A SMALL BUSINESS PARTICIPATES
IN
MAJOR GOVERNMENT PROCUREMENTS

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SUMMARY

It is generally believed that only multi-million and billion dollar corporations are awarded the big military contracts by the government. The belief stems from reading the listing of these large companies whenever the government announces their contracts. It could be construed that companies have to be of a certain size to qualify for big government contracts.

This practice of seemingly ignoring the small business in awarding big contracts has been defended by several well known propositions about Small Business. A small business doesn't have the technical capability for the project. With a small business you increase the risk of failure, or delays, and our national defense cannot be placed at risk. A small business may have top management turnover and that could hurt the project. They'd want special considerations because they're small. They can't handle all the paperwork. If a problem arises, they don't have the resources to resolve it. It's better to have a single point of contact and control for these big projects, rather than splitting them up among several small contracts.

So for all practical purposes, Small Business has been excluded from participation in Major Procurement Programs.

This report will tell the story of how a small business does participate in two different Major Procurements. This report tells the story of how
AIRCRAFT GEAR CORPORATION of Chicago, Illinois participates in the Army's Advanced Attack Helicopter (AAH) project, a several billion dollar contract with Hughes Helicopter Company; and in The Coast Guard's Short Range Recovery (SRR) Helicopter project, a 100 million dollar contract with Aerospatiale Helicopter Corporation.

It is expected that this report might assist other agencies look with favor on small business participation and that it might help other small businesses seek this form of participation. It may also show— with considerable evidence, that any business needs adequate technology and production skills— along with enthusiasm and commitment to meet procurement criteria, and that these good things are not a monopoly of the large company.
A SMALL BUSINESS PARTICIPATES IN
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It is believed that Aircraft Gear Corporation, 6633 West 65th Street, Chicago, Illinois, is the only small business that has become a co-producer or, if you will, a co-prime contractor in two large government procurements. This is a unique form of small business endeavor, and it is reviewed in this report.

Aircraft Gear Corporation is located sixty-five blocks south and sixty-six blocks west of the Loop in Chicago, Illinois. The Company was formed in 1965, when the owners purchased the assets of a small division of the Hupp Corporation, Cleveland, Ohio.

Since 1965, Aircraft Gear Corporation has conducted its business with the following goals and objectives: (All are significant to an understanding of this company's participation in major government procurements.)

A. Maintain a good and stable Management Team - Aircraft Gear has a general management team that has developed a capacity to function in every requirement of the business, is flexible enough to represent the Company in all areas, and is consistently growing in their entrepreneurial skills.
B. Constantly refine Marketing Strategies - Aircraft Gear Corporation has sought the aerospace business, has emphasized jet engine gear assemblies, and the specialty business requiring their greatest skills. By narrowing their marketing focus, they have concentrated on getting business that requires their strengths. Their attention to cost and service is no accident, it is part of a "vertical sales" approach where every department of a customer is known and cultivated in order to best serve the needs of that customer.

C. Constantly improve Production - In any manufacturing business a company is known by its product's reputation. This reputation is built on timely deliveries, control of quality, and competitive pricing. Aircraft Gear has improved wherever possible its manufacturing techniques, its facilities, and its machinery. The Company has also, through training programs, upgraded the skills of its personnel. The resulting efficiencies have set a base for future growth.

Aircraft Gear Corporation does its business today with a sense of tomorrow about it. Forward, progressive thinking impacts on every day's activities - in their marketing, their engineering, and their production. This Company is building constantly for an even greater future. As a result, Aircraft Gear Corporation is dynamic, is alert to opportunities, is flexible, and is ready to participate with any company that is doing business which requires their specialized skills.
In the late 1960's, the Defense Department determined that our country needed a new weapon for use in a modern heavy tank battlefield environment. It was further determined by the early 1970's that by optimal use of helicopter technology and new weaponry, an Advanced Attack Helicopter (AAH) could be developed. (The program summary is included in the addenda of this report.) The Secretary of Defense authorized the U. S. Army to proceed with this program and to involve at least two major helicopter companies in a competitive development for selecting the best weapon to handle the needed military task. The two largest companies, those thought to have the capability to work on this significant program, were asked to participate. Bell Helicopter Company, a division of Textron Corporation, agreed but Sikorsky, a division of United Technologies Corporation, chose not to participate. As the Army began to go forward, the third largest helicopter company, Hughes Helicopter Company, approached the Army and asked to be included in this competition. However, in a competition for a program of this magnitude, the resources and depth of capabilities required far outstretched those of Hughes Helicopter Company. So as a means of receiving favorable consideration, Hughes created what has become known as "A TEAM APPROACH". Hughes postulated that if they could get qualified companies to cooperate in making the specialized components of the Advanced Attack Helicopter (AAH), they would have
mobilized the capital, resources, facilities and people in such a manner as to be competitive.

While this approach had never been tried before, the Army gave its approval and allowed Hughes Helicopter Company with its Team to enter the competition. It is important to understand the critical necessity for good competition on a program for the following reasons:

(1) The overall costs of the Advanced Attack Helicopter (AAH) could be in excess of five to seven billion dollars. To grant a contract on the basis of low bid, without competition on major program components, could result in a failure of the entire project.

(2) The results of a competitive stage assists the Army in improving the design and product specifications in the final stages of the program.

(3) The importance of this program to the country, requires the most arduous competition, to insure the best possible product.

The contract to Bell and Hughes was let in July 1973 - for the design and fabrication of test vehicles and two flying prototypes. Following the first flights of the prototypes in September 1975, both companies (Bell and Hughes) conducted extensive tests on their helicopters and the Army also conducted its own evaluative tests on them at Edwards Air Force Base in California. On December 10, 1976, the source selection results were announced - Hughes Helicopter Company (and its team) won the competition and was awarded the contract for the final stages of the Advanced Attack Helicopter (AAH) program.

As Hughes Helicopter Company began to prepare for this next stage
of the program, one of the things they did was to evaluate the participation of the Team Members. In most cases, there was complete satisfaction, but in one case there was not. So in order to strengthen the Team, Hughes Helicopter Company decided to seek a new team member to make the tail rotor gear boxes. Six companies bid for this particular position on the team and Aircraft Gear Corporation was selected partially on reputation, partially on price, partially on geography and partially on logistics. This selection was significant for the reason that it made a Small Business a member of the Team that consisted of major companies such as, Honeywell, Sperry, Lockheed, Martin Marietta, Teledyne, RCA, Menasco, Garrett, Litton, Rockwell and General Electric. In wondering why Aircraft Gear should have been selected, the primary reason appears to have been its excellent reputation for service, for timely deliveries and for highly acceptable product among its customers. Hughes Helicopter Company has not had reason to regret changing in midstream from one team member to another, in fact, they now consider Aircraft Gear Corporation one of their best participants. All of the team members in a project of this magnitude must have a priority for the Advanced Attack Helicopter (AAH) equal to that of Hughes or the Army. It requires that the Team members be much more than just vendors - or subcontractors - they are indeed co-primes on a project of great importance to the future of our country as well as their respective companies. The Advanced Attack Helicopter Program (AAH) with Hughes Helicopter Company as Team Captain, has had the attention of the top corporate level of some of the largest corporations in United States industry. Within this framework, a small business, Aircraft Gear Corporation, was placed without any special distinction due to its size, and it must function with the best of them. These observations have been affirmed by the
President of Hughes Helicopter Company and by the Manager of the Advanced
Attack Helicopter (AAH) Program for the U.S. Army.

