

ARCHIVED REPORT

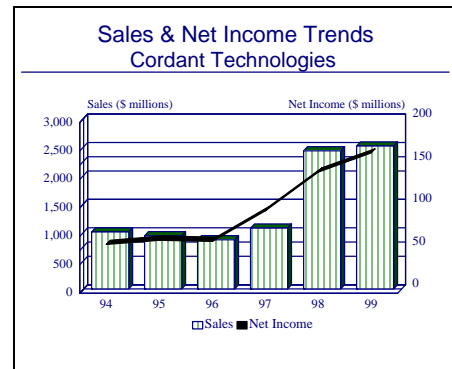
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Cordant Technologies - Archived 3/2002

Outlook

- Alcoa completed its acquisition of Cordant Technologies in May 2000
- Alcoa's primary interest was in Howmet Castings
- Alliant Techsystems will acquire Thiokol Propulsion from Alcoa in a deal valued at \$685 million



Headquarters

Alcoa
201 Isabella St. at 7th St. Bridge
Pittsburgh, PA 15212-5858
Telephone: (412) 553-4545
Web site: <http://www.alcoa.com>

(Formerly Cordant Technologies)
Gateway Tower West, Suite 1600
15 W South Temple
Salt Lake City, Utah 84101
Telephone: (801) 933-4000

Since its founding in 1930, Cordant Technologies (formerly Thiokol Corporation) has supplied solid fuel rocket propulsion for every manned space program and every land-based ICBM program. The company is a

leader in the development and production of high-technology solid rocket motors for aerospace, defense and commercial products; a major supplier of ordnance products; and recently a manufacturer of precision fastening systems for the aerospace and industrial markets.

In May 1998, Thiokol changed its name to Cordant Technologies. The new identity reflects the company's broadened business portfolio consisting of three businesses: Thiokol Propulsion, Howmet International and Huck International.

In March 2000, aluminum manufacturer Alcoa Inc purchased Cordant in a deal valued at \$2.9 billion.

Structure and Personnel

Structure prior to acquisition by Alcoa.

James R. Wilson
Chairman, President and Chief Executive Officer
Richard L. Corbin
Executive Vice President and Chief Financial Officer
James E. McNulty
Executive Vice President, Human Resources and Administration
Robert L. Crippen
Vice President & President, Thiokol Propulsion

Bruce M. Zorich
Vice President & President, Huck International Inc
Daniel S. Hapke, Jr.
Senior Vice President and General Counsel
Michael R. Ayers
Vice President and Controller
Nicholas J. Iuanow
Vice President and Treasurer
Edwin M. North
Vice President and Secretary

Product Areas

Cordant, through its Thiokol Propulsion unit, is a manufacturer of high-tech solid propulsion systems, ordnance, and composite products for space and defense. Its products include Redesigned Solid Rocket Motors (RSRM) for the nation's Space Shuttle program, Castor booster motors, Peacekeeper and Trident missile solid rocket motors, and propulsion systems for several tactical missile systems. In 1992, the company added precision fasteners to its product line through the acquisition of Huck International.

Although Alcoa has acquired Cordant, the organization and management of the former Cordant operations is believed to be unchanged for the time being.

1. Thiokol Propulsion
 - 1.1 Shuttle Operations
 - 1.2 Commercial Operations
 - 1.3 Launch Vehicle Division
 - 1.4 Tactical Operations
2. Howmet Corporation
3. Huck International
 - 3.1 Industrial Division
 - 3.2 Aerospace Division
 - 3.3 Tooling Division
 - 3.4 International Division

Thiokol Propulsion. Responsibilities include Shuttle booster motors, processing services at Kennedy Space

Center, strap-on solid propulsion systems for expendable launch vehicles and satellite placement motors. This unit is responsible for the Small ICBM first-stage motor, the Peacekeeper first-stage motors, the first- and second-stage components and first-stage loading on the Trident II, and the first-stage and destruct system on the Minuteman. This unit is also responsible for the company's infrared decoy devices and is developing a 120,000 pound, 120 inch Castor motor (Thiokol's Castor IVs are 40-inch-diameter motors). The segment also produces motors for Sea Gnat, Harpoon and VLA. In addition, this division is fabricating small steering motors for the LEAP program. This operation also produces motors for the Patriot, Maverick, Sidewinder and Standard Missile defense systems.

Howmet Corporation. Produces investment casting of superalloys and titanium primarily for jet aircraft and industrial gas turbine (IGT) engine components. Howmet also provides hot isostatic pressing, precision machining and protective coating services.

