


Figure C-7. Transmit/Receive Beam Contours for StarLynx™ GSO Satellite

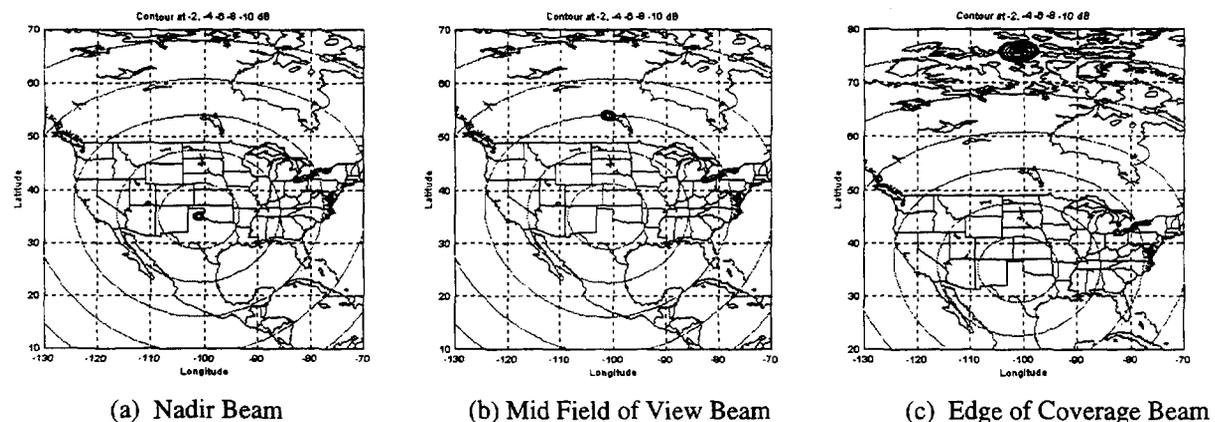
$$(G_{\max} = 56 \text{ dBi}, G/T_{\max} = 27.9 \text{ dB/K})$$

Figures C-8 (a) and C-8 (b) show antenna contours for StarLynx™ MEO satellites, with  $G_{\max} = 44.3$  dBi,  $G/T_{\max} = 16.2$  dB/K.



**Figure C-8. Transmit/Receive Beam Contours for StarLynx™ MEO Satellite Phased Array Beams ( $G_{\max} = 44.3$  dBi,  $G/T_{\max} = 16.2$  dB/K)**

Figure C-9 (a) shows antenna contours of a spot beam in the nadir direction. Figure C-9 (b) shows antenna contours of a spot beam midway between nadir and the edge of coverage, delineated by the 30° elevation angle contour. Figure C-9 (c) shows antenna contours of a spot beam at the edge of coverage.



**Figure C-9. Beam Contours for a StarLynx™ MEO Satellite Over CONUS**

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## APPENDIX D: FINANCIAL REPORT



#### HOWARD HUGHES

Pioneer Howard Hughes founded Hughes Aircraft Company in 1932. Two years later he set his first aircraft speed record in the "H-1 racer." In 1938, the aviation pioneer and his crew were the first to fly non-stop around the world.

#### FALCON MISSILE

The world's first air-to-air, radar-guided missile was Hughes' Falcon. The company produced more than 50,000 Falcons between 1952 and 1963.

#### LASER

In 1960, Hughes scientists achieved the first successful operation of a ruby laser, a breakthrough hailed as one of this century's most important engineering achievements.

#### PIONEER VENUS

The first extensive mapping of Venus using radar was a major achievement of the Pioneer Venus space mission, which began in 1978. Hughes built the orbiting spacecraft and the probe that carried the instruments to collect data for the National Aeronautics & Space Administration.

#### SYNCOM

Hughes launched the world's first synchronous satellite in 1963. Syncom transmitted the first high-quality voice message between two U.S. Navy ships on opposite sides of the Atlantic Ocean and paved the way for the commercial satellite communications industry.

#### RADAR

The first tactical air-to-air fire-control radar, delivered in 1949 to the U.S. Air Force, was named the "Hughes E-1." This innovative new radar enabled a pilot to fire at a target he could not see.

#### GM SUNRAYCER

Hughes' advanced solar energy technologies were vital components of the GM Sunraycer, an innovative solar-powered electric General Motors vehicle that in 1987 won the grueling 1,950 mile World Solar Challenge race across Australia.

#### SURVEYOR 1

In 1966, Hughes' unmanned Surveyor 1 was the first spacecraft to make a controlled, soft landing on the moon. Hughes designed and built seven Surveyor spacecraft, which led the way for future manned landings.

#### DIRECTV

Hughes launched DIRECTV®, the nation's first high-powered digital direct broadcast satellite television service, in 1994. Customers receive signals with the DSS® system, which features an 18-inch satellite dish, receiver unit and remote control.



