It's About Time!
—Case report on IFR implementation at CareFlite, Grand Prairie Texas
by Raymond K. Dauphinais and John R. Wish

Background
On March 26, 2005, at 1907, two medical services responded to the scene of a two car Motor Vehicle Accident (MVA) in suburban Dallas. The weather was marginal. CareFlite rejected the request as a Visual Flight Rule (VFR) flight due to weather and filed an Instrument Flight Rule (IFR) to an airport one mile north of the scene. Another program's pilot accepted and flew the mission VFR. The two aircraft arrived at the scene about the same time. CareFlite delivered the first seriously injured patient to definitive care 20 minutes after patient pickup. The other helicopter had to abort due to weather and take the patient back to the airport for a ground transport to the hospital significantly delaying the patient's arrival to a higher level of care. The VFR only pilot should be commended for aborting the patient transport when the weather deteriorated further. However the question remains, should he have been out in that weather at all?

Introduction
When weather, distance, location, or road conditions could delay transport or endanger a patient's condition, CareFlite flies IFR. CareFlite's charge is the same today as it was 25 years ago — to serve the community by providing the highest quality care by the safest means possible.

For CareFlite, the high accident rates and fatalities from VFR flying were unacceptable. The operational question was one of flight safety. Should it become a day VFR program (like the Germans), raise their VFR weather minimums, or adopt SPIFR?

This paper surveys the process and the decision to implement IFR capability at that company.

CareFlite Mission Profile

| Scenes: | Provide rapid assessment and stabilization of a patient outside the hospital environment and transport to appropriate receiving facility. Crew consists of pilot, nurse, and paramedic. Approximately 43 percent of patient flights are scene flights. |
| Interfacility: | Provide transport for the critically ill/injured patient from the referring facility to the receiving facility. Crew consists of pilot, nurse, and paramedic. Approximately 46 percent of patient flights are interfacility flights. |
| Specialty: | Provide transport for patients that require highly specialized teams and equipment (i.e., neonatal, pediatric, intra-aortic balloon pump with perfusionist, amputation teams, organ procurement teams). Crew consists of pilot, safety officer, and specialty team members as required. Approximately 9 percent of patient flights are specialty flights. |

Implementation of IFR
In 2003, CareFlite decided to explore the financial, clinical, and operational feasibility of IFR operations.

In 1988, the National Transportation Safety Board (NTSB) published a report, "Commercial Emergency Medical Service Helicopter Operations," which was initiated because the accident rate for EMS operations was twice the rate experienced by Part 135 on-demand helicopter operations and one and one-half times the rate for all turbine-powered helicopters.

The NTSB determined that marginal weather and inadvertent flight into Instrument Meteorological Conditions (IMC) were the most serious hazards that EMS helicopters encounter.

The NTSB data strongly suggest that helicopter flights conducted under IFR are less likely to have

Patients 2004

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<th>Items</th>
<th>Amount</th>
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<tr>
<td>Incoming calls approximately</td>
<td>25,000</td>
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<tr>
<td>Air transports</td>
<td>&gt; 3,700</td>
</tr>
<tr>
<td>Interfacility</td>
<td>&gt; 1,900</td>
</tr>
<tr>
<td>Scene</td>
<td>&gt; 1,600</td>
</tr>
<tr>
<td>Specialty Teams</td>
<td>&gt; 200</td>
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<tr>
<td>Ground Advanced Life Saving (ALS) Transports</td>
<td>&gt; 9,100</td>
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<tr>
<td>Medical transport (not ALS)</td>
<td>&gt; 11,000</td>
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Financials

<table>
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<tr>
<th>Items</th>
<th>Amount</th>
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<tr>
<td>Assets</td>
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<tr>
<td>Annualized Fiscal Year 2005 Revenue</td>
<td>$41 million</td>
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Seventeen years later:
2005 Federal Aviation Administration (FAA) Air Ambulance Task Force Recommendation Document: #AER-10

Visibility as a Causal Factor in Accidents "It appears marginal visibility has been a significant factor in a number of helicopter medical evacuation accidents operating under VFR in the past several years."

FAA notice #8000.293

In addition, the recent FAA notice #8000.293 identifies that night, VFR, and Inadvertent Instrument Meteorological Conditions (IMC), as primary areas of concern for HEMS operations.

Nearly all fatal EMS helicopter accidents have been associated with VFR Controlled Flight into Terrain (CFIT) (AMJ January 2005, FAA and safety board report) [HAI's statistical data shows 18 out of 30 fatal accidents had characteristics of CFIT]. According to AER-10, page 3, the 26 fatal HEMS accidents between 1998 and 2004, which resulted in 73 deaths, were nighttime accidents. In 2004, all

weather-related accidents than helicopter flights conducted under VFR.

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five of the fatal accidents that resulted in 17 deaths occurred in VFR aircraft flying at night. One conclusion from the AER-10 report: "All the fatal accidents appear to have CFIT characteristics."