Huck International. This operation produces specialty fastening systems, including proprietary fasteners, power sources and installation tools. These operations are all undertaken through Huck International, a wholly owned subsidiary of Cordant.

Facilities

Elkton DLV, PO Box 241, 55 Thiokol Rd, Elkton, MD 21921. This facility produces satellite placement motors, launch erect and auxiliary power gas generators, safe and arm devices, anti-satellite propulsion control motors, decoy propulsion and munitions expulsion.

Thiokol Propulsion, PO Box 707, Brigham City, UT 84302-0707. Telephone: (435) 863-3511. Web site: <http://www.thiokol.com> This unit is responsible for the Space Shuttle solid rocket motors, for the Shuttle Processing Contract and for the company's efforts with the National Launch System (NLS) Program.

Thiokol Propulsion, PO Box 21005, Kennedy Space Center, FL 32899. Thiokol has some operations at the Kennedy Space Center for Shuttle product support

functions and to conduct tasks on the Shuttle Processing contract.

Thiokol Propulsion, TCR Composites Division, 231 N. Burns, Ogden, UT 84404. Telephone: (801) 334-6408. TCR Composites manufactures prepreg resin systems for filament-wound products used in commercial launch vehicles, recreational equipment, and commercial industrial products. TCR prepreg is a high-performance epoxy material that can be stored at ambient temperatures for at least one year.

Huck International Inc, 3724 East Colombia St, Tucson, AZ 85714.

Howmet Corporation, 475 Steamboat Rd, Greenwich, CT 06830.

Corporate Overview

Within Cordant's major categories for 1999, Propulsion Systems accounted for 23 percent of the company's sales and 25 percent of its income. The company's Fastening Systems segment accounted for 19 percent of sales and 15 percent of income. The Investment Castings operations contributed 58 percent to sales and 59 percent to earnings.

New Products and Services

RSRM Contract. In August 1999, Thiokol Propulsion signed a follow-on contract from NASA to continue producing reusable solid rocket motors (RSRM) for the Space Shuttle Program. The contract, valued in excess of \$1.7 billion, extends Thiokol Propulsion's RSRM activities until May 2005. This is the sixth in a series of contracts awarded to Thiokol Propulsion for the design, development, production and refurbishment of solid rocket motors for the Space Shuttle Program. Under its provisions, administered by NASA's Marshall Space Flight Center, Huntsville, Alabama, Thiokol Propulsion will deliver 70 flight motors – enough for 35 Space Shuttle flights – and three test motors. This will be accomplished using both new and refurbished hardware. The three test motors will be static fired at Thiokol's northern Utah facility to evaluate new materials and processes. The static tests are currently planned for May 2001, November 2002 and May 2004.

ICBM Upgrade. In December 1997, Thiokol Corporation was selected as the Propulsion Integrated Product Team leader by TRW, winner of the Air Force's Intercontinental Ballistic Missile (ICBM) Prime Integration Contract. Thiokol will lead a joint venture with United Technologies Corporation, Chemical Systems Division (CSD), to provide remanufactured Minuteman III solid rocket motors for all three stages as well as propulsion sustaining engineering for the Minuteman and Peacekeeper ICBM weapons systems. The propulsion program is a 15-year effort worth over \$1 billion. Major portions the ICBM Prime Integration Contract include the Propulsion Replacement and Ordnance Replacement programs, which are large production efforts running from 1999 through 2007. These efforts will replace rocket motors and ordnance on over 600 fielded and support missiles, extending the life of the Minuteman III system through the year 2020.

As the Propulsion lead contractor, Thiokol will consolidate the propulsion replacement providers from the current three contractors to two: Thiokol and CSD. In addition to production programs, the joint-venture team will perform sustaining engineering efforts that also will run for 15 years. Low-rate initial production

(LRIP) program of the Minuteman motors began in late 1999.

Plant Expansion/Organization Update

Thiokol Opens New Facility. In late 1999, Thiokol Propulsion completed a new nitration facility to synthesize, characterize and produce next-generation energetic materials. Construction of this state-of-the-art, \$3 million plant began in 1998 at Thiokol's northern Utah location. According to the company, the new nitration facility will allow Thiokol to become a prime supplier of new energetic materials to the industry.

Mergers/Acquisitions/Divestitures

Alliant to Acquire Thiokol Propulsion. In January 2001, Alcoa Inc and Alliant Techsystems Inc (ATK) reached a definitive agreement under which ATK will acquire Alcoa's Thiokol Propulsion business for \$685 million in cash. ATK is a supplier of aerospace and defense products, including conventional munitions and propulsion rocket motors. The transaction, which has received all necessary corporate approvals of both companies, is subject to customary regulatory approvals. It is expected to close by the end of the second quarter of 2001.

