The Future of Light Commercial and General Aviation: Helicopters Lt. Col. Lawrence P. Peduzzi, Federal Aviation Administration

The purpose of this report is to summarize the Civil Helicopter Panel's discussions and conclusions which may be useful to both the public and private sectors.

The Civil Helicopter Panel consisted of a very credible cross section of the industry, which included private operators manufacturers, associations, and representatives from the FAA, NASA, and DOD.

After a review of existing economic conditions, the panel members articulated present day problems which prevent growth and prosperity in the helicopter industry. These problems are:

> Public Acceptance Lack of Public Heliports Liability Insurance Lack of Standardized FAA Enforcement Industry Fragmentation

These problems must be considered when assessing the future. Without solutions, the civil helicopter industry's growth will be inhibited. The present day problems addressed by the Panel are only highlighted in this report. Because these problems lie mainly within the purview of the Government, they will be addressed in detail in a separate report to the FAA. The report to the FAA will recommend near-term solutions to the industry's pressing road-blocks.

The discussions on the future of civil helicopters concentrated on a 10-year span of time. The assessment generally substantiates the 1985 Workshop Report. (See Transportation Research Circular No. 299 February 1986).

Our discussions on the future involved the broad areas of:

- 1. Market Conditions
- 2. Government/Industry Structure
- 3. Liability Insurance
- 4. Technology
- 5. Infrastructure

## 1. Market Conditions.

In considering market conditions, helicopters and helicopter services were segmented into five submarkets.

- a. Offshore
- b. Business and Corporate Use
- c. Commuters and Intercity Services
- d. Public Service law enforcement and emergency medical service
- e. Manufacturing

a. <u>Offshore</u>: The market for helicopter operations in the offshore oil industry will remain at present levels for the next 2 years. An upswing in the oil industry is expected in the early 1990's. This upswing will precipitate an increase in demand for helicopter operations, and new oil fields will be explored and developed at greater offshore distances. The demand will follow for larger helicopters with greater speed and range.

b. <u>Business and Corporate Use</u>: Stable to modest growth is predicted. The first and most critical issue to growth and promotion of corporate executive transport business is the establishment of downtown heliports. Availability of such landing sites is essential to developing a viable corporate helicopter market. Opposition to construction of heliports is strong and public education is required to allay unfounded fears and to reduce misinformation. The FAA and industry must work together to develop clear cut heliport design criteria and noise regulations that will foster the growth of heliport development and the helicopter industry in general.

Constructive solutions are needed to improve helicopter access to airports. Specified helicopter approaches into and out of airports, out of the mainstream of fixed-wing traffic, need to be developed to allow the helicopter to exploit its unique performance capabilities.

The FAA Heliport Design Guide must evolve to accommodate the tilt-rotor, which will also help accommodate the helicopter in downtown areas. These actions will enhance corporate transport business.

c. <u>Commuters and Intercity Services</u>: Helicopter commuter and intercity services are presently concentrated in the Northeast U.S. (NEW YORK/NEW JERSEY/PHILADELPHIA/BOSTON).

There is a significant demand for point-to-point travel among the larger cities, specifically in the northeast. The lack of a public-use heliport in Washington, DC is a real impediment to connecting our Nation's capital to other major north eastern cities via helicopter. The development of advanced rotorcraft, such as the EH101 and Tilt-Rotor, makes pursuit of an aggressive heliport development effort imperative if we intend to accommodate these aircraft and exploit their usefulness to the Nation's transportation system. More effective use of existing helicopters and use of the tilt-rotor could be a boom for major cities and have significant potential to enhance the capacity at major metropolitan airports.

The problems of airspace procedures, lack of heliports, noise, environment, and zoning considerations must be overcome in dealing with the expanded use of rotorcraft for point-to-point travel and heliport development. The public sector must be convinced that the helicopter and tilt-rotor are viable and necessary links in the Nation's air transportation system.

d. <u>Public Service</u>: Public service helicopters performing law enforcement and emergency medical service missions represent one of the most rapidly growing segments of the helicopter industry. There are over 230 public service agencies flying approximately 570 helicopters. Most of the activity has been in the U.S. The trend is toward continued growth. Growth is predicted overseas but not nearly as dramatic as in th U.S.

