AVIATION UNIT REVIEW AND HELICOPTER FLEET ANALYSIS
BROWARD COUNTY SHERIFF’S OFFICE
28 February – 03 March 2017

Prepared by:
Law Enforcement Aviation Consultants, LLC
on behalf of the
AIRBORNE LAW ENFORCEMENT ASSOCIATION, INC.
Introduction

The overview of the Technical Services Agreement states that Broward County Sheriff’s Office seeks the assistance of the Airborne Law Enforcement Association (ALEA) with a thorough review of the sheriff’s aviation unit and current helicopter fleet to make informed decisions regarding the current missions, air rescue fees, cost analysis, organizational structure, standard operating procedures, and helicopter selection, purchase, operation, maintenance, and disposition of the current fleet by providing objective and impartial information. More specifically, Exhibit A requested that the consultant, Jim Di Giovanna, dba, Law Enforcement Aviation Consultants, LLC retained by ALEA, focus on the following areas to accomplish the intent of the overview:

- Review of primary mission(s), focus of air unit, and analysis of cost vs. cost recovery
- Recommendation of personnel staffing and shift scheduling to meet agency need
- Evaluation of physical plant facilities
- Gap analysis of unit SOP vs. PSAAC standards
- Determination/recommendation of aircraft capability and requirements vs. mission requirements
- Recommendations on aircraft replacement schedule and life cycle management relative to component overhaul requirements, down time and major inspection cycles
- Aircraft procurement strategies, including advantages/disadvantages of purchasing vs. leasing aircraft
- Recommendations to optimize maintenance operation
- Recommendations for aircrew training needs relative to mission and regulatory requirements
- Recommendations for potential funding sources and possible alternatives to current operations
- Recommendations to agency executives and unit management on the most efficient and cost effective practices to manage and lead the air unit in safely completing its mission

On February 28 – 03 March 2017 the consultant, on contract to the Airborne Law Enforcement Association (ALEA), conducted an operational review and helicopter fleet analysis of the Broward County Sheriff’s Office Aviation Unit. The assessment was conducted at the unit’s hangar and office facility located at Fort Lauderdale Executive Airport, Fort Lauderdale, FL. Participating in the assessment from the Aviation Unit were Sergeant Christine Ponticelli, Aviation Unit Supervisor; Deputy Brian Miller, Chief Pilot and various aircrew and paramedics. Additionally, the consultant met with members of the command staff for both the Department of Law Enforcement and Fire Command.
Primary and secondary data that formed the basis of the consultant’s analysis were collected from a review of organizational and unit statistical data, industry reference guides, and interviews with the Aviation Unit’s pilots, aircrews and mechanics. This information enabled the consultant to assess the Aviation Unit’s conformity with industry aviation standards, helicopter fleet requirements, and the unit’s ability to provide air support and rescue services to the Sheriff’s Division of Law Enforcement (DLE), Fire Command and surrounding communities, given the current aircraft, personnel, scheduling and availability. The source material used to gather data for aircraft cost comparison charts was obtained from Conklin & de Decker Life Cycle Cost and Aircraft Cost Evaluator for Helicopters software products. All other sources are as noted.

**Assessment Approach**

To address the specific areas, the consultant created five sections, each containing the following categories.

- Observations
- Recommendations
- A summary of the analysis and research

Section 1 – Mission Analysis and Aircrew/Aircraft Assessment  
Section 2 – Aircraft Operating Cost vs. Cost Recovery Options  
Section 3 – Calls for Service, Deployment and Staffing  
Section 4 – Aircraft Replacement and Life Cycle Management  
Section 5 – Aircraft Maintenance and Facilities  
Exhibit A – Aircraft Procurement Options – Purchase vs. Lease  
Exhibit B – Recommended Patrol and Rescue Helicopter Specifications  
Exhibit C – Example DLE Patrol Schedule  
Exhibit D – Example Air Rescue Schedule  
Exhibit E – Operations Manual Gap Analysis vs. ALEA Standards  
Exhibit F – Summary and Conclusions  
Exhibit G – Glossary of Terms  
Exhibit H – *Curriculum Vitae* – Mr. James Di Giovanna

**Purpose and Scope of the Review**

The command staff advised that the purpose and scope of the review should focus specifically on the feasibility of continuing medevac operations under FAA Part 135, including cost recovery structure from the local hospital districts, and a cost analysis as to what BSO should be collecting for this service. The command staff also requested an evaluation of the unit’s current fleet of aircraft and, procurement strategies to include benefits, disadvantages and feasibility of buying versus leasing options.
Section 1 – Mission Analysis vs. Aircraft/Aircrew Capabilities

1.1 – Observations

Conducting an aviation unit review and fleet assessment to determine the most suitable aircraft to support the needs of the agency always begins with a thorough analysis of the mission of the organization and the mission(s) the air unit might be expected to support. Once the mission(s) have been defined, an evaluation of the current fleet of aircraft may be conducted to determine if the current aircraft is indeed capable of supporting the mission as intended. Factors such as the geographical size and population of the agency's jurisdiction, history of calls for service and responses by the air unit, deployment patterns and crew scheduling, crew staffing and training, and forecasting future needs are all taken into consideration.

1.1.1 – Mission Analysis

As defined on the Broward Sheriff's Office website, the mission of the agency is “to focus on reducing violent crime, keeping kids out of jail and addressing the disadvantaged members of our community, including the homeless and mentally ill”. Based on information provided on the website, these missions are accomplished through a variety of policing models which include proactive patrols within each district and a significant involvement of community outreach and partnering. All of this is in addition to managing four jail facilities. Besides their law enforcement and detention responsibilities, BSO also commands the Broward County Fire Rescue, Port Everglades Fire Rescue and Ft. Lauderdale/Hollywood International Airport Fire Rescue departments through a contract with the Broward County Commission. Several other law enforcement, investigative, fire and support services combine to ensure the safety and security of the citizens of Broward County, including the Aviation Unit and its air rescue services.

The Aviation Unit’s mission as defined in the Standard Operations Manual is to provide effective and efficient airborne support to all BSO divisions and other government agencies that utilize BSO’s services for both law enforcement and medevac missions. The objective of the air unit is to perform the dual role of supporting both law enforcement and medevac missions, twenty-four hours a day, seven days per week. These missions include criminal search and apprehension, stolen vehicle recovery, vehicle pursuits, perimeter containments, search and rescue, EMS trauma patient transport, deployment and extraction of the SWAT Team, aerial crime scene photography, marijuana detection, and narcotic interdiction. Most of these missions are in support of sheriff’s ground units conducting law enforcement activities; however, the crew configuration only allows for one deputy pilot and two fire rescue medics, neither of whom is law enforcement trained.

Representatives of BSO Fire Command indicated that the mission of air rescue also includes search and rescue operations in canals, forested areas, the Everglades, offshore, medical evacuation of persons injured in remote areas, and occasional weather related rescue support activities such as flood and storm damage recovery operations. These missions, in addition to medevac, require a minimum crew of two paramedics to provide the level of trauma care often needed by the patients being rescued and transported.
1.1.2 – Aircrew Assessment

Having had the opportunity to fly with the day patrol crew during my visit to the Aviation Unit, I saw firsthand the marginal efficiency of the air unit during a Division of Law Enforcement (DLE) call caused by a nonsworn paramedic tactical flight officer (TFO) and the added workload placed on the pilot. While over the scene, it was the pilot not the TFO who communicated with and coordinated the activities of the ground units to set a perimeter around a barricaded suspect incident.

This is not the standard in any other law enforcement aviation unit. While involved in this activity, the pilot also had to coach the paramedic TFO who was uncertain of his responsibilities, while continuing to fly the helicopter in crowded and busy airspace. The job of a TFO is one of the most technically demanding of any job in law enforcement. To be effective, a TFO must be a fully trained and experienced field deputy who is well versed in law enforcement tactics that can be applied from the air.

The TFO is not a token assignment; it is critical to the overall success of the DLE Aviation mission. As was pointed out by a senior pilot within the unit, “The aviation unit’s support to patrol deputies is less effective, less valuable and more dangerous, because few medics learn anything more than the very basics of the TFO job”. I concur. This type of crew configuration is ineffective in that the ground units are not getting the benefit of a law enforcement trained and qualified TFO, and hazardous due to the excessive workload on the pilot. This issue requires immediate attention of agency executives and should be discontinued as soon as practical.

In 2016, 85% of the missions conducted by the air unit were in support of DLE. BSO must ask the question, why is the air unit crew configured to primarily respond to services that only make up 15% of the air unit’s call volume and of those, almost half are cancelled? Not only is this an issue of configuration and potentially lost revenue, there are maintenance costs associated with engine cycles, fuel, and all other variable costs.

1.1.3 – Aircraft Assessment

The three aircraft currently operated by the BSO Aviation Unit consist of variants of the EC135, each with different engines, equipment configurations and operating weights. At the very least, these aircraft should all be the same variant, operating the same engines and equipped in the same manner to avoid the inconsistencies that I witnessed relative to crew configurations, medical equipment and load capacity. The weight limitations of the current helicopter are primarily due to the requirement to support a dual mission with equipment and staffing needed for both medevac and law enforcement missions. These weight limitations also reduce the on-scene time available to rapidly respond to emergent law enforcement calls and limit the crew to three persons, requiring a fire paramedic to do the job of a law enforcement TFO.