Alcoa Completes Acquisition of Cordant. In May 2000, Alcoa completed its acquisition of Cordant Technologies. The transaction is valued at approximately \$2.9 billion based on 40 million fully diluted shares of Cordant common stock on March 13, 2000, and the assumption of \$685 million in debt. Cordant stock ceased trading on the New York Stock Exchange at the close of business on Wednesday, May 24, 2000. The acquisition was originally announced in March 2000.

Cordant Technologies brings to Alcoa technology expertise in products and materials related to existing Alcoa businesses and markets. Of particular interest to Alcoa are business units that complement the aluminum manufacturing giant. These include: Howmet Castings, which is a supplier of investment cast super-alloy and titanium components used in jet aircraft and electrical power generation; and Huck Fasteners, a designer and manufacturer of high-performance fasteners and fastening systems. Thiokol Propulsion, a supplier of solid rocket propulsion systems, is a less obvious match for Alcoa, and is in the process of being sold to Alliant Techsystems (see above).

Teaming/Competition/Joint Ventures

Boeing. In March 2000, Thiokol signed a teaming agreement with Boeing to initiate development of the proposed AirLaunch program. AirLaunch will be a possible launch system for the US Air Force's proposed Space Maneuver Vehicle with launch-on-demand capability. Boeing also is considering potential commercial applications with a Conventional Payload Module. Thiokol worked with Boeing previously during the initial investigations of the system. Thiokol will provide existing technologies and demonstrated solid-rocket motors for the small launch vehicle configuration.

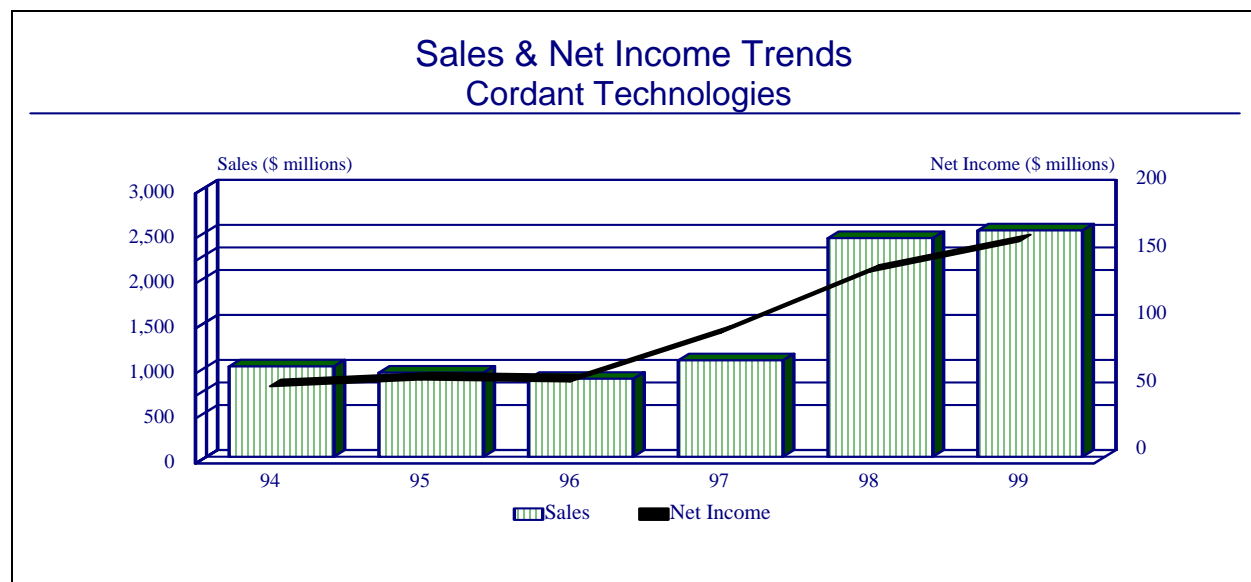
Alliant Techsystems. In mid-1995, the team of Alliant Techsystems and Thiokol was awarded a \$123 million contract by Lockheed Martin Missiles and Space to produce 24 propulsion systems for the US Navy Trident II ICBMs. Alliant would build propellant castings and motor finishing and install the nozzle, igniter and brackets. Thiokol would produce the nozzles, igniters, and first- and second-stage insulators, and would have overall responsibility for buying all materials.