Enhanced heliport facilities for emergency medical flights will be needed. There are approximately 1,400 private-use heliport facilities designed for emergency medical evacuation. Many of these facilities are at community-owned hospitals. Although the heliport is private-use, any helicopter operator may land at the facilities with a medical emergency patient on board. The term "private-use" applies here as a restricted use which is determined by the purpose of the heliport.

It is possible, with minor change in the enabling legislation, to fund development and safety improvements at hospital heliports through the Federal airport development grant process. At nonprofit hospitals, future Federal assistance in heliport development may be in the best interests of the Nation, even though these facilities are classified as private-use and are designed for the sole purpose of medical evacuation.

Potential technology transfer from the military to the private sector is not exploited. There are several existing or near term technological concepts that would be welcomed in the public service community. A "heads-up display," for example, would allow an emergency medical service pilot to monitor aircraft limitations while making an approach to an unimproved landing area. The public service operators' mission would be greatly enhanced by certification of this and other near term advances being developed in the military sector. NASA should act as the conduit between the manufacturers, the military, the FAA, and the public service community.

e. <u>Manufacturing</u>: Approximately 375 new helicopters are expected to be delivered in the world during 1988. A hundred of these will be delivered domestically. Other reports predict that 14,000 helicopters will be produced worldwide in the next 10 years. This equates to approximately \$65 billion worth of helicopters. A \$15 billion, 6,000 helicopters share is forecast for the civil sector, and \$50 billion, 9,000 helicopters share is forecast for the military sector.

Helicopters will become even more reliable. Real direct costs of operation should improve. Lower acquisition and spare parts costs will help stimulate the market. Product liability costs will have to come under control and back to pre-1984 levels. New production sources hold promise for reduced manufacturing costs. Assuming product liability comes under control, the outlook is reasonably positive for this period in which tilt-rotor aircraft will replace some helicopters and complement the operations of others.

## 2. Government/Industry Structure

Progress within the helicopter industry is dependent on significant enhancement of communications between government and the industry. The industry continues to perceive that they are made to operate with outdated regulations that forces operation in a system designed for fixed-wing aircraft only. A review of FAA rules and regulations pertaining to helicopters/heliports was suggested. If feasible, the development of one set of regulations addressing rotorcraft would be desirable and was endorsed by the panel.

Lack of sufficient information about the helicopter industry reduces the industry and FAA's ability to educate the public on the safety and utility of the helicopter. Government and industry statistical gather methods differ significantly. The resulting analysis and forecasts, therefore, are often misleading and conflicting. A comprehensive review of the statistical gathering methodology of the FAA, NASA, NTSB, and the representative industry associations needs to be accomplished.

A consensus was clear that the industry needs the FAA to be more proactive. Specifically in their promotion of aviation role toward the helicopter industry. More heliports are needed now and for future tilt-rotor aircraft. The lack of suitable helicopter landing areas is stifling the industry.

3. <u>Liability Insurance</u>: Insurance costs of all types have driven many operators out of business. These high costs continue to stifle the industry to a significant degree. Several industry initiatives are planned to directly influence the cost of liability insurance. These initiatives are enhancing safety through human factors training to flight and maintenance crews on judgment and discipline; improved methods of measuring and controlling direct costs of helicopter operations; expanded use of simulators for training and certification; and development of a program that calls for mandatory helicopter and pilot checks.

Several bills relating to tort liability reform have been introduced in the Congress (H.R. 2238 and S.473) that are intended to provide some relief from the high cost of product liability insurance. Passage of these bills is possible in 1988. These legislative actions will have a positive impact on reducing the liability insurance costs and remove a major obstacle to industry growth.

4. <u>Technology</u>: Department of Defense (DOD) rotorcraft initiatives and programs are sophisticated and very impressive. However, it appears that our process of technology sharing between major Government agencies is lacking. A significant need exists for an enhanced process of intra-government sharing and transferring of technology for the benefit of the civil helicopter industry. Specific military technology transfer opportunities for civil application are entire airframe programs; broad functional areas in propulsion; composites; cockpit systems; rotors; antitorque systems; reliability, maintainability, and availability. Specific systems are heads-up display (HUD); electronic visual systems; automatic approach to hover; and navigation systems encompassing global positioning system (GPS).