As a result of Aircraft Gear Corporation’s participation in this
program, several good and beneficial things have happened to them.

(1) Participation with the Team has brought exposures to Aircraft
Gear’s personnel not possible in the usual contracts. There
are Team Meetings, at various locations, two, three or four
times a year. All can participate in plant tours, technical
discussions, and demonstrating various systems. There is an
exchange of ideas for the improvement of the project. There
is an opportunity to ask the U.S. Army questions about time
schedules and possible contract changes. This kind of unique
camaraderie functions well under Hughes Helicopter’s leader-
ship and benefits the participants and their ability to perform
on the contract immeasurably.

(2) The morale at the Aircraft Gear Corporation has risen
dramatically. The contact with Hughes was viewed as the
end result of more than ten years of dedicated, hard—often
frustrating—work. The workers, the engineers, the sales-
men—all—had a sense of fulfillment—no, more than that—a
sense of winning. They had all worked on their own Team—that won a major contract, after some stiff competition. All
employees now have an extra sense of purpose for their work.

(3) Aircraft Gear Corporation has added 25,000 sq. ft. to its
plant in South Chicago. The need for more assembly, test cell
and expanded machining space made this necessary. There
have not been many, if any, such industrial expansions in that area of Chicago in the past five years.

Aircraft Gear Corporation has increased its employment by 60%. This is significant in South Chicago, which has one of our nation's highest unemployment rates. It is also important to note that the largest increase in number of new employees occurred in categories requiring intensive training and orientation. Aircraft Gear had to train these people to high skill levels before they could work on this very exacting project. As a result of the Advanced Attack Helicopter (AAH) project, there are 102 more people employed at fairly high labor rates in South Chicago.

GROWTH IN JOBS AT AIRCRAFT GEAR CORPORATION

<table>
<thead>
<tr>
<th></th>
<th>1976</th>
<th>1980</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Mfg.</td>
<td>77</td>
<td>131</td>
<td>+ 70%</td>
</tr>
<tr>
<td>Indirect Mfg.</td>
<td>57</td>
<td>88</td>
<td>+ 54%</td>
</tr>
<tr>
<td>Assembly</td>
<td>10</td>
<td>19</td>
<td>+ 90%</td>
</tr>
<tr>
<td>Heat Treating</td>
<td>6</td>
<td>9</td>
<td>+ 50%</td>
</tr>
<tr>
<td>Sales</td>
<td>5</td>
<td>7</td>
<td>+ 40%</td>
</tr>
<tr>
<td>Admin. &amp; Exec.</td>
<td>16</td>
<td>19</td>
<td>+ 19%</td>
</tr>
<tr>
<td></td>
<td>171</td>
<td>273</td>
<td>+ 60%</td>
</tr>
</tbody>
</table>

In studying the above chart, it is interesting to note that while there has been a 60% increase in the overall employment, there has been only a 19% increase in the Administrative and Executive classifications.
Aircraft Gear Corporation has been able to increase its capital investment in modern computer controlled machinery. It means that the Company is better equipped to meet exacting production schedules and quotas.

Aircraft Gear Corporation has received unsolicited requests for bids on other projects because of its participation in the Advanced Attack Helicopter (AAH) and is a member of the Hughes' Team. The Company name has been printed in literature, appears in advertisements and in news articles giving this kind of exposure to the Company not usually possible for a small business. In the past, the Company's sales personnel would work for years with a potential customer to get an opportunity to bid. Now many companies come to Aircraft Gear Corporation with their production requirements.

This contract with Hughes has helped increase Aircraft Gear's technology. Aircraft Gear has had to handle change orders and has had to contain the tooling costs made necessary with changes in design. It has been able to suggest changes and improvements within its purview, such as to recommend a cost savings and weight savings in the lubricant used in the tail rotor and intermediate gear boxes. This experience of dealing with a variety of design engineers and systems people, has reinforced their own competencies - and stretched them into new concepts and technologies.

Aircraft Gear Corporation has reaffirmed its Vertical Sales
Approach. This approach has proven itself as being highly successful. By this approach Aircraft Gear is recognized as being present and readily available to the customers they serve. It has made Aircraft Gear as well known as its larger competitors, but with a lower budget. The proof of success is also seen in the other opportunities to bid on more work by the same customers.

(9) The Company has solidified its reputation as a top manufacturer of high precision parts and sub-system assemblies to tight specifications. As more than one person has said, "They are the finest precision gear manufacturer in the United States and maybe in the world". In quality engineering, and in production, the Company has achieved a superb level of competency.

(10) The Company has learned to defend its cost estimates all the way from the Hughes people, on to the Army, and on to the Department of Defense and Congress. (See in the addendum a copy of a letter from a local Congressman regarding his review of the project as presented by Aircraft Gear Corporation.) The detailed and public scrutiny of cost estimates is not easily accomplished by any contractor. The well-documented support for these estimates and the "willing to help answer questions" attitude of Aircraft Gear Corporation's management has helped Hughes, has helped the Army - and, in turn, helped Aircraft Gear handle this part of doing business.

(11) Aircraft Gear Corporation now has the opportunity to expand its business as additional applications for the Advanced Attack
Helicopter (AAH) develop. The military of Europe may choose to use the Hughes Helicopter in their arsenal of weaponry, rather than take the 10 years it would take to develop their own. The civilian use of a highly reliable and safe helicopter is almost limitless, as short range flying becomes more important to commerce and industry needs.