GBI Program. In June 1992, Martin Marietta and Lockheed selected Thiokol's Huntsville Division as their propulsion team member to compete for the National Missile Defense ground-based interceptor (GBI) program. Army Strategic Defense Command was to award a contract in 1993 to build and deploy at least 100 interceptors for the SDIO limited defense system to protect against ballistic missile strikes.

Financial Results/Corporate Statistics

Cordant posted 1999 sales of \$2.5 billion compared to sales of \$2.4 billion in 1998. The company posted net income of \$164.4 million for 1999 compared to \$142 million posted in 1998. Please note that the company has changed its fiscal year-end from June 30 to December 31. Restated financial results for the past six years are as follows.

| Y/E December 31 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-----------------|--------|-------|-------|--------|--------|--------|
| (\$ million) | | | | | | |
| Net Sales | 1002.3 | 932.9 | 864.6 | 1070.1 | 2426.9 | 2512.9 |
| Percent Govt | - | - | - | 54.0 | 30.0 | 28.0 |
| Net Income | 57.1 | 62.1 | 60.7 | 96.6 | 142.0 | 164.4 |
| Backlog (Govt) | - | - | - | 1800.0 | 1400.0 | 2800.0 |

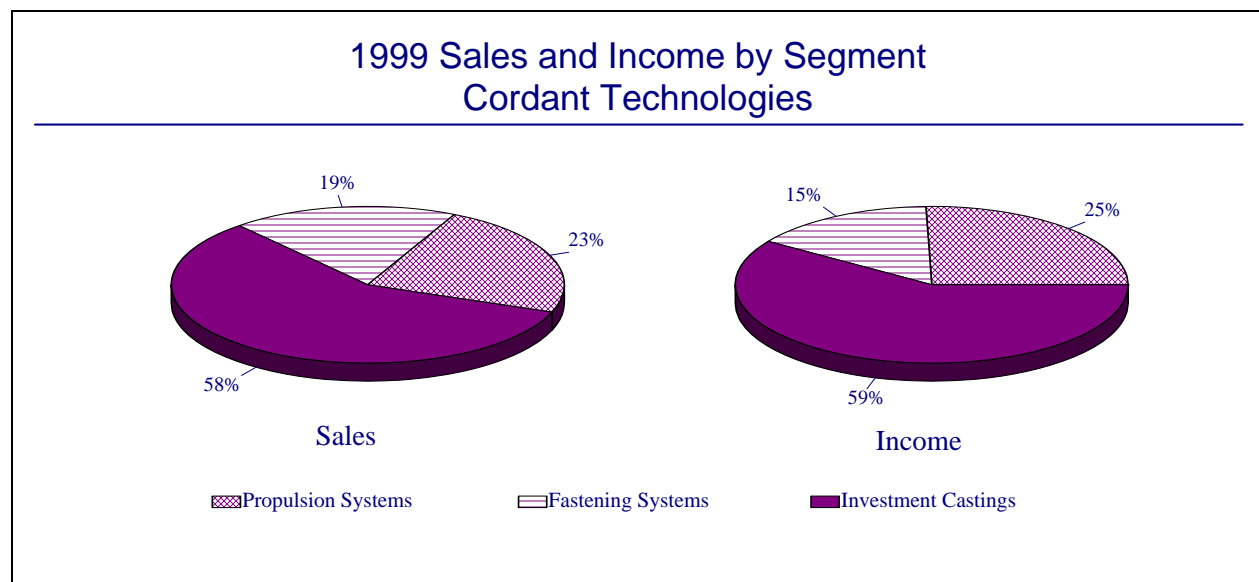


Industry Segments

Beginning in 1998, Thiokol began reporting financial figures in three categories: Propulsion Systems, Fastening Systems, and Investment Castings.

| SALES | 1995 | 1996 | 1997 | 1998 | 1999 |
|---------------------|--------------|--------------|---------------|---------------|---------------|
| (\$ million) | | | | | |
| Propulsion Systems | 695.1 | 611.7 | 645.5 | 643.0 | 588.0 |
| Fastening Systems | 237.8 | 252.9 | 319.4 | 433.3 | 465.2 |
| Investment Castings | - | - | 105.2 | 1350.6 | 1459.7 |
| TOTAL | 932.9 | 864.6 | 1070.1 | 2426.9 | 2512.9 |

| OPERATING INCOME | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------------|-------------|-------------|--------------|--------------|--------------|
| (\$ million) | | | | | |
| Propulsion Systems | 14.1 | 63.3 | 64.4 | 82.1 | 87.9 |
| Fastening Systems | 4.1 | 8.0 | 40.4 | 65.2 | 52.8 |
| Investment Castings | - | - | 11.7 | 185.8 | 204.7 |
| TOTAL | 18.2 | 71.3 | 116.5 | 333.1 | 345.4 |



Strategic Outlook

Following its acquisition by Alcoa, Cordant has ceased operating as an independent entity and has instead become part of the aluminum manufacturing giant. While Alcoa is a major producer of aluminum and titanium products for airframe and landing gear manufacturers, aerospace-related sales make up only a tiny portion of the company’s \$23.5 billion in sales.