**Message to Shareholders...**  
The vision that is reshaping Hughes  
See Page 2



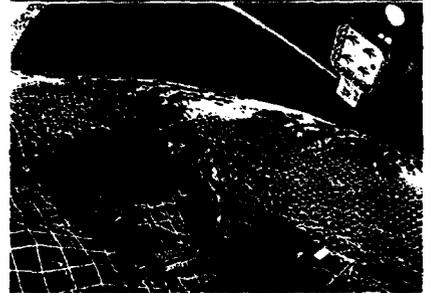
**Financial Highlights at a glance**  
See Page 5

*Hughes Electronics Corporation, a subsidiary of General Motors Corporation, designs, manufactures and markets advanced electronics equipment and services. The markets for the company's products and services are undergoing dramatic changes, and to remain a financial, market and technology leader, Hughes must change, too. This annual report, following the theme of Building on Strength – Launching the Future, reviews the strengths of Hughes Aircraft Company, Delco Electronics and the Telecommunications & Space companies, and outlines opportunities and plans for these operations.*

**Automotive Electronics...**  
Making changes at Delco Electronics  
See Page 6



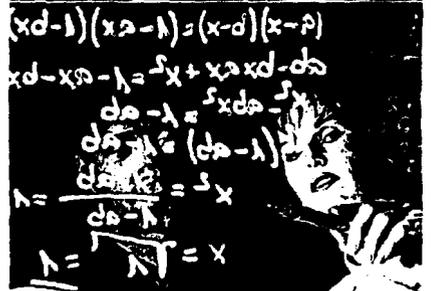
**Aerospace & Defense Systems...**  
Winning in a tough market  
See Page 10



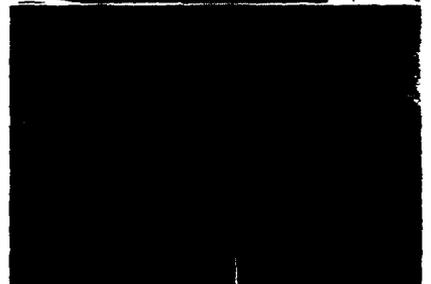
**Telecommunications & Space...**  
Planning for a "Wireless Expressway"  
See Page 14



**Research & Development...**  
Concepts are turned into advanced products at Hughes Research Laboratories  
See Page 26



**Operating & Financial Review**  
See Page 27



## MESSAGE TO SHAREHOLDERS

### *Building on Strength...LAUNCHING THE FUTURE*

Most annual reports offer a look back – a survey of the year that was. For Hughes Electronics, this report marks a major change in our company. Not only does it outline a year of goals met and gains made; it also describes the substantial strengthening of our business segments and the unlocking of shareholder value expected from three significant transactions.

It's become a cliché to note the pace of change in our global economy. Yet if our competitive environment is teaching us any lessons

“We look forward to a more focused participation in the Information Age with the excitement that comes from having both the technology and the services that satisfy market needs.”

at all, it is that it's not enough to lead the market of the moment. To stay on top, a company has to see over-the-horizon: to anticipate the changes and challenges ahead, to see – before others see them – not just obstacles but opportunities. That is the key reason Hughes Electronics made its decision to look beyond its success in today's markets, to restructure and refocus itself for the future.

On January 16, 1997, GM, Hughes and Raytheon announced their plan, pending final government and shareholder approvals, to: 1) spin off Hughes Aircraft Company (HAC) after which it will merge with Raytheon; 2) transfer Delco Electronics to GM's Delphi Automotive Systems; and 3) recapitalize GM's Class H common stock – creating a new tracking stock linked to the performance of Hughes Electronics' telecommunications and space businesses.

That's the “what.” As for the “why” behind the transactions, we must simply look to the competitive market around us. 1996 saw the continued post-Cold War consolidation of the defense sector, driven by more downward pressure on defense procurement that has cut the overall defense budget in half since the height of the 1980's buildup. A new wave of mega-mergers is redefining the meaning of critical mass, such that we believed the best future for HAC was in combination with another industry leader. HAC's merger with Raytheon offers our customers a stronger critical mass of programs, skills and investment that will be sustainable while enabling reduced costs. The merger should also offer GMH shareholders excellent value in the face of the defense industry's restructuring.

Just as the defense sector dictated the need for redefinition, the evolu-



left to right:

Charles H. Noski  
Vice Chairman and  
Chief Financial Officer

C. Michael Armstrong  
Chairman of the Board and  
Chief Executive Officer

Michael T. Smith  
Vice Chairman

tion of the automotive electronics industry also dictated change. Customers' desire for systems rather than separate components created a natural alliance for Delco and Delphi – opportunities in combination that neither alone could seize. Delco/Delphi will possess capabilities unmatched in the automotive electronics industry, a single entity possessing the breadth and potential to deliver integrated systems at the lowest cost.

Finally, the transactions enable us to take our telecommunications and space businesses to a new level – a chance to bring significantly greater financial resources and a sharper focus of our management, talent and technology to the emerging markets for space and satellite communications. This is an important step as we work to realize our vision of a Wireless Expressway™ – an Information Skyway – using space and satellites to offer instant, affordable and ubiquitous delivery of data, voice and video.

We look forward to a more focused participation in the Information Age with the excitement that comes from having both the technology and the services that satisfy market needs – and a price performance that sets us apart.

- In satellites, we will introduce the most capable, powerful and versatile satellite family in the industry with the launch of our HS 702.