This aircraft model is designed to do one or the other of these missions very effectively, but not both simultaneously in this configuration. Thus, the unit has instituted a policy of responding to DLE calls only when dispatched, because of weight limitations. This greatly extends response times to emergent calls for service, compounding the ineffectiveness of the air unit by not being able to conduct its main mission: proactive DLE patrols.
The capability of the current helicopter as well as the air unit’s deployment model and crew configuration fall short of meeting the needs of the community and particularly the patrol deputies on the ground who rely on the air unit for scene containment, suspect information and most of all, their safety.

1.2 – Recommendations

Interviews with both deputy pilots and fire paramedics pointed to a common theme of frustration over not being able to do a joint mission satisfactorily with the current aircraft and crew. The deputy pilots made it clear that as much as the fire paramedics try, they are not qualified to act as TFOs. The fire paramedics expressed similar concerns over trying to perform a law enforcement mission as a firefighter.

Therefore, it is my strong recommendation that the aviation unit divide the mission responsibilities into two separate operations: one law enforcement only mission, using a law enforcement crew of two deputy sheriffs in the roles of pilot, and TFO; one mission being strictly air ambulance, using the current crew configuration, if the sheriff decides to continue providing this service. More about this issue will be discussed later in the report.

If the law enforcement mission is separated, this service can be provided very effectively with two single engine helicopters capable of performing all the missions currently anticipated and outlined in the Aviation Unit’s Operations Manual. The general specifications for the single-engine helicopter best suited to perform the tactical DLE mission are listed in Exhibit B.

If the air ambulance mission is separated, a helicopter with similar performance capabilities as currently employed by the Aviation Unit can meet the needs of the single Air Rescue mission. Although the Fire Command expressed to me a need for a helicopter that is larger and has greater capability, this need is mitigated by separating the missions. If these aircraft are only used to back up the DLE mission, much of the law enforcement equipment could be removed, allowing a greater useful load, especially on the newest EC135T2. The occasional need for search and rescue operations in the Everglades that require an external hoist could still be performed by calling upon Miami Dade Fire’s search and rescue helicopter to render assistance under mutual aid. Assuming the two missions are separated, I recommend a twin-engine helicopter like those currently operated by BSO to meet the mission specifications found in Exhibit B. However, if the missions are not separated and continue to be performed in one helicopter, the need of a larger aircraft is warranted but must also include a four-person crew consisting of a deputy pilot, deputy TFO and two paramedics. This is the only scenario in which I can recommend a dual mission in one helicopter.

Mission demands, aircraft unavailability due to maintenance staff shortages, and deployment schedules all drive the need to own and fully operate four aircraft supporting two separate missions. However, if the decision is made to perform both missions in one model helicopter, then three aircraft that are larger in size and weight capability would be sufficient. Conversely, should the sheriff decide to privatize the air rescue mission and partner with a private operator to provide paramedics only, then the stand alone DLE mission could be supported with three single-engine helicopters.
1.3 Summary of Analysis and Research

The following chart reflects a ten-year annual cost comparison of two single engine helicopters (see gray and blue lines) compared to the cost of maintaining the two most serviceable existing BSO EC 135s, N257BC and N109BC (see orange line):

**Chart 1.1**

![Cost Comparison Chart]

The total ten-year cost to maintain the two EC135s is $10.8 million vs. a total of $7.5 million for the two single engine helicopters with power by the hour and $7.1 million without power by the hour over the same time span. In each case, the chart reflects an average of 600 hours per year for each aircraft and assumes that the missions would be separated and aircraft deployment would remain the same.

However, if the number of flight hours in support of DLE missions increases, the annual costs associated with the operation of the single engine helicopters in support of this mission would also increase.

The cost to maintain and operate four aircraft in a separate mission configuration could be mitigated if two of the current fleet, specifically the EC130B4 and the oldest EC135 (N158BC), were sold, auctioned, or salvaged and immediately replaced with two single-engine helicopters to support the DLE mission and maintained under a power-by-the-hour program for engines and dynamic components. The remaining two EC135s should be retained until the two single-engine helicopters are fully operational, whereupon a replacement cycle could begin to replace these helicopters with similar aircraft meeting the specifications outlined in Exhibit B.
The chart below reflects the ten-year operational costs of continuing to perform the DLE and Air Rescue mission in a single helicopter model of a larger volume and weight capacity. The specifications of this helicopter were described by Fire Command and previously specified by the Aviation Unit as the aircraft of choice. This information is intended as an operational cost comparison only and not an endorsement of the model helicopter portrayed.

**Chart 1.2**

![Cost Comparison of three H145 helicopters over ten years](chart)

The total ten-year cost to operate and maintain the three H145s is $18.1 million without power by the hour vs. $24.6 million with power by the hour. In each case, the chart reflects an average of 600 hours per year for each aircraft and assumes that the missions would be combined and aircraft deployment would remain the same. The Aviation Unit and Fire Command have previously developed the specifications for this helicopter, thus they are not included in this report.
Section 2 – Aircraft Operating Costs vs. Cost Recovery

2.1 – Observations

In 2015, the BSO Aviation Unit spent $3,216,954 supporting four aircraft and 11 positions within the unit. Additionally, Fire Air Rescue spent $1,086,181 that supported nine full time positions assigned to the aviation unit for a total of $4,303,135. In 2016, the BSO Aviation Unit spent $3,993,450 and the Fire Air Rescue budget was $1,280,691. The combined budgets totaled $5,274,141 to provide twenty-four hour per day, seven day a week aviation services. In 2015, the air unit conducted a total of 2,551 missions and flew a total of 1,724.3 flight hours and in 2016, the unit conducted a total 2,534 missions and flew 1,639 hours. Of those totals, in 2015 the air unit received 436 requests for air ambulance services and transported 224 patients while flying 295 hours in support of these missions and in 2016, the unit received 437 requests for air rescue, transporting 176 patients while flying 252 hours in support of these missions.

Based on the funds expended and hours flown, the operating cost per flight hour in 2015 for DLE missions was $2,136; for air rescue missions, the cost per hour was $9,722. In 2016, the cost per flight hour in support of DLE missions was $2,518 and air rescue was $13,405 per hour. These calculations consider the cost of personnel and operational expenses, less fixed costs, that includes maintenance, fuel, lubricants and EMS operational expenses such as medical supplies.

The air unit is certified by the FAA to conduct commercial flight operations under a Part 135 certificate and thus can receive compensation for air ambulance services. Obtaining a Part 135 certification is a significant and expensive undertaking by any aircraft operator; it is particularly difficult for a government agency that would normally not operate as a for-profit business but in this case, is merely collecting fees to offset the cost of the services being provided.

Billing records associated with air ambulance transports from fiscal years 2003 through 2015 show that the air unit transported 3,070 patients at an average charge per transport of $5,674 with a potential yield of $17.5 million in actual costs billed. After adjustments, the average receipt per transport was only $2,083, which netted approximately $6.79 million or 36% of the amount billed. From FY 2003 through FY 2010, the average number of transports was 308 per year. Then, beginning in FY 2010 through 2015, that number steadily decreased to an average of 183 per year. During that same time, 915 patients were transported, at an average charge per transport of $5,593 and a potential yield of $5.1 million. After adjustments, the average receipt per transport dropped to $1,680, and total receipts only netted $1.6 million, an average of $322,844 per year or 32% of the amount billed over the five years specified.

The following chart reflects program costs associated with missions flown by the air unit in support of law enforcement and air rescue during calendar years 2015 and 2016. Assuming a similar billing and cost recovery as in previous years 2010 through 2014, the average cost per patient transport in 2015 was $12,848 and $19,195 in 2016. This results in a 13% collection rate in 2015 and only 8.75% in 2016. A commercial air ambulance provider would have ceased to operate under a similar cost recovery rate.
I was advised by representatives of Fire Command that the billing rate for FY 2016 – 2017 was raised from $4600 per liftoff and $80 per mile to $7,000 per lift off and $95 per mile. Given the average rate of recovery over the past five years at 32%, this could potentially net an average of $2,240 per transport, which would raise the average cost recovery for patient transports to just under 12%, still far short of a cost recovery of actual expenses.

The chart below obtained from data provided by the air unit, reflects operational cost comparisons for hours flown in support of the respective missions during 2015 and 2016:

### Program Costs – Air Unit DLE

<table>
<thead>
<tr>
<th>Budget Year</th>
<th>Operating Budget</th>
<th>Total Missions</th>
<th>Flight hours</th>
<th>Cost per mission</th>
<th>Cost per flight hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$3,052,391(^1)</td>
<td>2,115</td>
<td>1,429</td>
<td>$1,443(^2)</td>
<td>$2,136(^3)</td>
</tr>
<tr>
<td>2016</td>
<td>$3,492,040</td>
<td>2,097</td>
<td>1,387</td>
<td>$1,665</td>
<td>$2,518</td>
</tr>
</tbody>
</table>

### Program Cost – Air Rescue

<table>
<thead>
<tr>
<th>Budget Year</th>
<th>Operating Budget</th>
<th>Total Calls</th>
<th>Flight hours</th>
<th>Patients Transported</th>
<th>Cost per lift off</th>
<th>Cost per flight hr</th>
<th>Cost per patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$2,877,957(^4)</td>
<td>436(^5)</td>
<td>296</td>
<td>224(^6)</td>
<td>$6,681</td>
<td>$9,803(^7)</td>
<td>$12,929(^8)</td>
</tr>
<tr>
<td>2016</td>
<td>$3,378,247</td>
<td>437</td>
<td>252</td>
<td>176</td>
<td>$7,811</td>
<td>$13,486</td>
<td>$19,276</td>
</tr>
</tbody>
</table>

In addition to the revenue generated by billing individuals for emergency medical transports, the two hospital districts within Broward County pay $622,000 per year directly to the Broward County General Fund for medical transport service provided by BSO. In reviewing these contracts, I observed that they both expired several years ago, and have never been renewed. This raises serious liability concerns for BSO, Broward County and the hospital districts which should be addressed immediately. These contracts should be renewed or the services discontinued. Additionally, per the fiscal data I was presented associated with these contracts, the amount paid by both hospital districts falls far short of the actual negotiated in 1998. The contract amount should be renegotiated at a price structure more consistent with the services rendered, along with new contracts with both districts.