The target of the acquisition was not Thiokol, but Howmet Corp. Howmet’s specialty of precision castings, plus the fact that it serves many of the same customers as Alcoa, further diversifies Alcoa’s portfolio. In keeping with its previous track record, Alcoa has announced it will divest the non-

complementary Thiokol Propulsion to Alliant Techsystems.

“This is a sound strategic acquisition that will deliver significant value to customers, employees and ATK shareholders,” said Paul David Miller, chairman and chief executive officer of ATK. “When approved, we will have a blend of propulsion expertise, leadership spirit, and personal commitment to integrate effectively these businesses.”

For its own sake Thiokol Propulsion still maintains a respectable presence in government programs. Aside from continued Space Shuttle work (for which the company received a \$1.7 billion contract in 1999),

Thiokol is the Propulsion Integrated Team Leader on the USAF's ICBM Prime Integration Contract which will provide over \$1 billion in revenues to cover its 15-year run.

As the unit looks to the future, the industry is speculating on whether Thiokol will re-enter the tactical missile propulsion market. Currently, the company is focused on solid propellant motors for strategic missiles such as the Minuteman and the Trident II. With these programs winding down, Thiokol is investigating the possibility of undertaking tactical missile propulsion work in order to keep its revenue streams flowing.

The company has, in the past, produced motors for the Harpoon and High-speed Anti-Radiation Missile

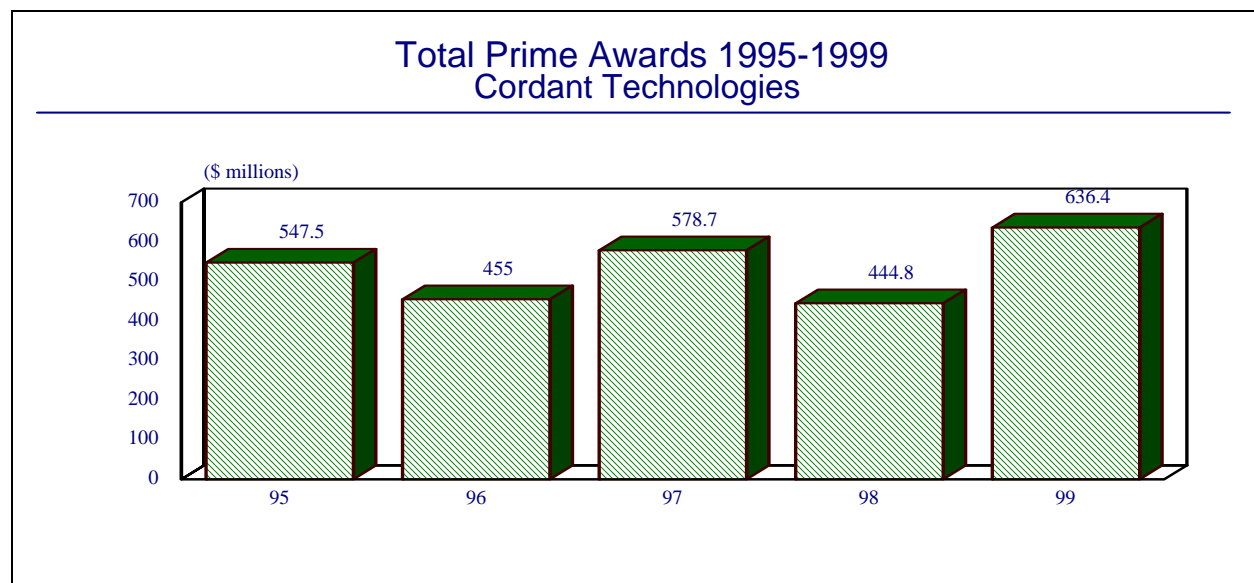
(HARM). Today, company officials feel that tactical missiles, especially in the standoff segment, may provide future opportunities for Thiokol to apply its expertise.