- In networks, we will appeal to a wider Internet user base as we continue to drive down the costs of Turbo Internet™, a satellite-based interactive Internet service that provides speeds 14 times more rapid than today's telephone lines.

- In our soon-to-be-completed merger with PanAmSat, we will expand our global capacity by more than 70% in the next couple of years as we bring needed communications infrastructure to a world evolving toward a single market.

- In DIRECTV®, we will introduce PC-based services that bring access to the Internet, DIRECTV programming, a menu of Web sites

and multi-media magazines – all to a single dish serving both your television and personal computer.

- Internationally, Galaxy Latin America will expand its coverage to include all of the 90 million television households of Latin America and the Caribbean, while the expected launch within a year of DIRECTV Japan will take our direct-to-home service to a country that is only 4% cable-penetrated, yet is mature in its interest in entertainment, information and education.

“Using technology, talent and investment to lead in markets, to build new businesses, to create new value: that’s what the new Hughes Electronics will be all about.”

#### **BUILDING ON STRENGTH...Launching the Future**

For Hughes Electronics, 1996 marked a year of goals met and ground gained, paving the way for the transactions announced in January 1997.

##### **AEROSPACE AND DEFENSE SYSTEMS:**

For the year, Hughes Aircraft Company reported a nearly 7% increase in revenues, to \$6.3 billion. Equally important, HAC maintained its double-digit margins, as well as a sizable \$8.2 billion backlog in missiles, sensors and information systems and services. In the downsized defense procurement environment, HAC posted an impressive 77% win ratio for the competitions it entered. Finally, in the key area of international growth, 1996 saw an increase of 80% for international orders.

##### **AUTOMOTIVE ELECTRONICS:**

Delco Electronics ended 1996 retaining its industry lead in market share, while posting a 20% rise in international and non-GM North American Operations sales. A fourth-quarter

reorganization strengthened Delco to deal with a challenging competitive environment, making possible new steps toward rightsizing and structural cost reductions, accelerated technology introduction into GM's North American Operations, and a realignment of international operations to sharpen focus on profitable growth.

TELECOMMUNICATIONS AND SPACE:

As the fastest growing segment of Hughes Electronics, Telecommunications and Space posted a 33% growth rate in 1996 — with total revenues of \$4.1 billion. Hughes Space and Communications increased revenues by 21%. Hughes Network Systems broke the \$1 billion revenue threshold for the first time, while the PanAmSat merger announcement marked a major milestone on the path to a truly global communications service. DIRECTV in the United States, attained a subscriber base of 2.5 million in early 1997, making it equivalent in size to the nation's seventh largest cable television company.

Using technology, talent and investment to lead in markets, to build new businesses, to create new value: that's what the new Hughes Electronics will be all about. With more focus on our markets, with capital available for investment and with a team that has proven it makes a difference, our new dedicated company will give us more potential to create value.

It is never easy to so significantly restructure a

business that is succeeding. Employee lives are disrupted, customer relationships must be preserved, shareholders need to be assured and satisfied even as the need to do daily battle with the competition continues.

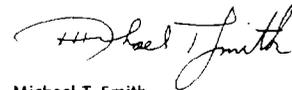
Yet, at each stage in our company's history, Hughes has always been a place where people accept change as challenge — a company that's been too busy defining the future to be afraid of it. We are confident the changes we're making in 1997 will serve to solidify the one constant through Hughes' long history — securing this company's legacy as an industry leader for years to come.



C. Michael Armstrong  
Chairman of the Board and  
Chief Executive Officer



Charles H. Noski  
Vice Chairman and  
Chief Financial Officer



Michael T. Smith  
Vice Chairman

# HUGHES ELECTRONICS CORPORATION

## Financial Highlights\*

(Dollars in Millions, Except Per Share Amounts)	1996	1995	1994
<b>FOR THE YEAR</b>			
Revenues	\$15,918	\$14,808	\$14,099
Net Sales	15,744	14,714	14,062
Earnings	1,151	1,108	1,049
% of Revenues	7.2%	7.5%	7.4%
Operating Profit <sup>(2)</sup>	\$ 1,594	\$ 1,667	\$ 1,630
% of Net Sales	10.1%	11.3%	11.6%
<b>Earnings Attributable to General</b>			
Motors Class H Common Stock			
Total	\$ 283	\$ 265	\$ 242 <sup>(1)</sup>
Per Share	2.88	2.77	2.62 <sup>(1)</sup>
<b>Dividends Per Share of</b>			
GM Class H Common Stock	0.96	0.92	0.80
<b>Average Number of Shares of</b>			
GM Class H Common Stock			
Outstanding (in millions)	98.4	95.5	92.1
Capital Expenditures <sup>(3)</sup>	\$ 840	\$ 820	\$ 746
Research and Development Expenses	730	762	699
Return on Equity <sup>(4)</sup>	19.0%	20.8%	22.9% <sup>(1)</sup>
Pre-Tax Return on Total Assets <sup>(5)</sup>	13.1%	14.0%	14.5%
<b>AT YEAR-END</b>			
Cash and Cash Equivalents	\$ 1,161	\$ 1,140	\$ 1,502
Backlog	15,100	14,929	13,210
Number of Employees (in thousands)	86	84	79

\* Financial Highlights are unaudited and exclude purchase accounting adjustments related to GM's acquisition of Hughes Aircraft Company

(1) Includes the unfavorable effect of accounting change of \$30 million, or \$0.08 per share of GM Class H common stock.