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1 Operating budget includes air unit personnel and aircraft operating expenses, less capital outlay  
2 Total number of DLE missions divided by operating budget  
3 Total number of flight hours in support of DLE missions divided by the operating budget  
4 Operating budget includes air rescue personnel only and aircraft operating expenses, less capital outlay  
5 Total calls include calls resulting in transport and those cancelled en route  
6 Based on patient transport numbers provided by Fire Command for both years  
7 The air rescue cost per flight hour and lift off, includes the hourly cost of the pilot vs. operating budget  
8 The cost per patient transport reflects the actual cost to BSO based on the net air rescue operating budget (including the hourly cost of the pilot) vs. number of patients transported.
2.2 – Recommendation

Obtaining, maintaining and operating under a Part 135 certificate incurs added costs for aircraft equipment, certification, maintenance, and personnel training, beyond what is normally required of a governmental agency. Compounding cost recovery problems, none of the proceeds collected for patient transports flown under Part 135 are being directed back to the sheriff. Therefore, based on the costs of providing air ambulance services compared to the revenue received for these services over the past five fiscal years, one cannot justify continuing this mission under a Part 135 certification.

Two alternatives should be considered regarding air ambulance services:

2.2.1 Discontinue the practice of billing individuals for patient transport and surrender the Part 135 certification. Instead, provide air rescue and trauma transport as a county-wide service free of charge or supported financially by a special assessment for air rescue billed annually to all Broward County property owners. Under these circumstances, a Part 135 certification is not required since no compensation is directly received.

   a. The air rescue surcharge could be imposed by the county commission through a property tax assessment and pro-rated based on property size and value. The surcharge could be structured to recover the costs associated with the current air rescue mission on an annual basis.

   b. The hospitals could continue to pay the county for the air trauma transport services under a renegotiated contract. This reimbursement would not require a part 135 since no direct billing or compensation is involved.

   c. Maintain a schedule of service 24-hours per day, seven days a week in accordance with the funding provided through the property tax assessment.

   d. Continue operating two twin-engine helicopters to support this mission.

2.2.2 Privatize air ambulance services by relinquishing responsibility to the hospital districts for providing the service.

   a. The hospital districts could contract with a commercial air ambulance company to provide the service under a Certificate of Public Convenience and Necessity to operate an Advanced Life Support (ALS) air ambulance issued by the County commission, similar to what is done in Palm Beach, Hillsborough and other surrounding counties.

   b. In this scenario, the medical crew could still be provided by BSO Fire Rescue and a portion of the revenue generated by the air ambulance provider under contract to the hospital districts could be paid to the county for the flight medic services.

   c. This service would include inter-facility transfers and the hospital districts would only be responsible for contracting the pilot and aircraft.

   d. This is the only scenario where only three helicopters would be required to support a single mission of law enforcement.
2.3 – Summary of Analysis and Research

2.3.1 – Special Assessment

Special assessments are used by many cities and counties throughout Florida to generate revenue for special benefits that would otherwise not be provided. They are particularly attractive in that they require no approval by taxpayers. In the case of fire rescue, the special benefit derived is air ambulance services otherwise provided by a commercial operator and billed based on use at a substantial increase in cost resulting in a significant financial hardship on the patient.

Although several counties throughout the United States provide some type of airborne search and rescue service to their citizens, very few provide and bill for air ambulance services. Those that do bill, struggle to recover actual costs. Others, such as Los Angeles County, have established a Fire Assessment District that funds approximately 57% of the Fire Department’s annual budget. Below is an example of the assessment rate billed via property tax for fire services in Los Angeles County for fiscal year 2016:

Chart 2.2

<table>
<thead>
<tr>
<th>Land Use</th>
<th>SPECIAL TAX RATE</th>
<th>SPECIAL TAX RATE w/SPRINKLER CREDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family Residential</td>
<td>$65.08</td>
<td>Not-Applicable</td>
</tr>
<tr>
<td>Mobile Home in Park</td>
<td>$32.53</td>
<td>Not-Applicable</td>
</tr>
<tr>
<td>Multiple Family Residential 2 or more units less than 4 stories</td>
<td>$82.20 + $.0083 per Sq. ft. over 1,555 sq. ft. *</td>
<td>$82.20 + $.0078 per sq. ft. over 1,555 sq. ft.</td>
</tr>
<tr>
<td>Non-Residential, Commercial/Industrial less than 4 stories</td>
<td>$78.76 + $.0530 per sq. ft. over 1,555 sq. ft.*</td>
<td>$78.76 + $.0510 per sq. ft. over 1,555 sq. ft.*</td>
</tr>
<tr>
<td>High Rise, 4 stories or more</td>
<td>$95.87 + $.0648 per sq. ft. over 1,555 sq. ft.*</td>
<td>$95.87 + $.0619 per sq. ft. over 1,555 sq. ft.*</td>
</tr>
<tr>
<td>Special Use, such as refineries and major chemical handlers</td>
<td>$119.86 + $.0809 per sq. ft. over 1,555 sq. ft.*</td>
<td>$119.86 + $.0772 per sq. ft. over 1,555 sq. ft.*</td>
</tr>
<tr>
<td>Vacant Land – 2 acres or less</td>
<td>$16.27</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vacant Land – more than 2 acres and less than or equal to 10 acres</td>
<td>$21.48</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vacant Land – more than 10 acres and less than or equal to 50 acres</td>
<td>$42.97</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vacant Land – more than 50 acres</td>
<td>$65.08</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

https://www.fire.lacounty.gov
The Los Angeles County Fire Department’s aerial firefighting and air rescue services are funded through this special assessment district providing air attack fire prevention and airborne search and rescue 24-hours per day, seven days a week. The total budget for the Fire Department’s Air Attack and Rescue Unit is approximately .02% of the revenue generated by the special assessment district.

According to the Florida Housing Data Clearinghouse, the housing profile for Broward County is as follows:

**Housing Profile**  
**Broward County, Florida**

- Households, 2015: 726,366
- Homeownership Rate, 2015: 67.1%

**Existing Home Values (Based on County Property Appraisers’ Just Value)**

- Single family home, average just value, 2016: $297,276. (Statewide, the average just value of a single-family home in Florida in 2016 was $219,681).
- Mobile home, average just value, 2016: $73,691.
- Condominium, average just value, 2016: $152,607.

Using a similar formula as Los Angeles County, if Broward County would assess each household $5.00 per year for air rescue services alone, it would generate approximately $3.6 million in revenue that would cover the entire cost of the Department of Fire Rescue and Emergency Services Air Rescue budget for FY 2016/2017.

2.3.2 – Privatization

Privatization of air ambulance services in Broward County is a viable option, but would necessitate the County Commission issuing a Certificate of Public Convenience and Necessity to operate an Advanced Life Support (ALS) air ambulance to a commercial air ambulance operator. The two hospital districts would then contract with the operator to provide all air ambulance services. In comparing this option to Palm Beach County’s Trauma Hawk program solution is worth exploring further.

The biggest challenge going forward with this option is the difficulty in negotiating contracts with two hospital districts and getting them both to agree to this plan. However, if the two districts merged, which reportedly is being proposed by a Broward County law maker, the possibility of contracting this service out to a private operator seems more likely. The biggest advantage to the BSO Aviation Unit would be reducing the fleet to three single-engine helicopters and supporting DLE missions only. This would cut the annual operating costs of the air unit substantially.

The major disadvantage to this option is the increased costs for trauma and inter facility transports borne by citizens of Broward County in need of these services. The air ambulance services provided by a private operator are billed at a much higher rate, as much as three times higher, than what is currently charged by BSO Air Rescue. Billing practices are also far more aggressive with a private operator.
Section 3 – Calls for Service, Deployment and Staffing

3.1 – Observations
The statistical data on calls for service by hour of the day by mission in 2016, reveals an alarming disparity of call volume by mission. The greatest amount of calls for DLE service occurs just prior to 1000 hours each day, remains consistent from early afternoon through late evening, and then drops noticeably around 0600 and continues to decline sharply through 0800 before starting an upward trend. The chart in Section 3.3 provides a visual reference of the call volume disparity.

When compared to deployment and call volume, I observed that pilot scheduling is inconsistent, primarily due to insufficient pilot staffing to support a 24-hour, seven day per week schedule utilizing 10-hour shifts. This too often results in overtime to fill vacancies with little time available to support aviation related in-service training.