The most notable improvement in Thiokol's business base has been its successful diversification into other markets. In the realm of demilitarization, the company has plans to assist Russia in demilitarizing some of its missiles. Another application of demilitarization technology is Thiokol's use of an environmentally acceptable process to remove solid propellant and insulation from rocket motor casings.

Prime Award Summary

Thiokol's five-year summary of awards by customers, with dollars in millions, is given below. Dashes indicate data are not available. Zeroes indicate awards, if any, of less than \$50,000.

| Thiokol | 1995 | 1996 | 1997 | 1998 | 1999 |
|--------------------|-------|-------|-------|-------|-------|
| (\$ millions) | | | | | |
| AIR FORCE | 19.7 | 28.9 | 37.8 | 15.2 | 13.2 |
| ARMY | 49.6 | 24.2 | 95.6 | 41.4 | 6.2 |
| CORPS OF ENGINEERS | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| DEFENSE AGENCIES | 27.3 | 3.5 | 17.3 | 4.3 | 0.2 |
| EPA | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| NASA | 439.9 | 396.1 | 426.4 | 379.1 | 613.4 |
| NAVY | 9.4 | 2.3 | 1.6 | 4.8 | 3.4 |
| TOTAL | 547.5 | 455 | 578.7 | 444.8 | 636.4 |



The five-year summary of awards by key location and by customer, with dollars in millions, is reported below. Dashes indicate data are not available. Zeroes indicate awards, if any, of less than \$50,000.

| Brigham City, UT | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------------|-------------|-------------|-------------|-------------|-------------|
| (\$ millions) | | | | | |
| AIR FORCE | 17.4 | 28.5 | 36.7 | 6.6 | 11.9 |
| ARMY | 16.2 | 8.3 | 13.2 | 18.3 | 5.5 |
| CORPS OF ENGINEERS | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| DEFENSE AGENCIES | 27.3 | 3.5 | 17.3 | 4.3 | 0.0 |
| NASA | 438.3 | 394.8 | 0.0 | 0.0 | 0.0 |
| NAVY | 9.2 | 1.6 | 0.4 | 3.6 | 2.6 |
| TOTAL | 509.1 | 436.7 | 67.6 | 32.8 | 20.0 |

| Elkton, MD | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------|-------------|-------------|-------------|-------------|-------------|
| (\$ millions) | | | | | |
| AIR FORCE | 2.2 | 0.4 | 1.1 | 8.4 | 1.3 |
| ARMY | 1.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| NASA | 0.5 | 0.2 | 0.1 | 0.0 | 1.7 |
| NAVY | 0.1 | 0.5 | 1.3 | 1.1 | 0.8 |
| TOTAL | 3.8 | 1.2 | 2.5 | 9.5 | 3.8 |

Program Activity

Some important aerospace and government programs currently under way at Thiokol are listed below. The briefs are intended to provide a listing of programs that are of major importance to the company. For detailed information or analysis of specific aerospace and defense programs or equipment, please refer to the appropriate FORECAST INTERNATIONAL binder (for example, AIRCRAFT, MILITARY VEHICLES, WARSHIPS, MISSILES, ELECTRONICS, and GAS TURBINES). The following is an outline of the company's business interests:

- Missiles
- Ordnance
- Space Systems
- Systems Integration
- Training Systems
- Unmanned Vehicles

Missile Programs

Thiokol has been a major supplier of SRM for strategic programs, starting in the 1950s with Minuteman. The company has produced all of the first stages for the US land-based ICBM forces. Thiokol's Tactical Division is currently involved in several production and development programs. Below are the major missiles programs pursued by Thiokol.

AGM-65 Maverick

The Maverick is an air-to-surface family of guided missiles designed for the neutralization/destruction of

tanks, command posts, ships, and other "hard" targets. The AGM-65A, B and C are powered by a Thiokol TX-481 dual-thrust motor. The D, E and F versions are powered by the Thiokol Corporation TX-633 motor which, while having the same performance specifications, is smokeless.

AGM-84E SLAM

The AGM-84E Stand-off Land Attack Missile (SLAM) was the result of the US experience gained during the April 1986 raid against Libya. During that attack, the US Navy found it lacked a missile capable of being deployed from carrier-based aircraft that could surgically strike high-value near-shore targets (port facilities, ships at anchor, etc.). Thiokol produces a solid-propellant tandem booster for the Sea SLAM variant.

AGM/RGM/UGM-84 Harpoon

The Harpoon is an all-weather family of anti-ship missiles. The RGM-84A-1 variant features the addition of a solid-propellant tandem booster jointly produced by Thiokol and Aerojet.