Aircraft Gear Corporation pursued a consistent course of action in making a bid for participation in this major government program. It has achieved, through performance, flexibility, and reliability, a reputation as a small business that acts as though size doesn't matter when it comes to competent management, personnel and product.
Operating as a part of the Transportation Department is the U. S. Coast Guard. This branch of the service has as one of its main functions, the rescue of persons from the coastal seas of our country. The use of helicopters in rescue work is well known to everyone who watches television or reads newspaper accounts of these dramatic rescues. The Coast Guard in the mid 70's determined that it needed to improve these rescue capabilities - by increasing the maximum range, the endurance of search and patrol missions, and the load capacity of its helicopters - while still maintaining a helicopter properly sized to sit on their vessels. The Coast Guard then issued a request for bids to the major U. S. helicopter manufacturers. At this time, Hughes was at full capacity with its Army Advanced Attack Helicopter ( A^2H ) work - but Bell ( a division of Textron ) and Sikorsky ( a division of United Technologies Corporation ) responded. While some of the specifications were being written by the Coast Guard, and before any competition began, to the surprise of everyone, Sikorsky withdrew from the contest. At this point, Bell Helicopter was alone and could get the contract by proceeding with the development of a prototype ( or adapt one of their production helicopters ) to meet the specifications. A relatively new company formed in 1969 as an outgrowth of a diversification plan by the Vought Corporation for entry into the helicopter field, called Aerospatiale Helicopter Corporation of Grand Prairie, Texas, asked the
Coast Guard if they could participate in this competition by adapting a recently developed helicopter made in France - the Dauphin (SA 366).

( This company is the U. S. subsidiary of the parent organization - Société Nationale Industrielle Aerospatiale, or as it is commonly referred to as Aerospatiale, France. ) The Coast Guard gave an affirmative answer, but cautioned Aerospatiale Helicopter that it must have at least 51% of its cost in American product should it win the competition. After the "fly-off" and the completion of the testing and selection process, it was clearly indicated that the Aerospatiale Helicopter - the Dauphin as modified - was superior and was declared the winner. In planning for this, Aerospatiale Helicopter Corporation had gathered a group of 20 American subcontractors to provide more than 71% of the content to the aircraft. Of the subcontractors selected, they determined that four would be classified as major subcontractors. They are Avco-Lycoming for the engines, Collins Avionics (a division of Rockwell) for the total avionics system integration, Aerospatiale of France for the airframe, and Aircraft Gear Corporation for the transmission.

Despite having won the competition and despite full compliance with the provisions of the Buy America Act, Aerospatiale faced an unexpected hurdle because Bell Helicopter brought suit against the Secretary of the Department of Transportation and the Commandant of the U. S. Coast Guard for awarding the contract to Aerospatiale Helicopter Corporation. This suit questioned the compliance of Aerospatiale with all of the provisions of the Buy America Act. In defending Bell's legal action, the Transportation Secretary and the Coast Guard Commandant called for testimony and documentation from Aerospatiale, and they in turn called upon their major team members. While the two large corporations did respond in time, it was the
immediate and almost instantaneous response of the small business - Aircraft Gear Corporation - that again proved the point. Within 48 hours, the management of Aircraft Gear Corporation provided personal testimony and documentation to the proper authorities. The result of this activity was that the claim was not proved by Bell and the suit was dismissed.

The manufacturing by Aircraft Gear Corporation involved in this contract with Aerospatiale Helicopter Corporation, is of a different kind, and it is called final manufacturing. For years Aerospatiale of France, not having its own in-house gear manufacturing capability, has had gears and gear assemblies fabricated to their design by companies in Europe. Fiat of Italy has been making the transmissions for the Dauphin (SA 366). For this Coast Guard contract, Fiat will make and certify the quality of the components they will ship from Turin, Italy to Aircraft Gear Corporation in Chicago. Aircraft Gear will do the final manufacturing, assembly, check-outs, and testing of the transmission for certification by the U. S. Federal Aviation Authority (FAA). Aerospatiale Helicopter made this "final manufacturing" approach to the complicated gearing requirements, in order to meet the stringent Coast Guard delivery requirements on these vehicles.

Aircraft Gear Corporation now has a new test stand for these gear assemblies of Aerospatiale. When the production phase of these Short Range Recovery (SRR) helicopters is completed in a couple of years, Aircraft Gear has been promised the complete rebuilding and testing of all the Aerospatiale transmissions that are sold in America. The management of Aircraft Gear Corporation, with a view to the future of the company, realize the value of this follow-on work with a respected customer.
Another area of responsiveness by Aircraft Gear Corporation to the needs of Aerospatiale Helicopter Corporation has been its approach to the problem of familiarization with this particular product. It has been a challenge to get in a form so that they can be understood, the complete French and Italian drawings and reports. Aircraft Gear Corporation, in order to insure the best possible orientation for its personnel working on this project and to provide the greatest chance for good communications, sent key personnel from their assembly, test cell operators, lead inspectors, and management to France and Italy for two weeks. All parties are confident that Aircraft Gear Corporation will produce on schedule on all its contract agreements.

Aerospatiale Helicopter Company and the Coast Guard has found another advantage in working with Aircraft Gear Corporation as a small business. They know that they can go directly to the appropriate person at Aircraft Gear and receive a direct prompt answer to a question and that it will be well documented, without going through several layers of management. This practice of giving good prompt answers has been acknowledged as very helpful in the development of this project.

Aircraft Gear Corporation has given top priority to the important requirements of doing business with the government and to those things which will facilitate the participation with Aerospatiale. It has become a business relationship which is especially gratifying to both. There have been personal contacts between the Chairman of the Board and Presidents of both companies. Aircraft Gear Corporation received special recognition at the dedication ceremonies of Aerospatiale's new, almost one million sq. ft. facility in Grand Prairie, Texas. Aerospatiale's Management has
said many times that if anyone wants to learn how to operate a company, how to be an active participant in government contracts, and how to develop a documented planning function - they should visit and study Aircraft Gear Corporation. They say that Aircraft Gear's people have a handle on how the company is operated and they have tremendous flexibility in exercising their management prerogatives.

The long term values of this international cooperation between Aerospatiale of France and several American companies is tremendous. All of the companies are learning a great deal from each other, especially in the area of technology. The sharing of technology will give impetus to competition in the future, and certainly it will improve international understanding as well.

Needless to say, Aircraft Gear Corporation is pleased to be included in this form of participation in a major contract.
CONCLUSIONS

A review of this small business participation in two major government contracts, of the relations involved, and of the impact it has had on all parties shows:

1. The Small Business has more than held up its end of the contract without any different considerations given or requirements made on them.

   - The technology they are required to have in quality engineering has been more than satisfactory - in fact, they have demonstrated innovations whenever possible.
   - Their participation has been totally responsive to the project as seen in their marketing and service approach.
   - They have built new test cells and bought the latest and finest precision machines.
   - They have contained personal and stockholder returns so as to better deploy capital in the business.
   - They have sought to continuously improve their production skills through training and new methods.
   - They have been like any other member of the Team.
The Small Business has overcome several of the usual impediments to participate in major contracts. The theory of economies of scale frequently are the downfall of small business—they cannot maintain budgets in all areas of expenditure as large companies (i.e., the small business cannot buy a 10 second time slot on prime time TV very often). The small business must attempt alternative methods to achieve similar results. They have done this through their Vertical Sales Approach—and by narrowing their markets to match their maximum strengths.