(2) Net Sales less Total Costs and Expenses other than Interest Expense.

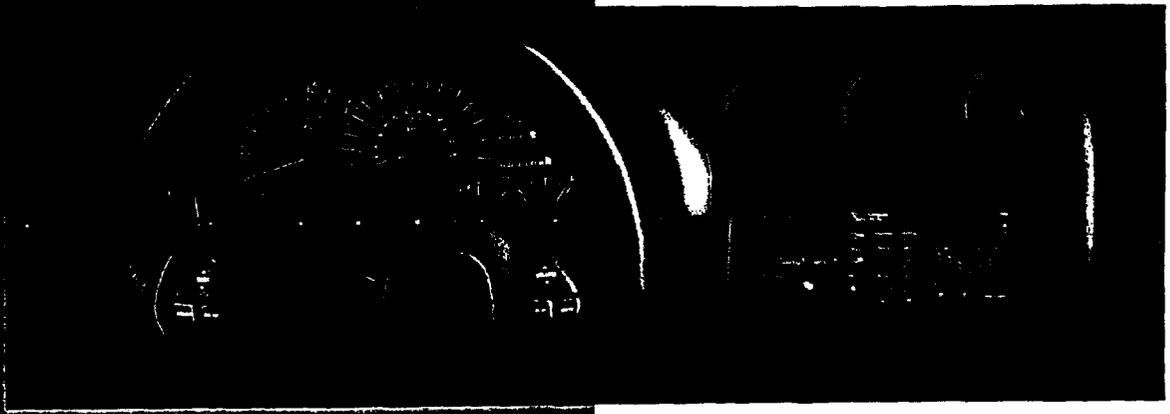
(3) Includes expenditures for telecommunications and other equipment of \$188 million in 1996, \$275 million in 1995, and \$256 million in 1994.

(4) Earnings Used for Computation of Available Separate Consolidated Net Income divided by average stockholder's equity (General Motors' equity in its wholly-owned subsidiary, Hughes Electronics). Holders of GM Class H common stock have no direct rights in the equity or assets of Hughes

Electronics, but rather have rights in the equity and assets of GM (which includes 100% of the stock of Hughes Electronics).

(5) Income before Income Taxes divided by average total assets

# HUGHES AUTOMOTIVE ELECTRONICS



**D**elco Electronics (DE) has been one of the world's largest providers of automotive electronics for many years – achieving a 22 percent global market share in 1996 – and the company intends to remain at the top of this \$24 billion market.

Vital components of DE's continued global leadership are its growth with non-

Furthermore, DE continues to demonstrate its technology leadership. Its navigation and communications technologies are found in the new OnStar™ on-vehicle communications system for the 1997 GM models; its advanced electronics are part of GM's EV1™ electric vehicle, and a variety of DE designed and manufactured components are found on new GM models.

DE

DE's products are core components of auto cockpit instrumentation displays, controls that increase safety and comfort, as well as audio systems that provide entertainment.

The automotive industry has been undergoing major structural changes. Automakers are seeking suppliers who can give them more cost-effective systems solutions rather than individual components. To maintain its leadership position in this changing marketplace, DE has been undertaking a realignment of its operations.

DE's traditional focus has been on designing and manufacturing vehicle electronics, and it has long been a world leader in its field. The company's broad product line – developed over 60 years – includes engine and transmission controls; antilock brake control modules; air bag electronics; vehicle security electronics; and audio, climate control, navigation and communications systems.

Since these products complement those of Delphi Automotive Systems, the GM sector that produces automotive components and systems, DE has been working more closely with Delphi. For the last several years, the two companies have been co-locating many of their international facilities. Together, the two companies have begun offering

automakers inte-

...ation  
customer  
... results  
... gains in  
... from  
... GM's  
... increased to  
19 percent of total  
DE revenues, a 22  
percent increase  
over 1995.

... for  
... supplies  
... world  
... GM's  
... suppliers  
... a select  
... receive the award.

The 1997 Chevrolet Corvette features 10 of DE's advanced technologies, including systems that improve performance, security and driver safety.



grated electronic and mechanical systems solutions, such as Traxxar. This system increases vehicle stability and safety by integrating steering, braking and suspension electronic controls. Traxxar is being marketed on the 1997 Cadillac as StabiliTrak. Assuming the pending transfer of Delco Electronics to Delphi Automotive Systems occurs later in 1997 (see page 28 for further details), the new partnership will have an even greater competitive edge in the global marketplace.

Another facet of DE's realignment was the appointment in 1996 and early 1997 of a new senior management team, headed by General Manager Michael J. Burns. In 1997, DE's management will continue to improve the company's competitiveness by satisfying customers with cost savings and lower prices plus high manufacturing performance standards; expanding international operations with an increased emphasis on profitable growth; and continuing technology leadership.