AGM-88A/B/C HARM

This is a high-speed anti-radiation missile. The missile is powered by a smokeless, high-speed, solid-propellant boost/sustain rocket motor designated Tu-780, developed and produced by Thiokol Corporation.

AGM-114A/B HELLFIRE

The HELLFIRE is a modular laser-guided anti-tank/anti-ship missile system. The missile is powered by a solid-propellant rocket designated TX-657 developed and produced by Thiokol Corporation.

AIM-9 Sidewinder

This is an all-weather, short-range air-to-air missile. The present propulsion is the Mk 36 Mod 7 solid-propellant rocket motor, competitively produced by Aerojet Tactical Systems Company, Hercules Incorporated, Thiokol Corporation and the US Navy/Naval Propellant Plant. The Mk 36 Mod 9 (Thiokol company designation TX-683) reduced-smoke rocket motor for the AIM-9M was initially developed by Thiokol Corporation to reduce identification of the launch aircraft.

ERINT 1

ERINT 1 is designed for the interception and destruction of inbound tactical ballistic missiles as part of an overall theater missile defense system. The program is currently in full-scale development for demonstrations and validation.

LGM-30F/LGM-30G Minuteman

The Minuteman is a three-stage, solid-propellant, intercontinental ballistic missile. The Minuteman II first stage was supplied by Thiokol. The firm was also the prime on the MM III first-stage rocket propulsion which is designated TU-122 (M-55). The Minuteman is out of production.

MGM-118A Peacekeeper

The Peacekeeper is a strategic intercontinental ballistic missile. The first-stage solid rocket motor and nozzle were produced by Thiokol.

MIM-104 Patriot

The Patriot is a land mobile, medium-to-high-altitude, surface-to-air guided-missile system. Patriot is being adopted for the anti-tactical missile role. The missile is powered by a single-stage, high-energy solid fuel rocket designated TX-486 using Hydroxyl Terminated Polybutadiene (HTPB) as the propellant. Thiokol is under contract to Lockheed Martin for continued development and production.

RIM-66/67 Standard

The Standard Missile is a modular surface-to-air missile for both medium- and extended-range engagements. The RIM-66G Medium-Range missile uses the Mk 104 dual-thrust solid rocket motor (manufactured in Mod 1, Mod 2 and Mod 3 versions) which is being procured on a competitive basis from Thiokol Corporation, Atlantic

Research Corporation and Aerojet. The SM-1 and SM-2 Extended-Range missiles depend on the Thiokol Corporation Mk 70 solid-propellant booster.

UGM-96A Trident I/UGM-133A Trident II

The Trident is a strategic, Submarine-Launched Ballistic Missile (SLBM). The Trident is powered by a three-stage, solid-propellant rocket jointly developed and produced by Hercules and Thiokol.

Space System Programs

Athena

Athena (formerly the Lockheed Martin Launch Vehicle) is a family of launch vehicles designed to accommodate payloads ranging from 1,000 to 3,600 kilograms. The Athena series is based on the Thiokol Castor 120 and Chemical Systems Orbus 21D solid rocket motors. The Athena I uses the Castor 120 as a first stage and the Orbus 21D as the upper stage. The larger Athena II uses a Castor 120 first and second stage, with the Orbus 21D acting as the upper propulsion system. Larger still is the Improved Athena II, which would use segments either from the Titan IV solid propellant boosters or the Space Shuttle Solid Rocket Boosters (SRM).

Atlas Launch Vehicles

Atlas is a family of medium-lift expendable launch vehicles. Atlas expendable launch vehicles are designed primarily to carry large communications satellites to geosynchronous transfer orbit (GTO). The Atlas IAS features four Thiokol Castor IVA solid-propellant strap-on rocket boosters.

Castor 120

In mid-1992, Thiokol test-fired the Castor 120 rocket motor. Company officials say the motor represents the next generation in expendable launch vehicle solid propulsion. The motor, a derivative of the Peacekeeper Stage 1, will accept either a fixed nozzle or one that can be vectored. The Castor 120 is suitable for use as a first or second stage or as a strap-on for unmanned launch vehicles. Orbital Sciences became the first customer for the new motor when it contracted with Thiokol to use the Castor 120 to power the first stage of the Taurus launch vehicle.

Conestoga Launch Vehicles

Conestogas are a series of small to medium expendable-launch vehicles. Conestoga launch vehicles are built around Thiokol solid-propellant rocket motors. The launcher's final configuration depends on the arrangement of strap-on solid rocket motors and upper stages. For the Comet program, Space Services has developed the Conestoga 1-6-2-2. The "1" refers to the

Castor V solid-propellant core motor, the “6” is the number of Castor V strap-on motors, and the first and second “2s” indicate the Thiokol Star 48 will be used for both upper stages.