They also have overcome questions of capability and competency by tremendous attention to detail, and prompt shipments of quality product. While it's still difficult to gain first entry into this government procurement business, the greatest door openers will be the reputation of product, service and attitude. In these areas, the Small Business persisted and finally won.

This story has several values for other small businesses.

- It should encourage small businesses to become a member of a team in seeking their subcontract work on major contracts. The struggles of a small business are needed and well regarded by the prime contractor. They do need to know you exist.

- It should encourage small business to explore putting together their own Team in order to qualify (size and scope)
for a major contract. There are provisions of the Small Business Act which allow this collaboration as exempt from the antitrust laws. By this team approach, the competencies and strengths can be greater than that of the individual firms involved.

- It should encourage small business to seek out contracts with foreign companies in order to provide American content under the provisions of the Buy America Act.
ADDENDA

   Page 24

2. Copy of booklet entitled - "U. S. Army Advanced Attack Helicopter - Program Summary, August 1978".  
   Page 26

3. Copy of page from "Army Aviation" magazine - showing the "AAH Program Management Team (Army)".  
   Page 32

4. Copy an an Aircraft Gear Corporation ad in magazine.  
   Page 33

5. Copy of a booklet prepared by Hughes Helicopter Company - "YAH-64 - A Total System for Battle".  
   Page 34

6. Copy of a page from "Army Aviation" magazine - showing the AAH Program Management Team (Hughes).  
   Page 39b

7. Copy of a page from National Defense Magazine showing the major contractors and additional subcontractors on the Advanced Attack Helicopter.  
   Page 40

8. A copy of the page in The Observer, a publication of Hughes - highlighting Aircraft Gear Corporation.  
   Page 41

9. A copy of a letter from a local Congressman who responded to the request of a small business to look into a major Department of Defense procurement contract.  
   Page 42

10. A copy of a booklet - HH-65A Dolphin U. S. Coast Guard Short Range Search and Rescue Helicopter.  
    Page 43

11. A copy of a picture of the Rockford Research Board. This group sponsored the research and writing of this report.  
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PERSONS INTERVIEWED

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Small Business Administrator

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Regional Director, Procurement

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U.S. ARMY
ADVANCED ATTACK
HELICOPTER
Program Summary

AS OF AUGUST 1978
The YAH-64, a two-place twin engine rotary wing aircraft specifically designed to deliver anti-armor and area suppression fires in day, night and adverse weather conditions, is in full scale engineering development.

The YAH-64 AAH represents an optimization of helicopter technology for the modern tank-heavy battlefield environment. It will contribute greatly to the Army's ability to fight outnumbered — and win!

BACKGROUND

In June 1973, the Deputy Secretary of Defense authorized the Army to initiate a two-phase development of the Advanced Attack Helicopter. Phase I was a competitive development for selecting the best helicopter airframe to enter Phase II, full scale engineering development. Phase II focuses on completing subsystems (missile, cannon, rocket, target acquisition and night vision) development and their integration into the winning helicopter.

During July 1973, Bell Helicopter Company and Hughes Helicopters were awarded contracts to design and fabricate a static test article, a Ground Test Vehicle, and two flying prototypes to be evaluated in the competitive fly-off.

The Bell Helicopter candidate, a two-bladed tricycle-gear aircraft with pilot located in front, was designated the YAH-63 and the Hughes Helicopters candidate, a four-bladed, 3 point-gear system with pilot in rear seat, the YAH-64. Both aircraft used twin T-700 General Electric turbine engines rated at 1560 SHP each.

Source Selection results were presented to the Secretary of the Army on 10 December 1976. He selected the Hughes YAH-64 as the winner. On the same day, the Deputy Secretary of Defense authorized the Army to proceed with the YAH-64 full scale engineering development program. It will include the fabrication of three (3) additional flying prototypes, the development and integration of a target acquisition-designated system, a pilot's night vision system, and the fire control essential to integrate the anti-tank and the area weapons subsystems.

SYSTEM DESCRIPTION

The YAH-64 AAH is the first Army Attack Helicopter to be developed specifically for the day, night, adverse weather anti-armor mission with emphasis on the ability to fight, survive, and live with the troops in the "Front Line" battlefield environment.

To achieve this objective, emphasis was placed on designing in the following prioritized characteristics:

PHASE I DEVELOPMENT PRIORITIES:

FLIGHT PERFORMANCE

The best measures of performance for a helicopter, at a prescribed atmosphere, mission weight and endurance, are vertical rate of climb (VROC), cruise speed and agile maneuverability (the ability to avoid obstacles at high speed). The following charts present the flight performance while carrying sufficient fuel for 1.83 hours endurance.

Hughes Helicopters YAH-64

Following first flight of the prototypes in September 1975, both companies conducted extensive developer tests of their aircraft before delivering them to the Army for Government competitive tests at Edwards Air Force Base, California.

Military developer test pilots and operational pilots from user commands participated in the evaluation of the helicopters. The
FIREPOWER

The primary point target weapon of the AAH is the HELLFIRE anti-tank missile. Area suppression fires are provided by secondary armament 30mm cannon and 2.75 FFAR rocket subsystems.

ARMAMENT INTEGRATION

INTEGRATED HELMET

TARGET ACQUISITION

AND DISPLAY SIGHT

SYSTEM

PILOTS'

NIGHT

VISION

HELLFIRE MISSILES

2.75-IN ROCKETS

30 MM

CHAIN GUN

INTEGRATED FIRE CONTROL

POINT TARGET SUBSYSTEM

16 HELLFIRE MISSILES

BUILT-IN TEST AFTER LOADING

Hellfire Weapon Subsystem

AREA WEAPON SUBSYSTEM

- 1200 ROUND MAGAZINE
- RELOAD 1200 RDS-10 MINUTES
- POWER DOWNLOADER

REPACKAGES AMMUNITION

- LIGHTWEIGHT TURRET
- FLEXIBLE:
  - AZIMUTH LEFT OR RIGHT 110°
  - ELEVATION +11° TO -60°
- SAFETY INTERLOCKS
- SPRING AUTO ELEVATE
- CRASH ACCOMMODATING

30mm AREA Weapon Subsystem

2.75 ROCKET SUBSYSTEM

76 FFAR Rockets

Weapon/Stores Management

SURVIVABILITY

The AAH is the most survivable helicopter known. This is achieved through a synergistic aggregation of high maneuverability, a rugged twin engine airframe highly tolerant of 23mm HEI and invulnerable to 12.7mm rounds. Redundant flight control systems, self-sealing fuel cells, armor plating of critical components, and 23mm HEI blast shields for the crew make the AAH an exceedingly "hard" helicopter.

DETECTABILITY – AURAL, VISUAL, RADAR, IR

A low flicker rotor, low glint canopy, composite materials, "scissor" tail rotor, overall compact design and a new approach to engine plate suppression have resulted in low signature across the spectrum.