However, the biggest disparity is the difference in shift scheduling between the flight medics and pilots. Flight medics deployed on a 24-hour Kelly schedule are aircrew members for 85% of the missions flown, but are not required to adhere to the same Part 135 crew rest standards as pilots due to their designation as “medical personnel”. As medical calls decrease in the early morning hours, the volume of DLE calls remains steady through 0500. Although the pilots are circulating through 10-hour shifts each day and can stay rested, the flight medics are expected to respond to any call during their entire 24-hour shift, affording them little down time.

This is additional justification to split the mission of DLE and Air Rescue and schedule crews more in line with actual duty hours rather than attempting to integrate incompatible schedules.

In the sections that follows, I have detailed my recommendations regarding the current mission, deployment, flying hour limitations, aircrew staffing and future aircrew needs of the BSO Aviation Unit based on a dual, but separate mission assignment.

3.2 – Recommendations
3.2.1 – Deployment – Helicopter DLE Patrols

Staffing required to facilitate a 10-hour patrol schedule utilizing a pilot and pilot/TFO cannot be accomplished with the current pilot staffing. A 10-hour shift, seven days per week would provide one aircrew approximately 20 hours per day on overlapping shifts, scheduled during the peak hours of DLE calls for service. However, splitting the missions utilizing this schedule is the only way to assure that BSO field units are being properly and safely assisted from the air.

A sworn tactical flight officer would also serve as a pilot trainee, allowing a more diversified crew, capable of working both positions in support of DLE and rotating into the Air Rescue pilot assignment as needed. Although this staffing alignment will take some time to build, in the long run it will serve the needs of the Aviation Unit and BSO exceptionally well. A total of six pilots and six TFO/pilots will be needed to adequately staff the new DLE schedule as proposed.
An example of a 10-hour DLE patrol schedules and the staffing required to facilitate this schedule is provided in Exhibit C.

3.2.2 – Deployment – Air Rescue

Three assumptions have been made to determine the deployment and staffing needs of the Aviation Unit relative to Air Rescue:

- The sheriff will either continue to internally provide or partner through privatization to provide Air Rescue services to the citizens of Broward County;
- The Air Rescue deployment and staffing models are based on a single mission profile operating 24-hours per day, seven days per week;
- The deployment and staffing model can be used as a Public Aircraft mission or in accordance with Part 135.

If the decision is made to provide Air Rescue services as a separate mission, changes will be required in the deployment and staffing of the pilot. Operating on a call-when-needed basis, the pilot and flight medics will have more down time awaiting calls for medical service than when performing a dual mission. Under these circumstances, it would be best to schedule the pilots on a 12-hour shift to provide more compatibility with the flight medics and make better use of available pilots. The 24-hour schedule will also provide emergency law enforcement back-up when the DLE aircraft is unavailable during off hours. An example of a 24-hr Air Rescue schedule is provided in Exhibit D.

3.2.3 – Flying Hour Limitations

Weight restrictions on the three EC135 helicopters operated by BSO limit the fuel capacity of the aircraft. This is brought about partly by Fire Command’s practice of adding a second flight paramedic and partly by severe weight restrictions associated with one or more of the helicopters. This in turn limits the amount of flight time available for all calls.

In addition to limiting flight time, the weight restrictions reduce the potential patient weight capacity, in some cases limiting the aircraft’s useful load to less than 150 pounds. This is unacceptable for an air ambulance operation. However, to be clear, I fully support Fire Command’s decision to staff a second flight paramedic, which is the standard practice in the air ambulance community to provide the best medical care to trauma patients. Unfortunately, the current fleet of aircraft are weight limited due to heavy mission equipment. For example, the EC135T2+, which should be the most powerful aircraft, is the most severely limited due to an autopilot on the aircraft that is rarely, if ever, used.

Before current staffing configurations were enacted, pilots could add fuel allowing for 2.5 hours of flight which could have been used for proactive patrol. Now, fuel loads are limited to a capacity allowing for 1.5 hours or less of flight time depending on the crew weight and aircraft.

Tactical flying in support of ground-based law enforcement activities requires the air unit to be in the air and available to immediately respond to calls for service. Responsiveness in the air is no different than responsiveness on the ground. If the air unit is to have an impact on crime fighting and law enforcement support, it must be able to respond quickly from the air to requests for assistance.
Responding from the hangar or flight ramp to an emergency call usually results in arriving after the critical time needed to apprehend or assist in the search for a suspect. In the airborne law enforcement community, this is known as “responding to a Code-4”, meaning that the call is long since over by the time the air unit arrives.

In reviewing statistical information regarding flight time for law enforcement missions, I noted that in 2015, 1,724 hours were flown in support of DLE (roughly 4.7 hours per day), but in 2016, the number of flight hours dropped to 1,639 hours or roughly 4.5 hours per day. Law enforcement agencies in the US flying proactive patrols in support of ground officers will fly an average of 4.5 hours per shift and respond to twice as many calls for service as reported by the BSO Aviation Unit. This is an example of the impact of weight limitations and fuel capacity with the existing aircraft.

Four and one half hours of flight time during a 24-hour duty day is not enough time to effectively handle calls for service or provide adequate air support for an agency the size of Broward County Sheriff’s Office. The bill payer for this reduction in flight time and availability is the field deputy, who relies on air support to be available when he/she needs it the most.

3.3 – Summary of Analysis and Research

The charts that follow were created from data supplied by the air unit and reflect the responses by the Aviation Unit in 2016 by mission, hour of the day, and day of the week.

Chart 3.1
Staffing related to call volume often determines deployment patterns in law enforcement to ensure that adequate resources are available during “prime crime time”. Airborne law enforcement is no different. Scheduling of air units should be based on the volume of calls the agency receives based on time of day and day of week. If these numbers are reflective of the agency’s call volume, then scheduling is representative of need. I recommend verifying this comparison, since the agency’s total call volume based on time of day and day of week was not available during my visit.

Based on the patterns of calls depicted in these graphs, I recommend 24-hour staffing of Air Rescue, since no other EMS operator is available in Broward County to provide this service and because of the limited availability of trauma centers on the west side of the county. Additionally, I recommend establishing a DLE patrol schedule from 0930-1930, with an overlapping evening shift from 1900-0500, deploying proactively a minimum of 4.5 hours each shift. Although not the optimum in the way of crew configuration, emergent DLE calls from 0500-0930 could be handled by Air Rescue.
Section 4 – Aircraft Replacement and Life Cycle Management

4.1 – Observations

The helicopters operated by BSO are in various stages of life cycles related to age, airframe, component and engine times and their respective residual values. The EC130B4 is disassembled in the hangar, undergoing a 12-year inspection, which reportedly has been in process for at least three years. The EC135P1 is one of the oldest in the fleet and currently has over 11,600 hours of engine time and over 10,000 hours on the airframe. Its next major engine overhaul will be due at the 14,000-engine hour mark. Now is a good time to sell this aircraft.

Of the remaining two helicopters, the EC135T1 just completed its first engine overhaul in December 2016 and transmission in February 2017. Having been manufactured in 1999, it has also completed its 12-year inspection. Given the airframe and engine times on this aircraft, it is also at its optimal resale value.

The newest helicopter, an EC135T2+, is relatively low time but has been the most problematic of the three helicopters, due to its very high operating weight and low useful load, primarily because the aircraft is equipped with an autopilot and has a full medical interior. The engine and airframe times on this aircraft are also at optimal resale value.

Replacing helicopters is like patrol car fleet replacements. Both require planning to optimize value while avoiding costly overhauls and inspections, and both require updating before safety is jeopardized. Aircraft replacement cycles must be established at intervals to make maximum use of life-limited equipment, considering escalating operating costs as the aircraft reaches age and flight hour milestones.

Aircraft components (engines, transmissions, gear boxes, rotor blades, etc.) require overhaul or replacement at specified flight hours or years of service. Life cycle management requires establishing a replacement cycle that is based on airframe hours and the age of the aircraft. Two of the costliest items are engine overhauls and 12-year airframe inspections. Aircraft should be replaced before reaching certain milestones, namely a second engine overhaul, usually at the 7000-hour mark, or the 12-year inspection, whichever occurs first. In the case of BSO’s helicopters, three of them have already reached or exceeded these milestones.

The useful life of helicopters in terms of flight hours, operational costs, and depreciated value, is primarily determined by the amount of flight hours accumulated in the first ten years of operation. Some agencies will near or exceed the 7000-hour benchmark within the first ten years. The decision point on replacing aircraft should occur prior to reaching one of the milestones mentioned previously. Investing in maintaining an aging fleet and running the risks of operating older aircraft that continue to depreciate, as opposed to establishing a replacement cycle, is an unwise business practice.

The charts in Section 4.3 provide annual operating cost data for each sample single-engine helicopter as well as the optimal resale value of the selected aircraft.
4.2 Recommendations

Aircraft should be replaced at intervals that avoid costly operational expenses and should be sold optimally at one-third their original value. Ideally, the replacement decision is made at a point within the first ten years of operation when the residual value of the aircraft is high and the operational cost is trending upward but has not yet reached its highest point.

Two of the helicopters, the EC130B4 and the EC135P1 have reached critical stages in their life cycle and should be replaced as soon as possible. Continuing to invest in these aircraft will not provide a return on investment due to their age, component and engine times, and current condition.