#### Satisfying Customers

DE's focus on customer satisfaction stresses cutting costs and striving for manufacturing excellence through on-time delivery and products with zero defects.

**Reduce Costs.** The company made further progress in cutting costs in 1996. However, work stoppages at several North American GM plants, intensified global price competition and ongoing investment in international expansion reduced DE's operating margin.

DE continues to achieve cost reduction by incorporating the latest advances in technology into its products more rapidly than many of its competitors. DE also is redesigning its products to decrease the number of parts it buys for each system. Both cost-saving approaches are essential for the company to remain a world-leading supplier to its automotive customers.

An example of how redesign can dramatically impact costs is DE's new generation of sensors for air bag systems, the SDM-R, which employs nearly 50 percent fewer parts and is priced almost 60 percent lower than the previous design – and offers comparable functionality, performance and quality. Another successful redesign effort focused on the company's GEN-II manifold pressure sensor, which helps increase a car's performance. Through redesign, DE cut the number of assembly components nearly in half and improved reliability compared with its predecessor design.

Because purchased materials account for more than 50 percent of the cost of the company's products, redesign continues to have the greatest potential for reducing costs in future years for all of DE's customers.

Another way DE attacked costs in 1996 was by continuing to rationalize and integrate its processes. For example, by establishing uniform processes for engineering teams, DE was able to eliminate significant non-value-added costs. In 1997, another important component of its realignment efforts is to lower structural costs by streamlining the organization.

**Ensure Quality.** DE has set high standards for each part of its operations and expects continuous improvement toward achieving them. This helps assure that the company will meet its goal of delivering products to customers on time and manufacturing products with zero defects. In addition, the company has received certification by independent experts. In 1995, DE achieved ISO 9000 certification, a well-regarded interna-



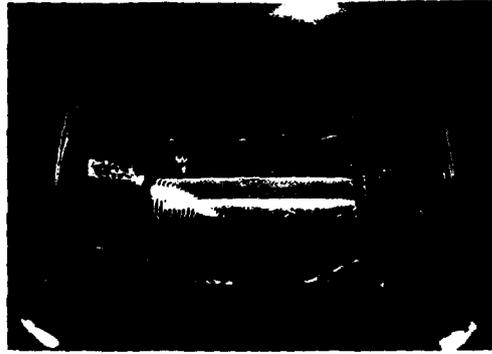
The Monsoon brand audio system, introduced by DE in 1996, is being marketed directly to consumers who seek both power and finesse in a vehicle sound system. The branding and retail marketing effort is designed to stimulate product demand and help automakers sell cars when they offer Monsoon as an option.



Rockford Fosgate's radios are supplied by DE. These high-performance auto sound systems are available to consumers through independent and regional distributors.



Many of the components and systems in GM's EV1 electric vehicle were developed by DE. The company's inverter (near right), the propulsion system's brain, converts direct current stored in the batteries to alternating current required by the electric motor.



DE's MagneCharge™ inductive charging system (far right) provides a safe, efficient and convenient way to fill up the car.



tional standard for manufacturers, in all of its manufacturing facilities around the world. Further, in early 1997 DE won global QS-9000 certification, which is the U.S. automotive industry's own tough quality standard for automotive equipment suppliers.

#### Expanding Globally with a Focus on Profitability

A key part of DE's long-term growth strategy is to diversify its customer base, and sales to international and non-GM-NAO customers increased to more than \$1 billion in 1996, compared with \$841 million in 1995. Globally, DE has approximately 50 non-GM-NAO customers. The company is continuing to expand, but with an intensified focus on the profitability of its operations.

#### International Expansion. In 1996, DE:

- Opened a new design facility in Singapore that will serve Pacific Rim customers;

- Dedicated a new facility in Piracicaba, Brazil, that is manufacturing parts for automakers serving the South American market, including GM do Brasil;
- Opened a high-tech manufacturing facility in Liverpool, England, that is supplying DE's hybrid engine control unit and other electronics to European customers, and;
- Announced a joint venture, named Shanghai Delco Electronics & Instrumentation Co., Ltd., that is manufacturing a wide variety of automotive products in Shanghai, China, for the Chinese market.