BALLISTICALLY SURVIVABLE

The vulnerability assessment of the YAH-64 indicates an invulnerability to 12.7mm fires and low vulnerability to 23mm HEI. Added features such as the requirement for the main gearbox to operate one hour without oil further enhance mission accomplishment.

CRITICAL COMPONENT MATERIALS

- Typical Aluminum
  - Advanced Aluminum

Part

Alloy in AAH

23-MM HEI CREW PROTECTION BLAST SHIELDS

Transparent Shield

Between Cockpits

Below Seat Shield
BALLISTICALLY SURVIVABLE (Continued)

Fuel Cell/Structure — 23MM HEI Hit No Fire Self Sealed

MAIN ROTOR SPAR HIT – 23MM HEI
Operated 5.2 Hours After Hit – No Failure

CRASHWORTHY

Rugged construction and innovative design features maximize low system attrition. Additionally, 95% probability of crew survival at a crash impact rate of 42 FPS is engineered into the YAH-64. Our goal — save the crew and repair the helicopter to fight again.

ARMAMENT PAYLOAD

Varying temperature and altitude conditions will dictate finite mission loads. However, the AAH requirement is a minimum 450 VROC with 8 HELLFIRE and 320 rds of 30mm with 1.83 hours endurance at the Army hot day (4000', 95°, 95% IRP). The YAH-64 will exceed that minimum. The following chart depicts some representative options.

VISIONICS

The TADS and PNVS will be developed during Phase II. They provide the day/night/adverse weather target acquisition designation and NOE flight ability which enables effective launch of the attack armaments from stand-off range.

RELIABLE-AVAILABLE-MAINTAINABLE

Much attention has been given to RAM during design. The results elicited the following comment from the SSEB operational suitability area chief, “The most outstanding helicopter I have seen, in my career, for meeting the NOE mission and ease of maintenance in the forward battle area.”
AVIONICS/COCKPIT ARRANGEMENT

The AAH will have VHF-UHF-FM secure communication links and a lightweight Doppler navigation system. Tape-type instruments and overall panel/console arrangements are designed to keep crew workload to the minimum.

PILOT'S DISPLAY PANEL

- Vertical Scale Instruments
  - Engine Torque/Temp
  - Engine/Rotation Speeds
  - Fuel
  - Oil Pressure/Temperature

- Electronic Attitude Director Indicator
  - Altitude
  - Speed
  - Altitude
  - Hover

- Integrated Weapons Controls
  - Hellfire Missiles, 2.75 Rockets, 30mm Gun
  - Target Acquisition Designation System
  - Helmet Sight, Night Vision
  - Stores Stations

- Remote Transmitter Display

CO-PILOT/GUNNER'S DISPLAY PANEL

- Vertical Scale Instruments
  - Engine Torque
  - Engine/Rotation Speeds

- Integrated Weapons Controls
  - Hellfire Missiles, 2.75 Rockets, 30mm Gun
  - Target Acquisition Designation System
  - Helmet Sight, Night Vision

- Keyboard
  - Fire Control
  - Fault Detection/Location System

FARRP TURNAROUND TIME

Time to refuel, rear and return to the fight are of critical importance to the commander. The AAH is optimized for minimum FARRP time.

- Rearm Hellfire (8 each): 2 Men - 5 Minutes
- Rearm 76 Rockets: 10 Minutes
- Rearm 30mm (1200 rounds): 10 Minutes

- Armament Option Change
  - Hellfire to 2.75 Rockets: 10 Minutes
  - 2.5 Rockets to Hellfire: 10 Minutes

- Single Point Pressure Refueling: 4 Minutes

DEPLOYABILITY

With an 800+ NM ferry range, the AAH can self deploy over the indicated routes with up to a 20-knot headwind and 45-minute reserve at speeds for maximum range. During Phase II we will also look at in-flight refueling possibilities. Where more rapid response is needed, C-141, C-5A loadings can be effected in a matter of a few hours.

SELF-DEPLOYABLE (800NM FERRY RANGE)

YAH-64 Transatlantic Ferry Mission

- Goosebay, Canada to Frobisher Bay: 700 NMI
- Frobisher Bay to Sonderstrom, Greenland: 440 NMI
- Sonderstrom, Greenland to Reykjavik, Iceland: 760 NMI
- Reykjavik, Iceland to Prestwick, Scotland: 790 NMI

AIR TRANSPORTABLE

- C-141 - 2 Each
- C-5A - 6 Each
PHASE II PROGRAM PLAN

The Phase II program is a 56-month full scale engineering development wherein the two Hughes helicopters from Phase I will be modified to the latest configuration. Three more helicopters will be built, and development of HELLPFIRE, 30mm cannon, and 2.75 rocket subsystems completed. We will also competitively develop the target acquisition and pilot's night vision and fire control sub-systems. The subsystems will then be integrated for test and evaluation leading to the production award in December 1980.

AAH PHASE II SCHEDULE

<table>
<thead>
<tr>
<th>Contract Award</th>
<th>Feb 78</th>
<th>Mar 78</th>
<th>Apr 78</th>
<th>May 78</th>
<th>Jun 78</th>
<th>Jul 78</th>
<th>Aug 78</th>
<th>Sep 78</th>
<th>Oct 78</th>
<th>Nov 78</th>
<th>Dec 78</th>
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<tbody>
<tr>
<td>Phase 1 Eng Dev</td>
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<tr>
<td>Phase 2 Eng Dev</td>
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<tr>
<td>First Flight - Sys Dev</td>
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<tr>
<td>TADS/PNVS Selection</td>
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<td>GEAC III</td>
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<tr>
<td>Production Contract</td>
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<td>Initial Production Delivery</td>
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<tr>
<td>Deliveries Complete</td>
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</tr>
</tbody>
</table>

PRODUCTION/PROCUREMENT OBJECTIVE

The Army currently plans to procure 536 AAH's. The production decision is scheduled for December of '80 with the first delivery in December 1982.