Delta II Launch Vehicle

The Delta II is a medium-lift expendable launch vehicle. The 6925 Delta II uses nine Thiokol TX-780 Castor IVA strap-on solid rocket boosters.

Eagle S-Series

This is a series of expendable launch vehicles. Eagle S-series boosters can boost small satellite payloads into low-Earth orbit (LEO), geosynchronous transfer orbit (GTO), or geosynchronous orbit (GEO). E’Prime Aerospace Corporation is the prime contractor. Subcontractors involved in the Eagle S-series include Thiokol (now Cordant); Gencorp Aerojet and Honeywell Space Systems. The rocket series’ future is doubtful as no launch orders have been announced.

H-2A

The H-2A is a two-stage heavy satellite launch vehicle. Mitsubishi Heavy Industries (MHI) Ltd and Kawasaki Heavy Industries Ltd are H-2 prime contractors. Thiokol produces the Castor 4A-XL solid-propellant sub-boosters for the vehicle.

Space Shuttle

The Space Shuttle is a manned, reusable launch vehicle. Thiokol produces the Redesigned Solid Rocket Motors (RSRMs). On July 17, 1991, Thiokol was awarded a \$2.6 billion space agency contract, an extension of its original 1974 contract, to continue production of the space shuttle’s solid rocket booster motors. This contract package with NASA, the third installment or Buy III, extended Thiokol’s Shuttle production through September 1997. Under the terms, Thiokol was to supply motor sets for 68 more flights of the Space Shuttle program, and six test motors. The contract also

calls for Thiokol to refurbish expended flight hardware; provide launch site, operations, flight and integration support; and conduct special studies. Thiokol (Cordant) is also a team member and holds about 11 percent of the work content on the Lockheed Shuttle Processing contract, which was initially a \$2 billion NASA award. Competed for and won by Lockheed in the early 1980s, the total NASA awards for Shuttle processing over the contract’s 15-year period could total \$6 billion. The processing contract covers most of the work necessary to assemble, launch, retrieve and refurbish reusable systems and parts of the Shuttle program.

Taurus

Taurus is a four-stage, solid-propellant expendable launch vehicle developed as part of DARPA’s Advanced Space Technology Program (ASTP). Taurus is a hybrid booster, combining the Thiokol Castor 120 solid rocket first stage with the three stages of the OSC Pegasus air-launched winged booster produced by Hercules Aerospace. The first Taurus vehicle was launched in March 1994.

Titan II

This is a decommissioned intercontinental ballistic missile refurbished as an expendable launch vehicle (ELV). The enhanced Titan II uses Thiokol TX-780 Castor IVA solid propellant rocket boosters. While the Titan II has proven itself ideal for launching military and NASA payloads, its steep cost is likely to prevent it from landing any commercial payload.

Unmanned Vehicles Programs

Model 324 Scarab

The Scarab is a high-speed, long-range, remotely piloted vehicle. The Model 324 uses a Teledyne 373-8C with 970 pounds of sea-level static thrust. The engine is aided on take-off by a modified AGM-84 Harpoon booster produced by Thiokol.

US Contract Awards

Below is a listing of major contracts awarded to Thiokol from the United States government in the past several years (contracts as of press date).

| <u>Date</u> | <u>Award (\$ millions)</u> | <u>Contract #</u> | <u>Description</u> |
|-------------|----------------------------|-------------------|--|
| 1998 | | | |
| 2/20/98 | \$7.4 | F04611-98-C-0005 | Exploratory development of service life prediction technology in support of the integrated high-payoff rocket propulsion technology program. |
| 9/28/98 | \$7.1 | DAAA09-98-C-0046 | 8,872 M278 warheads. |
| 11/2/98 | \$10.4 | DNA001-95-C-0066 | Unsymmetrical Dimethyl Hydrazine disposition system support infrastructure. |

1999

| <u>Date</u> | <u>Award (\$ millions)</u> | <u>Contract #</u> | <u>Description</u> |
|-------------|--------------------------------|-------------------|---|
| 6/3/99 | \$5.2 | F04611-99-C-0002 | Critical defect assessment technology program for rocket systems. |
| 2000 | | | |
| 1/3/00 | \$9.2 | F04611-00-C-0057 | Test support for the integrated high-payoff rocket propulsion technology. |

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