**Cost/Benefit** First, a statistical benefit/cost analysis was performed using six years of historical operational data and 38 years of historical weather. During the six years beginning December 1997 and ending October 2003, there were 2,191 hospital transport missions cancelled, aborted, or turned down due to weather. To determine the IFR benefit, a statistical weather model was developed using historical weather data that included ceiling and visibility and the probability of thunderstorms, icing, and fog. An operational model was also developed using the cancelled missions/data and the date and time each mission cancelled. The two datasets were merged and it was statistically determined that 1,048 of the cancelled 2,191 hospital missions could have been completed during periods when the ceiling and visibility were greater than IFR approach minimums but below the VFR minimums. The benefit/cost report revealed that an average of 175 inter-hospital patients can be transported to a higher level of medical care each year by using an IFR network being developed under this project.

Substantial numbers of revenue producing flights could have been accepted if CareFlite had IFR capability.

**IFR Approaches for 17 hospitals** However, having IFR capabilities to airports was not enough. For timely patient care, Global Positioning System (GPS) point in space IFR approaches were needed at each of the major hospitals in the Dallas/Fort Worth Metroplex area, as well as outlying hospitals.

A review of historical patient referral patterns was conducted along with geographical coverage requirements of the service area. Those hospitals located within two miles of an instrumented airport were excluded as they fell within the VFR weather minimums. Seventeen hospitals were selected to have point-in-space GPS approaches developed and commissioned in order to meet the operational needs of an IFR program that provided improved patient care, enhanced safety of operations, and a more consistent patient transport service. The development of GPS approaches for 17 hospitals was a significant cost in developing the IFR network.

**Financials** The GPS approaches were developed by Hickok & Associates.

**Costs for their expertise included:**
- Engineering the 17 GPS approaches paid over five years: 
  - In-house flights checks (flight hour cost) = $8,000
  - Final FAA acceptance flight checks (all approaches) (flight hour cost) = $10,000

**Costs for their expertise included:**
- Maintenance of 17 GPS approaches.

**Additional costs for IFR included:**
- Jeppesen pubs for each pilot
- Garmin database subscription per aircraft

**Increased flying costs for instrument training:**
- Initial Pilot IFR Training per pilot = $7,000.00
  - all pilots have instrument ticket
  - 40 hours ground school
  - 14 hours flight time (includes check ride)
- Increased cost of six month check ride; per pilot = $2,500.00
- Increased annual pay for each IFR pilot = $2,000.00.

The added costs were substantial, but most could be capitalized as investments.

The costs were front-loaded with almost $200,000 in first year expenditures. Additional revenue from the IFR patient flights will not be substantial until 2006. Financial break-even is expected to come quickly, by mid-2006 at the latest. From a financial officer’s perspective, it was an easy decision.

"The IFR program allows CareFlite to safely capture flights we would otherwise have had to forego. Further, the net revenue easily offsets the increase in expenses while utilizing excess capacity."

—Christopher Turner, vice president and CFO of CareFlite.

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By enhancing helicopter access to the IFR system through hospital-based GPS approaches, the company can expect an increased utilization of their existing IFR certified and equipped helicopters, thereby yielding economic benefits in terms of greater returns on investment, and more efficient use of equipment, time, and other resources.

**Discussion** The decision to implement IFR was a "no brainer." More patients can be served, flights are safer, and projected revenue is higher.

Pilot training began in August 2004, and the first IFR patient flights were completed on November 19, 2004. All CareFlite pilots are expected to be IFR current and proficient in October 2005.

Seventeen hospital GPS approaches are in the process of being approved by the FAA and should be commissioned in November 2005.

**Lessons Learned** Don't be afraid to ask staff for help. Nearly every pilot has an area of interest or expertise. The acceptance of the SPIFR program was universal among the pilots, they were eager to assist and did an outstanding job with many portions of the project.

Bring your local FAA into the process early. The Flight Standards District Office (FSDO), regional office, airspace and procedures and instrumented local airports all have a stake in the success of the project. Make contact with the Controller's Union and keep them informed, their nuts and bolts approach to IFR operations can be very helpful. If the controller is happy, your pilots are happy.

**Conclusion** The Helicopter IFR Network being developed for CareFlite is the second largest implementation project of its kind ever undertaken within the United States and will become the third largest Helicopter Hospital IFR Network in the USA.

With IFR capability at all helicopter bases, and the implementation of hospital GPS approaches, CareFlite will achieve more timely and consistent transport of patients from rural areas.

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**Editor's Note:** The upgrading by CareFlite to a fully certificated IFR program, for the purpose of enhancing safety and increasing the capabilities of their helicopter air medical operations, is an example of the voluntary actions recommended by HAI in its recently published HEMS White Paper. All HEMS operators are strongly encouraged to evaluate their own programs to identify where appropriate or similar enhancements can be made.