The tentative basis of issue is:

- Airborne Division: 39
- Air Mobile Division: 75
- Heavy Division (Selected): 36
- Armored Cavalry Regiment: 18
- Air Cavalry Combat Brigade: 129

COSTS

<table>
<thead>
<tr>
<th>SUNK RDTE $M (esc)</th>
<th>352.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHASE 2 TO COMPL</td>
<td>165.0</td>
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<tr>
<td>TOTAL</td>
<td>986.2</td>
</tr>
</tbody>
</table>

Total Program = $4139.3

FY 72 $ unit FLYAWAY GOAL = $1.7M

CONTRACTORS

The major contractors involved in the AAH system development are:

- HUGHES HELICOPTERS (PRIME)
  - ADVANCED STRUCTURES - ROTOR BLADES
  - MAIN TRANSMISSION
  - TELEDYNE RYAN
  - DRIVE SHAFT
  - BERTEA
  - HYDRAULIC SYSTEMS
  - SHERWOOD
  - AUTO STABILIZING EQUIP.
  - MENASCO
  - LANDING GEAR
  - GARRETT CORP.
  - PRESS, AIR, ECU, APU
  - GENERAL ELECTRIC - ENGINE T-700; 1560 SHP
  - HONEYWELL
  - HELMET SIGHTING
  - ALCATEL GEAR CORP.
  - TAIL ROTOR GEARBOXES
  - TELEDYNE SYSTEM CO.
  - FIRE CONTROL COMPUTER
  - SPERRY
  - MULTIPLEX SYSTEMS
  - NORTHERN PACIFIC
  - TADS/PNVS
  - MARTIN MARIETTA

MANAGEMENT

The AAH is one of the Army's top priority programs. It is now structured under the new USADARCOM multi-level project concept. The Program Manager is BG Edward M. Browne; the Managers for the TADS/PNVS and 30mm developments report to him and use certain elements of the AAH staff to assist them in their program efforts.

AAH PROGRAM MANAGEMENT STRUCTURE
MANAGEMENT
AAH PROGRAM MANAGEMENT TEAM
(ARMY)

MAJOR GENERAL
EDWARD M. BROWNE
AAH PROGRAM MANAGER
1911/12

COLONEL
DONALD P. WRAY
PROJ MANAGER
TADS/PNVS
1992

MR. WILLIAM H. BRABSON, JR.
DEP PROGRAM MANAGER
1911

COLONEL
HAROLD L. JOHNSON
ASST PM
(TEST & EVAL)
AV 899-5105

MR. ROBERT L. JACKSON
CHIEF, LOG MGT DIVISION
1946

MR. ALBERT J. LAUBER
CHIEF, PRODUCT ASSUR OFFICE
1952

MR. ROBERT D. HUBBARD
CHIEF, TECH MGT DIVISION
1961

DR. FRANCIS E. SPRING
CHIEF, OPNS RES DIVISION
1931

MR. ALBERT J. LAUBER
CHIEF, PRODUCT ASSUR OFFICE
1952

LT. COLONEL DAVID LOGAN
PROJ MANAGER
30 MM AMMO
AV 880-3612

LT. COLONEL
GALEN ROSHER
ASST PROGRAM MANAGER
(REQUIREMENTS)
1921

MR. JAMES N. HEMMER
CHIEF, CONFIG MGT OFFICE
1941

TELEPHONE NUMBERS
MILITARY AUTOVON
693-XXXX
COMMERCIAL TELEPHONE
(314) 263-XXXX

CORRESPONDING ADDRESS:
ADVANCED ATTACK HELICOPTER PM
4300 GOODFELLOW BLVD.
ATTN: DRCPTM—AAH
ST. LOUIS, MO 63120
Aircraft Gear Corp. Performs For Hughes Helicopters YAH-64 Team

Aircraft Gear Corporation produces the intermediate and tail rotor gearboxes for the Hughes YAH-64. A unique feature of the gearboxes is that they employ only grease lubrication for high reliability and low maintenance. These grease gearboxes represent the first time this technology has been successfully demonstrated in the helicopter industry. Complete load-run testing is accomplished on test facilities established at Aircraft Gear Corporation.

Aircraft Gear has delivered 55,000 Aircraft Engine Gearboxes and Shafts to the aerospace industry over the past 17 years and is proud to be a member of the U.S. Army-Hughes No. 1 Team.
YAH-64
A Total System for Battle
AAH Objective

To provide front line commanders with a means of quickly concentrating antitank and suppressive firepower on targets in day, night and adverse weather conditions.

The Advanced Attack Helicopter represents an optimization of helicopter technology and contributes to the Army's ability to fight and survive on the modern battlefield.

Flight Performance

- Superior nap-of-the-earth capability
- Low vibration levels
- Maximum forward speed of 196 knots—sideways 45 knots
- Sustained rates of climb in excess of 3000 feet per minute
- Maximum gross weights up to 18,500 pounds

The primary mission of the YAH-64 requires a minimum 450 feet per minute vertical rate-of-climb with up to 8 Hellfire missiles, 320 rounds of 30mm ammunition and fuel for 1.8 hours mission duration at the standard Army hot day of 4,000 ft., 95°F.

The YAH-64 lightweight design results in the ability to perform its primary mission with substantial horsepower reserves, enabling the battlefield commander to select firepower options that provide optimum, tactical flexibility.

Firepower Options

The primary weapon on the YAH-64 is the Hellfire antitank missile. Suppressive firepower is provided by the 30mm CHAIN GUN and 2.75-inch rockets.

Armament Integration

30MM CHAIN GUN

2.75-IN ROCKETS

INTEGRATED FIRE CONTROL

INTEGRATED HELMET AND DISPLAY SIGHT SYSTEM

PILOTS NIGHT VISION

TARGET ACQUISITION AND DESIGNATION SYSTEM

Hellfire Missile System

- Defeats all known armor threats
- Reduces engagement time
- Permits launch from masked position
- Provides direct/indirect fire capabilities
- Allows multiple target engagements
Target Acquisition

The Target Acquisition and Designation System and Pilot Night Vision System (TADS/PNVS) provide crew with the capability to detect, recognize and engage enemy targets at extended standoff ranges during day, night and/or adverse weather.

Survivability

The YAH-64 is the most survivable helicopter down. Survivability features include:

- Optimized first-round kill
- Ballistic tolerance
- Back-up systems
- Twin engines
- Reduced signatures across the spectrum
- Agility
- Crashworthiness

Detectability

The YAH-64 is ballistically tolerant to API and HEI rounds and defies detection by infrared missiles.

Crashworthiness

The YAH-64 is ballistically tolerant to API and HEI rounds and defies detection by infrared missiles.
Design Characteristics

- Articulated rotor system
- High agility and maneuverability
- Reduced vibration levels
- Efficient autorotational characteristics
- Reduced rotor noise and flicker

Static Mast

Unique Hughes static mast
- Proven rotor system integrity
- Allows independent removal of main transmission or rotor system

Reliable, Available, Maintainable

The YAH-64 meets nap-of-the-earth mission requirements and displays ease of maintenance in the forward battle area.
- Built-in fault detection/location system
- Dynamic components located for easy access
- Complete forward area refueling and rearming in 10 minutes
- Grease-lubricated gearboxes
- Design simplicity ensures high reliability