The EC130B4, N156BC, should be the first aircraft sold, in 'as is, where is' condition. Due to its current condition, it is doubtful that the aircraft can be sold intact, and consideration must be given to salvaging the aircraft and selling off its parts. The amount of maintenance man-hours required to either complete the 12-year inspection or put the helicopter back together to sell will take valuable man-hours away from maintaining the remaining operational helicopters, jeopardizing sustained operations. It is very doubtful that any aircraft OEM would consider taking this aircraft in trade given its current condition. The difficulty of selling an aircraft that is not fully assembled hopefully will not negatively impact the unit’s ability to obtain replacement helicopters.

The EC135P1, N158BC, should also be sold or used as trade-in allowance on the acquisition of two single-engine helicopters. The sale/disposal of these two helicopters and the acquisition of two single-engine helicopters should take place this year.

Of the two remaining EC135s, N257BC poses unique challenges in that it is the least capable of the Air Rescue helicopters due to its weight limitations, but it’s the newest and lowest time helicopter in the fleet. If a decision is made to replace the Air Rescue helicopters in the next three to five years, then this aircraft should be replaced before 2019.

However, if the decision is to delay the rescue aircraft replacements, the next optimal time to replace this aircraft is prior to 2025, assuming that BSO is willing to absorb the cost of two engine overhauls that will be due in 2019. If sold next year it would bring the highest revenue of any of the aircraft, currently valued at $3.1 million, according to Heli-Value Helicopter Blue Book.

The remaining EC135, N109BC, recently underwent engine and transmission overhauls in late 2016 and early 2017 respectively. This aircraft should have been replaced before absorbing the cost of these overhauls. However, the investment made into this aircraft has raised its resale value and extended its useful life until 2020. The next optimal time to sell and replace this helicopter is anytime between 2018 and 2022. Its current resale value is approximately $1.5 million, according to Heli-Value Blue Book.
4.3 Summary of Analysis and Research

The following charts depict annual maintenance costs for the existing fleet of operational helicopters over a ten-year period and the comparative cost of three different single-engine helicopters, all meeting the desired specifications. The charts also depict high and low points of anticipated maintenance costs; the best time to sell and replace the aircraft is just prior to each anticipated spike in maintenance costs.

Chart 4.1

![Chart 4.1 EC135T2 N257BC Maintenance Cost per Year](chart)

Chart 4.2

![Chart 4.2 EC135T1 N109BC Maintenance Cost per Year](chart)
Chart 4.3

This chart provides an example of the annual operating costs of three single-engine helicopters, all of which meet the specifications of a law enforcement helicopter described in Exhibit B. The assumptions made on all three were operating under power by the hour (pbh) for the engine only and flying an average of 1200 hours per year. The total ten-year cost for one aircraft per helicopter model are as follows:

Leonardo AW119Kx: $10,926,355.00
Airbus H125: $8,463,377.00
Bell 407GXP: $7,740,212.00

The peaks in the power by the hour scale for the 407GXP and the AW119Kx are attributed to life limited engine parts replacements at the five and 10-year mark that may or may not coincide with the scheduled engine overhaul and are not covered by their respective power by the hour programs.
Section 5 – Aircraft Maintenance and Facilities

5.1 – Observations

Interviews conducted with the Director of Maintenance (DOM) and the two aircraft mechanics revealed concerns and frustrations similar to other law enforcement aviation units regarding maintenance operations. It all comes down to proper utilization of time and resources. The three mechanics are all highly skilled at what they do but want to ensure that an operational aircraft is always available, 24 hours per day, seven days a week. The demand increased after the EC130B4 went down for a 12-year inspection and is no longer available to work into the operational fleet.

Reducing the fleet from four helicopters to three has lessened the maintenance workload; however, it also reduces the number of available aircraft that are fully mission capable. Thus, almost all available maintenance man-hours are spent scrambling to maintain three aircraft, with little time devoted to the remaining tasks of maintenance activities such as shop organization, record keeping, and parts storage, accountability and inventory, the latter being a safety concern due to the lack of spare parts accountability and usage tracking. In short, the maintenance staff is barely getting by in managing the day-to-day maintenance requirements of the fleet.

The maintenance staff needs help. If keeping up with scheduled inspections and other known calendared maintenance events were their only responsibility, they would have no problem maintaining the fleet and satisfying all other ancillary requirements. Unfortunately, unscheduled maintenance activities, coupled with requirements to maintain and equip the aircraft to meet FAA Part 135 requirements, add to the workload. This has led other areas of the maintenance operation to suffer. Of greatest concern is the condition of the parts room.

The DOM admitted that he has no idea what parts he has on hand, how long the parts have been stored, or if there are sufficient quantities of consumable items to meet their needs. This is a serious safety concern that requires immediate attention: many parts are shelf-life limited. Lack of parts accountability is unacceptable. Additionally, the maintenance staff does not use a computerized maintenance management system that would allow for parts tracking, accountability and usage to better manage the parts supply system.

Maintenance and maintenance management are realities of aviation. There are no maintenance-free aircraft or short cuts. Helicopters are all subject to routine periodic inspections, scheduled maintenance, preventative maintenance, and maintenance to comply with service bulletins, airworthiness directives, or other regulatory requirements. Additionally, the drain on man-hours and budgets associated with unscheduled repairs due to unexpected or event driven component failures can be devastating. Planning, organizing and staffing all play key roles in the success of an operation that is constantly trying to balance operational needs with aircraft availability and aircraft downtime, whether scheduled or unscheduled.
5.2 Recommendations

Immediately invest in a computerized maintenance-management software system that will not only track maintenance activities, but also track parts inventory and supplies, parts usage trends, and ordering. This will streamline the process of maintenance management and parts inventory and provide better maintenance planning and organization. This is only the first step in the process of improving maintenance management.

The second is adding a full-time position to the maintenance staff responsible for aircraft parts management, accountability, storage and tracking. This person would also record maintenance activity in the maintenance management software on all maintenance actions for each of the aircraft and manage the aircraft publications library. Retaining a person to fulfill these functions offers safer and more efficient management of the parts inventory and will free up maintenance man-hours allowing the mechanics to concentrate exclusively on maintaining the aircraft.

Maintenance man-hours compared to flight hours are a standard method of determining the maintenance staffing needs of an aviation unit. Although the numbers can be somewhat arbitrary when compared to other operations, they form a basis of determining staffing needs. The maintenance man-hour cost per flight hour (MMH/FH) factor was obtained from two sources: Conklin & de Decker and the Helicopter Association International’s Guide for the Presentation of Helicopter Operating Costs Estimates.

Using both sources as a guide, I determined the MMH/FH ratio for the EC135 to be 2.8 hours of maintenance man-hours for every hour of flight. Over the past five years, the Aviation Unit has averaged 2,530 annual flying hours. Using the formula that is explained in Section 5.3 below, the Aviation Unit would need a total of four aircraft mechanics to sustain the current flying hour program if exclusively operating EC135s.

By comparison, two of the three single-engine helicopters meeting the recommended specifications factored approximately 1.8 MMH/FH, requiring three aircraft mechanics to support the flying hour ratio associated with DLE vs. Air Rescue flights, and the H145 factored 3.3 MMH/FH, but would require a total of five aircraft mechanics to support the entire flying hour program.

No recommendations are made in this area; the numbers speak for themselves. The maintenance staffing model selected should coincide with the fleet makeup and anticipated flying hour program to support both DLE and Air Rescue missions.

Administratively and operationally, the current facilities are adequate and appear to meet the needs of the unit. However, the hangar facilities are overcrowded with vehicles and equipment from other units within the BSO, taking away space that could otherwise be used for parts storage, aircraft maintenance and hangaring. I was advised that one of the units would be moving its equipment from the hangar soon, which will expand the space available to the Aviation Unit, provided no other unit moves in. Under these circumstances, the current facilities are adequate to sustain operations.
5.3 Summary of Analysis and Research

A Guide to Maintenance Staffing

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>EC135 dual msn</th>
<th>EC135 Air Rescue only</th>
<th>EC145</th>
<th>H125</th>
<th>407GPX</th>
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<tr>
<td>MMH/FH Ratio</td>
<td>2.8</td>
<td>2.8</td>
<td>3.3</td>
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<td>1.8</td>
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<td>2530</td>
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<td>1632</td>
<td>1632</td>
<td>1632</td>
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<td>5</td>
<td>2.5</td>
<td>2.45</td>
</tr>
</tbody>
</table>

Available Maintenance Man Hours per year are based on the following assumptions:

- A total of 2,080 man hours are available each year, per mechanic. Of that, approximately 160 hours are subtracted for vacations, holidays, illness, etc., leaving 1,920 available working hours.
- The actual physical time spent on maintaining the aircraft is approximately 85% of the available working hours, or 1,632 man hours for maintenance activities. These maintenance man-hours do not consider down time, meal breaks, rest periods, etc.

^9 The 300 hours is based on the average number of flight hours in support of Air Rescue Missions over the past five years. This also assumes a split mission, with the bulk of the hours flown in support of DLE in a single engine helicopter.
Exhibit A: Aircraft Procurement Options

Assessment

Broward Sheriff’s Office faces initial choices: maintain its current helicopter fleet or acquire other aircraft. The subsequent choice is whether to purchase or lease aircraft.

This exhibit’s overview assumes that manufacturer, model, training programs, and ancillary equipment lists are already selected. The County’s purchasing department will have requirements for quotes and bids that must be met before proceeding.