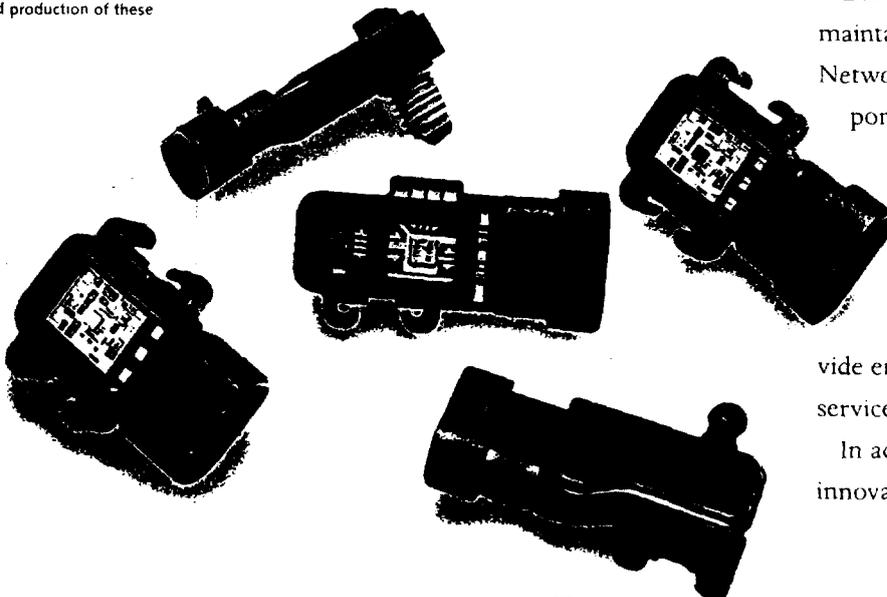
*New International Contracts.* Among DE's international wins in 1996 was a breakthrough contract for audio systems from Daihatsu Motor Company. For the first time, DE will be supplying radios on cars to be sold to Japanese consumers.

#### Continuing Technology Leadership

DE continues to develop new technology to maintain its competitive edge. DE, Hughes Network Systems and EDS have teamed to support GM's OnStar smart car system, introduced in 1997 Cadillacs. OnStar incorporates DE's automobile satellite navigation system that employs the Global Positioning System. Delco technologies also enable OnStar to provide emergency message capability and other services.

In addition, DE developed more than 15 innovative technologies for GM's new EV1

DE was a pioneer developer of hybrid manifold pressure sensors, a product now used by customers around the world. In 1996, DE won the prestigious PACE Award from Automotive News for improvements in the design and production of these sensors.



electric vehicle, which was introduced in California and Arizona in 1996, including the vehicle's power electronics bay and the MagneCharge inductive charging system.

And DE's PASS-Key® III security system is a standard feature on Buick's all-new Park Avenue. PASS-Key III offers a theft-deterrent system that is set to one of 68.7 billion codes. The system electronically determines if the correct key has been inserted into the vehicle ignition; if not, it sends a message to the engine control system that prevents the car from starting.

Looking ahead, DE engineers are working on smart occupant sensing, employing weight-based and infrared sensing devices to improve the safety of air bag systems by adjusting deployment according to the size and location of the occupant.

**Becoming an Even Tougher Competitor**

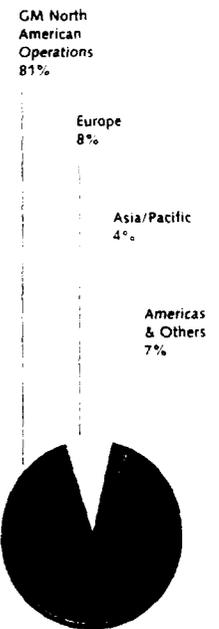
The proposed transfer of DE to Delphi later in 1997 is designed to meet the changing needs of the vehicle marketplace. By combining the strengths of the two companies, management expects to achieve greater efficiencies and to create an industry-leading supplier with an



EyeCue® increases safety by projecting critical vehicle information on the windshield, allowing drivers to keep their eyes on the road. DE's innovative system is available for cars and trucks.

unparalleled portfolio of electronically enhanced vehicle systems.

Reducing the duplication of resources should significantly improve the total cost structure. In addition, the DE-Delphi team will be able to offer better customer service by sharing commercial accounts, customer contacts and a global customer support network. With all of these advantages, the DE-Delphi team will be a much tougher competitor in the global automotive marketplace.



Percentage of 1996 Revenues by Customer Group



Percentage of Hughes Revenues

The following table sets forth selected pro forma data for the Automotive Electronics segment.

(Amounts in millions, except percentages)	Years Ended December 31		
	1996	1995	1994
Revenues	\$ 5,350.8	\$ 5,561.3	\$ 5,221.7
Revenues as a percentage of Hughes Revenues	33.6%	37.6%	37.0%
Net Sales	\$ 5,311.3	\$ 5,479.7	\$ 5,170.6
Operating Profit <sup>(1)</sup>	654.0	869.0	794.8
Operating Profit Margin <sup>(2)</sup>	12.3%	15.9%	15.4%
Identifiable Assets at Year-End	\$ 3,394.9	\$ 3,267.4	\$ 3,429.8
Depreciation and Amortization	195.9	151.4	142.2
Capital Expenditures	196.0	264.7	166.4

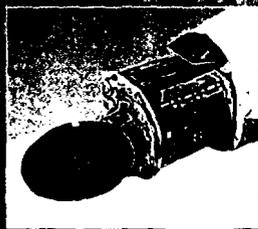
Certain amounts for 1995 have been reclassified to conform with 1996 classifications.  
 (1) Net Sales less Total Costs and Expenses other than Interest Expense.  
 (2) Operating Profit as a percentage of Net Sales.

# HUGHES AEROSPACE & DEFENSE

**H**ughes Aircraft Company (HAC) is an acknowledged leader in its core missile, sensor and information systems programs. It participates in about half of the U.S. tactical missile programs, provides radars to four out of five frontline U.S. fighter aircraft, and has developed 65 percent of the world's air defense systems.