Significant Program Milestones — 1979

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>First Hellfire launch — March 1979</td>
</tr>
<tr>
<td></td>
<td>Phase 2 modification complete — June 1979</td>
</tr>
<tr>
<td></td>
<td>Full system flight — June 1979</td>
</tr>
<tr>
<td></td>
<td>MFDI Subsystems integration accomplished</td>
</tr>
<tr>
<td></td>
<td>September 1979</td>
</tr>
<tr>
<td></td>
<td>Guided Hellfire missile launch —</td>
</tr>
<tr>
<td></td>
<td>September 1979</td>
</tr>
<tr>
<td></td>
<td>New aircraft first-flight — October-</td>
</tr>
<tr>
<td></td>
<td>December 1979</td>
</tr>
<tr>
<td></td>
<td>TADS/PNVS fly-off — December 1979</td>
</tr>
</tbody>
</table>

OVER 1,000 HOURS OF FLIGHT TEST — October 1979
Hughes Presents the U.S. Army's No. 1 TEAM

Comprised of the most talented aerospace companies ever concentrated on a helicopter program, the Hughes Team is No. 1 in technology, management and production.
The Prime Contractor depends upon support from numerous subcontractors. Among those supplying support to the Hughes Helicopters AH-64 and the components they provide are:

**SPERRY FLIGHT SYSTEMS**
- Aircraft Survivability Equipment
- Multiplex & Symbology

**LOCKHEED AIRCRAFT SERVICE COMPANY**
- Maintenance training

**MARTIN MARIETTA**
- Tactical Air Direction System/Pilot's Night Vision System

**TELEDYNE SYSTEMS COMPANY**
- Fire Control Computer

**RCA AUTOMATED SYSTEMS**
- Automatic Test Equipment

**BRANESCO**
- California Division
- Landing gear

**AIRCRAFT GEAR CORPORATION**
- Intermediate & tail rotor gearbox

**GENERAL ELECTRIC COMPANY**
- Engines

**BENDIX CORPORATION**
- Power generation system & drive shafts

**LITTON PRECISION GEAR**
- Main transmission & engine nose gearbox

**BERTA PARKER**
- Hydraulic Actuators

**TRE CORPORATION**
- Advanced Structures Division
- Rotor blades

**HONEYWELL, INC.**
- Helmet sight & 30mm ammunition

**ROCKWELL INTERNATIONAL**
- Missile Systems Division
- Avionics & Missile Systems Group
- Hellfire

**GARRETT AERORESEARCH**
- Pressurized air, Environmental Control Unit & Auxiliary Power Unit

**LITTON GUIDANCE & CONTROL SYSTEMS**
- Strapdown Heading Attitude Reference System

**TELEDYNE RYAN AERONAUTICAL**
- Airframe structure

**KEARFOTT**
- A Division of The Singer Company
- Doppler Navigator

**ADDITIONAL SUBCONTRACTORS**

<table>
<thead>
<tr>
<th>Company</th>
<th>Items Provided</th>
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<tbody>
<tr>
<td>ABEX CORPORATION</td>
<td>Aerospace Division, Hydraulic pump, variable delivery</td>
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<tr>
<td>EXPLOSIVE TECHNOLOGY</td>
<td>Canopy severance device, Fuel transfer &amp; fuel boost pumps</td>
</tr>
<tr>
<td>PNEU DEVICES, INC.</td>
<td>Dynamic Controls Corporation, Main &amp; tail rotor blade de-icing kit</td>
</tr>
<tr>
<td>NORTON COMPANY</td>
<td>Industrial Ceramics Division, Armored seats &amp; armored panels</td>
</tr>
<tr>
<td>CANADIAN MARCONI COMPANY</td>
<td>Engine/rotor &amp; fuel quantity instruments</td>
</tr>
<tr>
<td>MOOG, INC.</td>
<td>Controls Division, Pylon actuators</td>
</tr>
<tr>
<td>SERRACON/SYLMAR</td>
<td>Division of Serracin Corporation, Canopy</td>
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<tr>
<td>ELDEC CORPORATION</td>
<td>External stores elevation control set</td>
</tr>
<tr>
<td>ROSEMOUNT, INC.</td>
<td>Ice detector</td>
</tr>
<tr>
<td>PACE SYSTEMS, INC.</td>
<td>Air data sensor subsystems</td>
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<tr>
<td>COLLINS RADIO AVIATION</td>
<td>A Division of Collins Radio Antenna subsystem</td>
</tr>
<tr>
<td>GRIMES MANUFACTURING COMPANY</td>
<td>Engine out, rotor RPM &amp; low altitude warning system</td>
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<tr>
<td>FAIRCHILD AIRCRAFT SERVICE DIVISION</td>
<td>Ballistic foam for fuel cells</td>
</tr>
<tr>
<td>GRIMES MANUFACTURING COMPANY</td>
<td>Anti-collision lights, search lights, formation lights, &amp; navigation lights</td>
</tr>
<tr>
<td>IMC MAGNETICS CORPORATION</td>
<td>Eastern Division</td>
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<td>CLIFTON PRECISION PRODUCTS</td>
<td>Radio magnetic indicator</td>
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<tr>
<td>JANITROL AERO</td>
<td>Division of Midland Ross, Hydraulic heat exchanger, oil heat exchanger</td>
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<tr>
<td>AEC-ABLE ENGINEERING COMPANY</td>
<td>Maintenance crane</td>
</tr>
<tr>
<td>SARGENT-FLETCHER COMPANY</td>
<td>Auxiliary fuel tanks</td>
</tr>
</tbody>
</table>

**PRIME CONTRACTORS**—If you have a weapon system which you believe should be featured on this page, contact Sue Coulson at the NATIONAL DEFENSE Editorial Offices. This will be a regular editorial feature of NATIONAL DEFENSE to help explain the intricacies of defense production.

**SUBCONTRACTORS**—NATIONAL DEFENSE will offer the opportunity to advertise on a forthcoming subcontractors advertising page at special reduced rates. For information concerning the Subcontractors Advertising Page, contact the National Defense advertising headquarters at PMI, 1800 Pickwick Ave., Glenview, IL 60025; (312) 724-6960.
The following story is the second of an Observer series that will profile each of 20 team members working with Hughes Helicopters on the Army’s Advanced Attack Helicopter program. Together, the team comprises the most talented aerospace group ever concentrated on a helicopter program.

Aircraft Gear Corporation, based in Chicago, is a privately-held, small business company which provides highly sophisticated engineering capabilities and comprehensive production facilities for the nation’s military and commercial aviation, space and nuclear industries.

The company, having completed a decade of substantial growth in resources and facilities, is now one of the largest producers of precision aircraft engine and transmission gearing in the world.

Within the United States, it produces more aircraft engine gearboxes and engine main shafts than any other subcontractor. The company’s output of gearboxes for the last 17 years averages 167 per month.

As a member of the AAH team, Aircraft Gear currently supplies intermediate and tail rotor gearboxes, the main rotor shafts, tail rotor forks and drive plates for the AAH. Phase III (production) of this program should equal a sales volume of approximately $20 million for the company’s 260 employees involved in this effort.