New v. pre-owned

New airframes come at a higher initial purchase but include the manufacturer’s warranty. All parts are new, thus not subject to life-span replacements and out of service considerations that alter staffing and mission availability. Purchasing new aircraft may significantly lower BSO’s annual operational costs.

Pre-owned airframes come with a lower capital outlay but with a higher cost of maintenance, because life-limited components have already partially expired with previous owners.

Bond v. lease

Broward County’s finance department will be familiar with bond vs. lease purchases. In general, bonds require time for voter approval via election; legal approval of the Attorney General; fiduciary oversight of a paid, assigned trustee; limited options for early payoff; and minimum number of annual payments. Bonds count against the entity’s statutory debt limitation. In general, lease purchases can be completed with the option of a single attorney; have no maintenance fee; have minimal restrictions on early pay-off; more options for payment cycle; do not count against debt limitations; and require the County’s governing board to produce a resolution approving the project and its funding.

Purchase option

This option is quite straightforward. Helicopter purchases are considered a capital investment. Government agencies fund capital projects through a combination of cash on hand, existing or new taxes, fees, or user charges, and bonds. BSO staff is confident that there is cash available to purchase two single-engine helicopters, leaving its remaining fleet yet to be maintained, sold, and/or replaced.

Advantages of purchasing:

- Great negotiation potential on purchase, parts, training, technical support, may also negotiate trade-in terms.
- Allows strategic timing of purchase when aircraft become available; this includes option to resell a purchase ‘slot’ if OEM has an interested buyer, or defer delivery
- BSO / Broward County owns the asset and can sell or trade it without encumbrance

Disadvantages of purchasing:
• Large capital outlay; purchases and debt service tie up large volumes of the County's cash
• In the unlikely event of an accident, all equity goes with the aircraft if self-insured.

**Lease options**

This section provides very general terms for tax exempt municipal lease-purchase, operating lease, and capital lease. BSO's finance department will be aware of the implications, advisability, and mandatory processes for each.

**Tax exempt Municipal Lease-purchase:**

• The municipal lease includes termination for non-appropriation language. The non-appropriation clause, in cases where the lessee is unable to obtain funding for future payment obligations on the lease, enables the lessee to terminate the lease agreement at the end of the current appropriation period without further obligation or penalty.
• A municipal lease is referred to as a “municipal lease purchase”. During the term of the lease, the municipality holds the title to the leased equipment while the lessor holds the security interest. It is a full payout contract to purchase the equipment rather than a series of rental payments as with traditional commercial leases. The financing is structured so that there is no residual value, balloon payment or purchase option to consider.
• A municipal lease is also referred to as “tax-exempt” because the interest income on a municipal lease is tax-exempt to the lessor. The municipality benefits when the lessor passes these savings on to the municipality in the form of a lower interest cost.
• Municipal lease payments build equity in the future unencumbered ownership of the asset. Without penalty, the lessee has the option of purchasing the equipment outright, at any time, for a predetermined purchase price consisting of the remainder of principal and any accrued interest.

**Advantages of Municipal Lease-purchasing:**

• 100% financing to include delivery and aircraft configuration costs. The OEM and vendors are paid promptly upon funding of the lease. No capital outlay.
• Equipment such as aircraft financed through a tax-exempt lease may be funded into escrow to facilitate project financing or progress payments.
• Lease payments include principal and an interest portion and interest is tax exempt to the lessor. This means the municipality can take advantage of lower interest costs.
• No operating limitations or maintenance requirements such as power-by-the-hour or other restrictions on annual flight time.
• Municipal leasing allows public agencies to acquire equipment, especially aircraft, at regular intervals, setting up a predictable and responsible replacement plan.
• Lease payments are subject to annual appropriations, which means, the obligation is not subject to statutory debt limitations. Since no debt is created, municipal leases do not require voter approval.

• Payments may begin upon delivery or delayed until the following fiscal year. In addition, they may be made in monthly, quarterly, semi-annual or annual installments.

• Leases may be designed to match finance terms to the expected useful life of the aircraft and may be spread the cost over a multi-year period.
  o Up to 15-year terms for new airframes;
  o 10-year terms on pre-owned airframes;
  o 7-year terms can be available on mission equipment if leased separately

• Early pay-off options are usually available.

Disadvantages of a Municipal Lease

• Lessor will require hull insurance on the aircraft in addition to liability insurance throughout the lease term;

• Although interest rates on a municipal lease are considerably lower than a loan to finance, they are higher compared to a general obligation debt; and,

• The risk that the County may lose its accumulated equity in the leased aircraft if the Commission decides not to appropriate monies to make lease payments for a subsequent fiscal period and returns the leased aircraft to the lessor.

Operating lease option:

• An operating lease is a lease whose term is short compared to the useful life of the asset. For example, a helicopter which has an economic life of 15 years or more may be leased for 5 years on an operating lease.

• This can be a simple leasing transaction where at the end of the lease, the aircraft is returned to the lessor along with payment of the residual value of the aircraft. There may also be the option at lease end to buy the aircraft at Fair Market Value.

• However, if the buy-out is significantly less than Fair Market Value (FMV), then it isn't a true operating lease, but more of an installment sale.

Advantages of operating leases

• Less capital intensive than purchase, thus freeing up the County's cash on hand;

• Lessor, not BSO, holds the residual risk as the asset depreciates;

• Opportunity to turn in aircraft for credit towards operating lease on new aircraft;

• Lease terms can be relatively short and are not locked in like bond purchases.

Disadvantages of operating leases:
Since ownership remains with the lessor, restrictions may be imposed on aircraft operation: where it is based, how it is operated, where it is flown.

Return conditions may be stipulated to protect lessor's investment: engine power-by-the-hour maintenance requirements; penalty for high utilization; unusual wear and tear, etc.

Early returns can leave lessee responsible for remaining lease payments

No tax advantages; operating lease payments are expense only

At the end of the lease the aircraft's ownership remains with lessor, not BSO and return options are limited:
  o Purchase aircraft at FMV
  o Renew/renegotiate lease terms to continue operating lease;
  o Return aircraft pay return fee, usually equivalent to residual value

**Recommendation**

Aircraft financing and budgeting has always been a challenge to municipalities due to the high cost of aircraft and related mission equipment. Taking advantage of acquisition options like GSA Advantage or municipal lease financing are the greatest avenues of aircraft fleet management that also allows for a prudent aircraft replacement plan. Both options allow the County to manage the aircraft in the manner best suited for its operational requirements, without limitation or restriction, and still maintain a reasonable return on the county’s investment.

In my experience, municipal leasing has always been the first choice when acquiring new aircraft. This was principally to avoid a major capital outlay, and secondly, to establish a plan for replacement at the end of the lease term. In doing so, we avoided the costliest maintenance items, such as a second engine overhaul or a 12-year inspection, while still maintaining a high resale value toward the acquisition of the next generation of aircraft.

The strategy I developed with the Los Angeles County Sheriff’s Department was to replace aircraft every seven years through a municipal lease of the green airframe directly from the OEM, sell the existing fleet and use the proceeds from the sale to pay the cost of equipping the new aircraft in a specialized mission configuration. This strategy is still in use today.

I understand the reasoning behind a preference to purchase the next two helicopters if the decision is made to separate the DLE and Air Rescue missions. In this case, I would recommend negotiating with the selected OEM for the best price possible that would also include a competitive approach to selecting the after-market vendor to perform the aircraft completions.

However, in the next phase of aircraft acquisitions, replacing the two remaining EC135s, I strongly recommend considering a municipal lease option to obtain the green airframes while selling the last two aircraft and using the proceeds to partiality pay for the aircraft mission equipment and interiors. This is the most cost effective approach to aircraft acquisitions.
Exhibit B: Helicopter Specifications

Patrol Helicopter

1. Two single-engine VFR certified helicopters capable of carrying a minimum of four passengers plus pilot.

2. Internal fuel capacity should support continuous flight at economical cruise for a minimum of 3.0 hours, plus a 20-minute reserve as required by Federal Aviation Regulations (FARs) without refueling or use of an auxiliary tank.

3. The aircraft must be able to demonstrate safe autorotations at mission weight from a minimum altitude of 600' AGL at airspeeds of 60 knots or less.

4. The cockpit must have accessible internal space to accommodate the crew and mission equipment in a secure manner. A sample of mission equipment includes aviation charts and electronic navigational aids (iPads), weapons, flashlights, drinking supplies, stabilized binoculars, hand held radios, and writing supplies.

5. The ergonomic instrument panel should display all information easily with switches easily accessible, and interior cockpit and cabin lighting should be certified for night vision goggle operations.

6. The cockpit and airframe must be capable of supporting the latest in aviation and tactical communications radios, navigation instruments, air traffic collision avoidance systems, ground proximity warning systems, and video and thermal imaging sensor systems, in addition to an externally mounted search light, multi-sensor camera systems, public address system, communication and directional video downlink antennas, all previously approved under Supplemental Type Certificate (STC) by the Federal Aviation Administration FAA for installation on the selected helicopter.

7. Desired patrol helicopter performance specifications at sea level, international standard atmosphere (ISA 15°C or 59°F), max gross weight, unless otherwise noted:
   a. Cruise speed 130 kts. (120 kts @ ISA +20°C)
   b. Never exceed airspeed (Vne) 150 kts.
   c. Maximum Endurance 3.5 hours (with reserve)
   d. Hover in ground effect (IGE) 10,000 feet
   e. Hover out of ground effect (OGE) 8,000 feet
   f. Maximum internal gross weight, at least 5,200 lbs.
   g. Minimum useful load after mission configuration and crew 1250 lbs.
   h. Seating (Pilot/Passengers) 1/4
   i. Cabin volume No less than (NLT) 100 cubic feet
Rescue Helicopter

1. Two twin-engine VFR certified helicopters capable of carrying a minimum crew of one pilot, two paramedics plus one trauma patient and one ambulatory patient.