In 1996, revenues grew 6.6 percent to \$6.3 billion and backlog grew 6.2 percent to \$8.2 billion. HAC achieved an operating profit margin of 11 percent, the fourth year in a row of double digit profit margins. International new orders rose 80 percent.

Even in the face of a declining defense budget, HAC won 77 percent of all the



The Hughes APG-73 radar is being integrated with the AMRAAM missile and other weapons during operational testing of the F/A-18 E/F

The HAWK-AMRAAM hybrid integrates the HAWK system, deployed in 19 countries, with the increased firepower of Hughes AMRAAM® missile to provide a modern, affordable air defense system.

competitions it entered, increasing its contract win ratio by 17 percent over 1995.

In its fast-growing information and military computer systems and services businesses, HAC won contract awards for supplying U.S. Air Force personal computers and workstations, maintaining

U.S. Navy depots, and developing navigation systems for the Federal Aviation Administration.

These new contracts have combined potential revenues of more than \$3 billion over five years.



The accomplishments of HAC and its people have enabled it not only to post excellent financial results, but also to meet the challenges of dynamic global defense markets and create an outstanding merger opportunity in a rapidly consolidating industry

(see page 28 for further details).

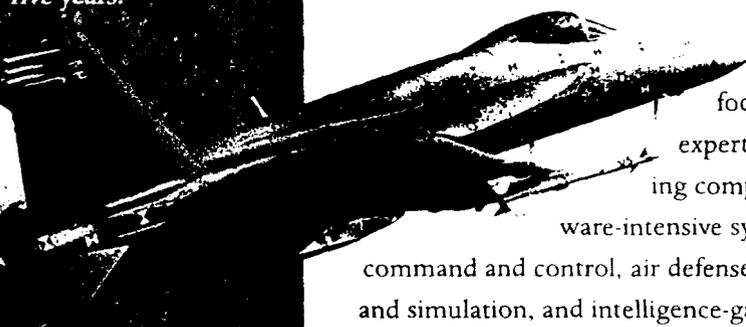
HAC delivered on its strategies last year and will continue to do so in 1997. The major strategies are: strengthening its leadership position through consolidations and realignments; providing advanced technologies at low cost; increasing its domestic defense program win/loss ratio; and expanding international sales.

#### Strengthening Leadership

**Reorganization/Consolidation.** The organization of HAC's considerable technologies, skills and assets was further refined in 1996 with the consolidation of the company's Electro-Optical Systems business unit and the Radar and Communications business unit into a Sensors and Communications Systems unit, whose programs include space, airborne and surface-based radars; lasers, infrared and other sensors; and military communications.

After this consolidation, HAC has three primary business units. The other two are: Weapons Systems - responsible for numerous cruise missile and tactical programs, and ship-board display and control systems; and

Information Systems - focusing HAC's expertise in building complex software-intensive systems for command and control, air defense, training and simulation, and intelligence-gathering.



*Partnerships.* HAC is carrying out several successful partnerships with Raytheon that were entered into prior to the proposed merger.

For example, in 1996 a HAC-Raytheon team won a key study phase contract for the U.S. Army's Aerostat program, an over-the-horizon surveillance effort using high-altitude sensor technology.

And in Norway, HAC and Raytheon have teamed with Kongsberg Gruppen, ASA, to incorporate HAC's Advanced Medium Range Air-to-Air Missile (AMRAAM), along with the Hawk missile, in a new air defense system that will allow a single firing unit to launch either missile.

If the HAC-Raytheon merger occurs as expected, there will be many more opportunities for integrating the two companies' parallel operations, which should give the new company a considerable advantage in the marketplace.

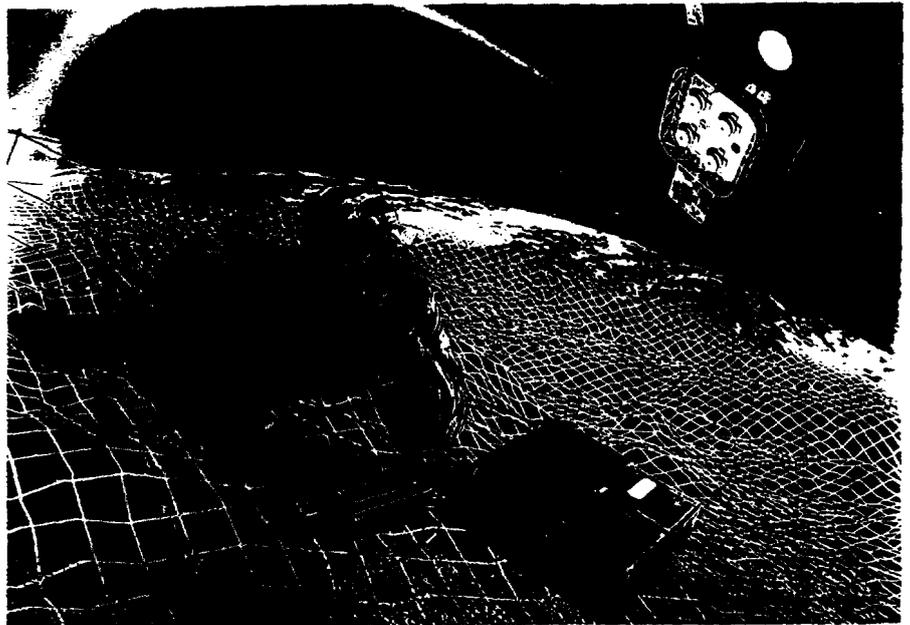
#### Fielding Advanced Technologies at Low Cost