The principal technical advancement experienced during its Phase II participation in the AAH program was the development of grease lubrication in the two gearboxes, the first successful use of grease in a helicopter gearbox.

The firm, as constituted, was first a division of Hupp Corporation, maker of the old Hupmobile, and was renamed Aircraft Gear Corporation by its current owners in 1965, the year the company was purchased from Hupp.

The company’s first major accomplishment was the successful production of liquid rocket engine gearing for North American Rockwell’s Rocketdyne Division in 1957 for the Navajo, Jupiter and Thor missiles. Even at present, the company remains a sole-source for this gearing in the United States and Japan where the Atlas missile is now manufactured.

Aircraft Gear Corporation has become a truly international supplier with such customers as Aerospatiale (France), Fabrique Nationale (Belgium), Hawker Siddeley (Canada), Rolls-Royce Limited (United Kingdom).

They are also somewhat unique in that they are the only supplier with gearing on all three engines which power the Boeing 747 transport. These are produced for the General Electric CF-6, the Pratt & Whitney JT-9, and the Rolls-Royce RB-211 engines.

Their newest program of note is that of transmission source for Aerospatiale Helicopter’s U.S. Coast Guard SRR Helicopter.

Aircraft Gear is the sole Small Business firm on the AAH team. They have had numerous nominations for the national “Small Business Award” of the year and have been renominated for this year’s award.

In recent years, the company has moved heavily into numerically-controlled facilities. Fourteen such machines for milling, turning and inspection are currently in place with six additional machines on order. A 30,000 sq. ft. plant expansion will be ready for occupancy this month.
Mr. Dean A. Olson
Board Chairman
Aircraft Gear Corporation
6633 Eau 65th Street
Chicago, Illinois 60638

Dear Mr. Olson:

Thank you for your recent telegram, letter, and phone call regarding the fate of the proposed AAH attack helicopter program for the U.S. Army. Acting on your suggestion, Dr. Forrest Frank of my staff met with General Browne and members of the AAH program management team on Friday, February 15, 1980, for more than two hours to review the program as presently structured. In addition, alternative programs were discussed.

On the basis of that briefing as well as additional discussions with other Members concerned about this problem, I believe the AAH program will remain on schedule without further restructuring, at least for Fiscal Year 1981. The program is nearing the end of the R&D cycle and funds have been included in the FY 1981 budget for long lead-time procurement. These funds must be appropriated if the first procurement systems are to be delivered in November, 1981, as presently planned.

There has been much discussion of a possible shift from the AAH to another platform for the HELLFIRE missile. However, I understand that after reviewing the operational test and evaluation data of the AAH and comparing that data with the AH-1S Cobra and an unarmed BLACKHAWK SYSTEM, the Army and civilian officials within DOD are now agreed that the AAH program should go forward as planned.

Accordingly, I look forward to supporting the final authorization and appropriation measures with funds included to complete research and development and proceed into procurement with the AAH this fiscal year. Incidentally, I would be neither surprised nor disappointed were funds to be sought next year to initiate a Marine Corps or Navy procurement of the AAH system. I suspect that this issue is now being thrashed out within the Administration.

Thank you again for your interest. I look forward to hearing from you in the near future.

Sincerely yours,

John B. Anderson
Member of Congress
HH-65A DOLPHIN
U.S. Coast Guard
Short Range Search and Rescue Helicopter
HH-65A PROFILE

Maximum Gross Weight .8400 lbs.
Rotor Diameter ................. 39' 2"
Overall Length ................. 37' 6"
Overall Height ................. 13' 1"
Overall Width ................. 10' 6"
Fuel Capacity .................. .291 gal.

Engine Rating (per engine) SLS

2½ min.
(one engine inoperative) ....... .735 hp
Take-off ....................... .680 hp
Maximum Continuous .......... .645 hp

PERFORMANCE

Never Exceed Speed ........... .175 kts
Maximum Cruise (SL) .......... .145 kts
Economy Cruise (SL) .......... .128 kts
Hover IGE ...................... .7510 ft.
Hover OGE ..................... .5340 ft.
Maximum Range ................. .420 nm
Maximum Endurance ........... .4.1 hrs.
FAA transport Category A
A Technically Advanced Aircraft

MISSION VERSATILITY

Primary Mission:
Short Range Search and Rescue
105 nm radius
30 min. on station
Rescue 3 people

Other Missions:
Patrol
Passenger Transport
Cargo Sling
Shipboard Capability
The HH-65A Meets Every U.S. Coast Guard Mission With Margins of Extra Performance

Today's Technology, Readiness, Efficiency

Greater Availability:
- Enhanced corrosion resistance — extensive use of composite materials.
- Modularized engines with on-condition maintenance.
- Simplicity of dynamic components.

Increased Operational Capabilities:
- All Weather, day-night, land or sea.
- Reduced pilot workload under any flight regime.
- "Go-anywhere" navigational accuracy.
- Four-axis autopilot with automatic transition to hover.
- Multi-function state-of-the-art cockpit displays.

Low Operating Costs:
- Fuel efficient engines.
- Infinio life or high MTBF components.
- Reliability Assurance Warranty of major avionics units.

SRR Program Status

Major Milestones:
- First flight HH-65A .............. August 1980
- FAA certification .................. October 1981
- First delivery to Coast Guard ........... Mobile, Alabama .............. February 1982
- First site activation, Mobile, Alabama .............. February 1982

Parent Aircraft Achievements

The SA 365N Dauphin 2, HH-65A parent aircraft, established a world category speed record on a Paris-London-Paris route averaging 163 kts ground speed for the round trip. The record was set February 8, 1980.

Aerospatiale Helicopter Corporation

2701 Forum Drive
Grand Prairie, Texas 75051
214 641-0000

Printed in USA

Standing - left to right - Dean A. Olson II, Executive Vice-President, Rockford Acromatic Products Co.; Peter Jeffrey, Pres., Illinois National Bank & Trust Co.

This is a policy and resource development Board - to review and develop research and development Projects and Proposals. It will also monitor them during implementation and publish the results appropriately.
A Small Business Participates in Major Government Procurements

Page 9  Line 5 - insert words "and intermediate" between rotor and gear.

Page 15 Line 14 - put in brackets the sentence "While some of the specifications were being written . . . . ." 

Page 15 Line 16 - delete the sentence "At this point, Bell Helicopter . . . . . " 

Page 15 Line 18 - make arrow from start of sentence "and a relatively new company . . . . " to the end of the sentence beginning "at this time, Hughes . . . . " on line 13.

Page 16 Line 2 - change SA 366 to SA 365

Page 17 Line 11 - change SA 366 to SA 365

Page 17 Line 23 - delete word "all" and replace with "several of"

Page 21 Line 14 - change letter "i" to "o" in word government