2. Internal fuel capacity should support continuous flight at economical cruise for a minimum of 3.0 hours, plus a 20-minute reserve as required by Federal Aviation Regulations (FARs) without refueling or use of an auxiliary tank.

3. The aircraft must be rated at a minimum of 770 shaft horse power (shp) at emergency power, one engine inoperative (OEI).

4. The cockpit and cabin area must have accessible internal space to accommodate the crew and mission equipment securely. A sample of mission equipment includes two rear swivel seats, two stretchers – one cot, one litter, storage cabinets, storage pouches, medical ports (two for O2, two for suction), inverter plugs, equipment brackets for IV pumps, monitors, and ventilator.

5. The ergonomic instrument panel should be a digital display providing all information easily with switches easily accessible, and interior cockpit and cabin lighting should be certified for night vision goggle operations.

6. The cockpit and airframe must be capable of supporting the latest in aviation and tactical communications radios, navigation instruments, air traffic collision avoidance systems, ground proximity warning systems, video and thermal imaging sensor systems, in addition to an externally mounted search light, rescue hoist, public address system, and communication antennas, all of which must be previously approved under Supplemental Type Certificate (STC) by the Federal Aviation Administration FAA for installation on the selected helicopter.

7. Desired rescue helicopter performance specifications at sea level, international standard atmosphere (ISA 15°C or 59°F), max gross weight, unless otherwise noted:
   a. Cruise speed 130 kts. (120 kts @ ISA +20°C)
   b. Never exceed airspeed (Vne) 140 kts
   c. Maximum Endurance 3.0 hours (with reserve)
   d. Hover in ground effect (IGE) 12,000 feet
   e. Hover out of ground effect (OGE) 7,000 feet
   f. Maximum internal gross weight, at least 6,500 lbs.
   g. Minimum useful load after mission configuration and crew 1500 lbs.
   h. Seating (Pilot/Crew) 1/2
   i. Cabin volume No less than (NLT) 160 cubic feet
   j. Rescue hoist maximum lift load 600 lbs.
Exhibit C: DLE Patrol Deployment

Sample 10-hour seven day DLE schedule, day and night shift

<table>
<thead>
<tr>
<th>DUTY WEEKS 1 &amp; 2</th>
<th>SUN</th>
<th>MON</th>
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DUTY WEEKS 3 & 4

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4 DLE Pilots @ 70 hrs per week, plus relief (.5) = 6 Pilots
4 DLE TFOs @ 70 hrs per week, plus relief (.5) = 6 TFOs

Exhibit D: Air Rescue Deployment

Sample 24-hour, seven-day Air Rescue schedule (Pilots only)

<table>
<thead>
<tr>
<th>DUTY WEEKS 1 &amp; 2</th>
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4 Air Rescue pilots @ 160 hrs per month, plus CFI relief (.5) = 6 Pilots

8 Training 12 Day Air Rescue Relief 12 Night Air Rescue Relief 12 Additional pilot
Exhibit E: Operations Manual Gap Analysis

The Public Safety Aviation Accreditation Commission (PSAAC) Standards for Law Enforcement Aviation Units (dated 27 July 2016) were used as the primary evaluation standard for the review. The PSAAC Standards are jointly owned and copyrighted by the Airborne Law Enforcement Association (ALEA), endorsed by the International Association of Chiefs of Police (IACP) and National Sheriff’s Association (NSA), and recognized by the NTSB as best practice standards for all law enforcement aviation units worldwide.

The gap analysis compared the BSO Aviation Unit’s administration, flight operations, safety and risk management, aircrew training, and maintenance programs against Public Safety Aviation Accreditation Commission (PSAAC) standards to confirm compliance, or non-compliance with mandatory standards.

The Aviation Unit is unique in that in addition to the unit’s Operations Manual or SOP, the unit also operates under a FAA Part 135 certificate that incorporates a separate General Operations Manual (GOM) for operations within the scope of the Part 135 certification. Although both manuals were cross referenced, it was recommended that some of the GOM policies and procedures be incorporated into the unit’s Operations Manual to avoid confusion when the policy has universal application regardless of the mission.

In areas that resulted in non-compliance, recommendations were provided for meeting the standard. In some instances, the policies and procedures examined were in partial compliance with the PSAAC standards due to incomplete application of the standard by the Aviation Unit. In those areas, the Aviation Unit was assessed as compliant and recommendations were made for minor improvements in the respective area.

The Aviation Unit’s overall assessment against the standards was based on the percentage of standards compliance compared to the total number of mandatory standards applicable to the Aviation Unit. The following table depicts the metrics used to determine an air unit’s overall operational risk level:

<table>
<thead>
<tr>
<th>Level of Risk</th>
<th>Rating Scale (Compliance %)</th>
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<tbody>
<tr>
<td>Minimal</td>
<td>90-100%</td>
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<tr>
<td>Low</td>
<td>75-89%</td>
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<td>Moderate</td>
<td>61-74%</td>
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<tr>
<td>High</td>
<td>50-60%</td>
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<tr>
<td>Unacceptable</td>
<td>&lt; 50%</td>
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In parallel with this objective evaluation against the PSAAC standards, each member of the Aviation Unit available during the time of the on-site visit was interviewed and asked to complete a survey questionnaire designed to evaluate the safety and organizational culture of the Aviation Unit. Some of the responses to the questionnaire were used in an evaluation of the findings and recommendations along with providing an independent perspective of the Aviation Unit’s culture.
Summary of Findings

Seventy-seven PSAAC standards are mandatory and applicable to most air units. However, only 70 mandatory standards applied to the Aviation Unit’s operation. The following depicts the Aviation Unit’s overall compliance percentage and assessment of operational risk (risk level):

<table>
<thead>
<tr>
<th>Aviation Unit</th>
<th>% Compliance</th>
<th>Level of Risk</th>
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</thead>
<tbody>
<tr>
<td>Broward Sheriff’s Office</td>
<td>70%</td>
<td>Moderate</td>
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</table>

The level of risk for the Aviation Unit’s overall operation is classified as **Moderate**.

Over the past four years, a total of 30 agencies in the US and internationally have been assessed using the PSAAC Standards as the comparative guide. Prior unit assessments have yielded an average compliance percentage of 85% (Low Risk), with 12 of those agencies achieving 90-100% compliance. At 70% compliance, the Aviation Unit ranks in the middle quadrant of the agencies assessed to date.

Review Findings and Recommendations

The review identified several areas that will require the Aviation Unit’s immediate attention and action to bring its policies and procedures in line with PSAAC Standards. The following analysis depicts our findings and recommendations for each Standard in five aviation subject areas: 1) Administration, 2) Operational, 3) Safety, 4) Training, and 5) Maintenance. M indicates Mandatory compliance with the Standards.

### 1.0.0 Administrative Standards

The Aviation Unit was assessed against 14 PSAAC mandatory Administrative Standards and one recommended Standard resulting in a compliance percentage of 85% (12 of 14).

#### 1.1.1 Missions (M) - Compliant

**Missions**: The following shall apply to all missions performed by the aviation unit:

1. Missions shall be defined, documented and approved by the public safety agency.
2. Crewmembers shall be trained and equipped in accordance with the standards as set forth in this document, for any and all missions they are authorized to perform.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit’s Operations Manual provides an excellent overview of all the unit’s missions to include a variety of mission profiles and the Manual is approved by the Aviation Unit’s entire chain of command.
• Training of Aviation Unit personnel focuses on tactical and medical missions associated with the unit’s two primary missions.

Recommendations
❖ None

1.1.2 Chain of Command (M) - Compliant

**Chain-of-Command:** There shall be a well-defined chain-of-command:

1. There shall be an organizational chart that defines where the aviation unit fits within the agency. There shall also be a chart that defines the structure of the unit.

2. Unit personnel shall understand the structure of the chain-of-command.

3. For law enforcement agencies that contract for aviation services, there shall be a policy that specifies lines of authority between the law enforcement agency and the contractor and the agency is responsible for assuring that the contractor meets the PSAAC standards related to the service they provide.

Findings
The Aviation Unit is compliant with this Standard

Recommendations
❖ None

1.1.3 Aviation Unit Budget (M) - Compliant

**Aviation Unit Budget:** There shall be evidence of an approved budget or funding source for the operation of the unit.

Findings
The Aviation Unit is compliant with this Standard.

Recommendations
❖ None

1.1.4 Base of Operations (M) – Compliant

**Base of Operations:** There shall be a clean, safe and secure work environment for all personnel, with adequate lighting, ventilation and space for storage of equipment

Findings
The Aviation Unit’s current base of operations at the Ft. Lauderdale Executive Airport is in general compliance with the Standard and meets the current requirements; however, other units housed with the aviation Unit cause excessive clutter and minimize much needed storage space for spare parts.