Today, crucial weapons and protective systems – aboard tanks, planes and ships and in the hands of soldiers themselves – must be made smarter by integrating next-generation electronics technologies, yet must be produced using low-cost manufacturing approaches. HAC excels at this.

In the United States, HAC is leading a team carrying out the Land Warrior™ contract to equip soldiers with an integrated system of 40 state-of-the-art components. The U.S. Army plans to order 34,000 units, and interest from U.S. allies is strong. The global market potential for revenue is in the billions of dollars.

To deliver the kind of value Land Warrior represents, and to achieve life-cycle cost containment in its programs, HAC is pursuing a multi-faceted approach.

Acquisition reform is one way. For the U.S. Army's Fire Support Combined Arms Tactical Trainer (FSCATT) program, acquisition reform is



helping HAC cut substantial time and cost during development, thereby lowering contract costs.

Other keys to HAC's ability to lower total life-cycle costs include: using today's most advanced electronics to achieve ten-fold improvements in performance-to-cost ratios; adopting commercial off-the-shelf technologies and common processes; leveraging all of these to build in high reliability from the start; and offering military customers up-front warranties on new systems, plus lifetime service contracts.

Innovative ways such as these to cut costs can be applied at every stage of building a weapons system. In a shrinking market driven by value, only companies that are able to consistently deliver on promises to be a low-cost manufacturer will succeed.

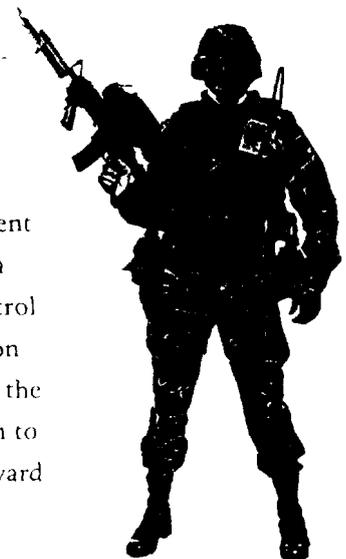
#### Winning Domestic Contracts

*Civil Aviation Expansion.* Two major recent contract wins reinforce HAC's position as a significant participant in the air traffic control marketplace: a \$483 million Federal Aviation Administration (FAA) award for improving the capability of the Global Positioning System to support navigation and landings; and an award of up to \$1 billion, jointly won with

HAC is a leading designer and manufacturer of military tactical communications, electronic combat and command and control products



Land Warrior is the U.S. Army's first integrated fighting and support system for soldiers. HAC is the systems integrator for this new product line, which has 40 components.





The Hughes integrated Synthetic Aperture Radar is a system employing military reconnaissance technology that helps non-military agencies with such surveillance activities as monitoring the environment and catching smugglers

Raytheon, to provide HAC's TracView air traffic control stations as a backup to FAA and Department of Defense air



traffic control terminals.

**Core Market Contracts.** Last year, HAC won numerous contracts from military customers in its traditional core markets, including more than \$700 million in awards to build AMRAAM missiles for the U.S. Air Force and U.S. Navy, and Tomahawk and Standard Missiles for the U.S. Navy. HAC also won the engineering and manufacturing development contract for the AIM-9X missile. The initial AIM-9X contract is for \$169 million, but the potential value of the program in sales to the U.S. Navy and Air

Force and international customers over the next two decades is \$5 billion.

Another key contract was HAC's more than \$200 million share in a \$641 million award to the Avondale Alliance to design, construct and support the U.S. Navy's next generation of amphibious ships. As systems integrator, HAC will be responsible for electronic systems over the 40-year life cycle of each ship. Because of the overwhelming importance of electronics to the operation and defense of modern high technology warships, this project points the way for HAC to take a leading role in future shipbuilding programs and retrofits of existing ships with the latest electronics.

**Opening New Markets.** Billions of dollars in business to perform military overhaul, repair and maintenance work previously exclusively done by government-run depots and terminals is being opened to industry. HAC is in the forefront of companies winning these "privatization" contracts. Last year, it won the largest such contract so far, an award with a potential value of \$1.3 billion over five years for privatizing the Naval Air Warfare Center in Indianapolis.

In the growing U.S. government market for desktop computers, workstations and informa-

(Opposite Page)  
HAC's Advanced Oceanic Automation System for the Federal Aviation Administration will provide direct controller-to-pilot data-link communications, automatic position reporting and region-to-region flight information communications.



The Unit Training Device is a cost-effective way for the U.S. Air Force to provide continuing combat training. HAC is the second largest training and simulation systems provider in the world.