Noise is still considered as a drawback to the rapid expansion of civil helicopter use. The current NASA/Industry National Rotor Noise Reduction Program is an excellent example of a cooperative effort and is achieving technical results yet to be applied in practice. Greater emphasis and application of technical results is required to continue rapid civil helicopter growth.

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The big challenge in making these new rotorcraft systems cost-effective is for manufacturers and FAA to develop new analytical concepts and methods so as to make certification as least costly as possible. The NASA appears to be the most appropriate agency to serve as the focal point for coordinating this technology transfer regarding rotorcraft. A strong consensus was expressed that an increased emphasis is needed to expand the research and operational data bases and the sharing of these data bases among military and civil users.

The most exciting area of rotorcraft technology is the tilt-rotor development. A joint FAA/NASA/DOD study on the civil applications of tilt-rotor aircraft has just been completed. The study examined potential applications of the tilt-rotor, specifically V-22 technology, to the civil marketplace. A series of transports were examined, ranging in size from 8 to 75 passengers, with special attention to V-22 derivative designs. The transports were analyzed for applicability and economic viability in several markets: high-density metropolitan, low-density population centers, cargo/package express, public service, and resource development. the study concluded that:

- o the civil tilt-rotor is a unique vehicle with a large market potential.
- o the civil tilt-rotor is superior to multi-engine helicopters under most conditions.
- o success of the civil tilt-rotor depends on the success of the military V-22 tilt-rotor.
- additional work is required to optimize the civil tilt-rotor's competitive economics, through application of advanced technology and innovative design.
- o a national civil tilt-rotor transportation plan, including suitable infrastructure and a technology demonstration program, is needed.

Good potential exists for a minimally modified military V-22 to serve as a civil demonstrator by 1994. A fleet of 10-15 civil tilt-rotor aircraft could be providing commercial services by 1998.

5. <u>Infrastructure</u>: The basic infrastructure that helicopters operate in is segmented into the three broad areas of: (1) operations within the National Airspace System; (2) use of heliports; and (3) the certification process of flight and maintenance crews and aircraft. This infrastructure aligns directly with the three primary areas of the FAA's Rotorcraft Master Plan -- Integration in the National Airspace System; Heliport Development; and Certification. The goals of the FAA plan are to enhance the National Airspace System (NAS) to permit rotorcraft to employ their unique capabilities to the maximum extent, to provide for an adequate system of visual flight rules/instrument flight rules (VFR/IFR) heliports, and to improve safety through certification by upgrading criteria and applying advanced technology. The FAA's Rotorcraft Master Plan is a good plan that addresses all aspects of rotorcraft requirements through the year 2000 in the areas of National Airspace System, heliports, and certification. This plan has recently been revitalized through realignment of management responsibilities. Enhanced coordination with industry on the plan's implementation and progress is needed. The coordination process should review the plan for validity, and focus on integration of the plan into the FAA's major capital expenditure documents.

## Conclusions

Market conditions indicate that the civil helicopter industry will experience slow, but steady, growth over the next decade.

Significant roadblocks to more moderate growth exist. An enhanced Government/Industry communication process must develop if these roadblocks are to be overcome. Key among these significant roadblocks is the lack of properly located public-use heliports. A more cooperative and mutually understanding relationship between Government and the Industry is necessary. A positive climate is developing and expected to continue in which the industry can continue to expand and realize the full potential of rotorcraft in enhancing the Nation's transportation system.

Liability costs are a substantial drain on the industry. But, relief through industry initiatives and Congressional action is expected.

The U.S. rotorcraft technology is expected to continue to provide world leadership. A civil tilt-rotor aircraft is expected to be in service within the next decade. Added emphasis on the application of rotorcraft noise reduction is necessary. However, our ability to share and transfer appropriate technology with other Government agencies to realize benefit to the civil industry in a timely manner needs significant improvement. The NASA should take the lead to serve as the focal point for coordinating appropriate technology sharing and transferring.

The present infrastructure in which the civil helicopter industry operates meets minimal requirements. A good plan exists in the form of the FAA Rotorcraft Master Plan to cause significant improvements to our infrastructure over the next decade. The primary challenge is to exercise the Government/Industry system to cause the plan to be implemented.