1.2.0 Operations Manual – (M) – (See Below)
**Unit Operations Manual:** The unit shall have an operations manual which at a minimum contains the following sections:

1. Aviation unit commander’s/manager’s Operational Policy
2. Mission Statement
3. Administrative
4. Personnel
5. Training
6. Operations
7. Safety Management System
8. Maintenance
9. Special Operations (if applicable)
10. Appendix

The unit shall ensure that all unit members have been trained and demonstrate an understanding of the contents of the Unit Operations Manual. This training shall be documented and all unit members shall receive a copy of the Operations Manual.

<table>
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<tr>
<th>01.02.01</th>
<th>Manual Contents</th>
<th>Compliant</th>
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<td>01.02.02</td>
<td>Commander’s Philosophy</td>
<td>Non-Compliant</td>
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<td>01.02.03</td>
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<td>01.02.09</td>
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<tr>
<td>01.02.10</td>
<td>Special Operations</td>
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**Findings**

The Aviation Unit is overall compliant for this set of Operational Manual standards when combined with the Part 135 GOM and the following is a summary of the findings:

- The Aviation Unit supervisor has not developed a written Operational Philosophy
- Unit members are not trained on the contents of the Operations Manual; no evidence of this training was found during the unit interviews
- The Training section is contained in the GOM and does not describe the training requirements for Unit Managers, Supervisors, Tactical Flight Officers (TFOs) and maintenance staff
- The Safety section of the Manual provides little detail and there is no evidence of a pro-active Safety Program in place; a Safety Management System (SMS) program has not been implemented by the Aviation Unit
The Maintenance section of the Manual lacks detail associated with tool inventory and spare parts storage procedures

Recommendations

❖ The Aviation Unit supervisor must develop an Operational Philosophy that incorporates her Safety Policy along with additional operational policies and guidance; ensure this is added to Operations Manual
❖ In addition to an emphasis on safety, the Commander’s Operational Philosophy should insist on professionalism in all aspects of the Aviation Unit’s operation, along with character, integrity and honesty as not only an expectation of all personnel, but also a necessary requirement for continued assignment to the Aviation Unit.
❖ Update the Training section of Manual to describe the training requirements for Unit Managers, Supervisors, and maintenance staff
❖ Fully implement a well-documented and pro-active SMS Program
❖ Update the Maintenance section of the Manual to include the missing sections

2.1.0 Operational Standards

The Aviation Unit was assessed against 18 of 24 PSAAC mandatory Operational Standards that are applicable to the unit, resulting in a compliance percentage of 89% (16 of 18).

2.1.1 General Operations (M) – Compliant

General Operations: Aviation Units shall comply with applicable Federal Aviation Regulations (FARs) Transport Canada (TC) Canadian Air Regulations (CARs) or applicable national aviation authority (NAA) and public laws for the type of operation being conducted by the unit. This includes the following classifications of operations:

1. Commercial Aircraft Operations (when applicable)
2. Civil Aircraft Operations
3. Public Aircraft Operations
4. Canadian or other international civil/government aircraft operations

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

❖ Aviation Unit provides law enforcement support regarded as Public Aircraft Operations per the FAA and PSAAC Standards and air ambulance operations for commercial purpose
❖ The Aviation Unit conducts most its operations under Part 135 in conformance with its air ambulance mission and Part 91 by policy.
Recommendations

❖ The Aviation Unit should pursue PSAAC accreditation and have an independent audit performed every two years

2.1.2 Helipad, Heliport, Airport Operations (M) – Compliant

*Helipad, Heliport, Airport and Off-heliport/Off-Airport Operations*: There shall be a written policy covering all helipad, heliport, airport, and off-heliport/airport operations in accordance with applicable FARs or Part III, CARS, Standard 325 Heliports related to Canadian units or appropriate national aviation authority. The policy shall cover fixed and rotor wing operations.

**Findings**

- The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

**Recommendations**

❖ None

2.1.3 Hearing & Eye Protection (M) – Compliant

*Hearing and Eye Protection*: Hearing and eye protection shall be provided and utilized by all aviation unit support personnel, including aircraft maintenance technicians who assist with the loading and unloading of passengers, who work near operating aircraft, or who are operating machinery or special tools.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Hearing and eye protection are provided and available for use by support personnel.

**Recommendations**

❖ None

2.1.4 Personal Protective Equipment (M) – Compliant

*Personal Protective Equipment*: The agency shall have a policy that addresses the personal protective equipment to be worn during flight operations.

1. All agency aircrew members shall be provided and wear personal protective equipment designed to protect against injuries associated with fire and/or major head trauma. The following safety equipment shall be worn by all aircrew members during helicopter flight operations:
   a. Flame-resistant flight suit made from “Nomex” brand or similar material
   b. Flame-resistant flight jacket when conditions require
   c. Flame-resistant gloves in accordance with agency policy
d. A US military or similar international authority approved flight helmet specific for use by helicopter crews

e. All-leather laced boots or non-leather boots which are flame resistant or have been approved for use by the military or appropriate governing agency for helicopter aircrews

2. Proper wearing of flame-resistant flight clothing includes collars up, sleeves rolled down and the use of flame-resistant flying gloves

3. Clothing made of nylon or other synthetic material shall never be worn as an outer or under garment

4. If a survival vest is worn, it must be made of flame-resistant material, such as “Nomex” brand or similar material

5. Qualified non-crewmembers shall wear PPE in accordance with their respective agency policy (or in accordance with applicable ASTM standards)

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Aviation Unit personnel are provided safety equipment in the way of approved flight helmets, flight suits, gloves and boots and they are required by policy to be worn

- Flight suits and gloves are replaced annually

**Recommendations**

- Annual inspection of safety equipment should be included in the unit’s policy and procedures manual to ensure their serviceability and crashworthy integrity

**2.1.5 Crew Rest Policy (M) – Compliant**

**Crew Rest Policy:** The aviation unit shall have a crew rest policy for all crew members relative to their individual flight duties. The crew rest policy shall at a minimum, address the following conditions:

1. A crew rest policy shall be established and managed in conjunction with a Fatigue Risk Management System (FRMS) under the implemented SMS system.

2. Maximum number of hours that may be worked during a 24-hour period.

3. Maximum number of flight hours during normal duty day and within a 24-hour period based on mission, flight conditions and day/night operations.

4. Minimum rest period of eight consecutive hours between duty periods, uninterrupted by the agency, to minimize the likelihood of aircrew fatigue during aviation operations.

5. An aircrew member may terminate or decline a mission if, in the aircrew member’s determination, it would be unsafe to perform the flight due to fatigue.

**Findings**

The Aviation Unit’s Crew Rest Policy is contained in the Part 135 GOM and is compliant with this standard. The following were observed:
The current policy as written in the GOM applies to all crew members, and is an excellent policy.

Flight medics are defined as “medical personnel” and not held to the same crest rest standards.

This definition can only apply when the flight medics are performing the duties in accordance with Part 135.

When not performing medical duties, flight medics are crew members supporting a law enforcement mission

**Recommendations**

❖ The Crew Rest Policy should be also made part of the Aviation Unit’s Operations Manual and applied to all flight personnel

❖ Since over 85% of the missions flown by the Aviation Unit are in support of DLE, and the medics are acting as TFOs on those missions, they should be held to the same crew rest policy as crew members.

### 2.1.6 Firefighting Equipment (M) – Compliant

**Fire Extinguishers and Firefighting Equipment:** Appropriate, adequate and up-to-date fire extinguishers and firefighting equipment shall be readily available, consistent with local laws and regulations. All unit personnel shall be properly trained (including recurrent training) on the proper use of the equipment.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• Policy regarding fire extinguishers is in the GOM

• Fire extinguishers of various sizes were available in and outside the hangar area.

• There was some evidence of initial and recurrent training as mandated, although training records were inconsistent

**Recommendations**

❖ Incorporate the policy into the unit Operations Manual

❖ Include a review of initial and recurrent firefighting equipment training for all Aviation Unit personnel as part of the overall training and safety program

❖ Include as an agenda item for the Aviation Unit’s Safety Committee and unit training day

### 2.1.7 Occupant Restraint Devices (M) – Compliant

**Occupant Restraint Devices:** The aviation unit shall have an Occupant Restraint Device policy that includes the following:
1. All helicopter occupants shall properly use seatbelts and shoulder harnesses during all phases of flight, except as necessary to perform mission tasks. There shall be a written policy requiring all occupants to have an appropriate form of restraint protection at all times. During rappel, rescue or similar operations, there shall be some form of fall protection (e.g. safety strap) attached, until the person is attached to the lowering system or is in place for hover-step deployment.

2. All fixed-wing occupants shall use occupant restraint devices consistent with Federal Aviation Regulations.

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Policy requiring the use of seat belts and shoulder harnesses is part of passenger briefing and included in the Unit’s Operations Manual
- Compliance with this policy was confirmed during interviews.

Recommendations
❖ None

2.1.8 Overwater Operations (M) – Compliant

Over Water Operations: If missions are routinely flown over water beyond autorotational or glide distance of a suitable landing site, the unit shall have a policy that at a minimum, includes the following:

1. Appropriate personal flotation device (PFD) shall be provided and worn by all occupants during sustained over-water operations. Additionally, aircrew members shall also be provided and wear PFD including a personal breathing device. Environmental thermal protection shall be worn when appropriate.

2. Flight following procedures.

3. All aircrew members to successfully complete a formal and documented training program (to include refresher training) for emergency water egress and survival.

4. A briefing on aircraft ditching, egress and the use of all over-water equipment to occupants.

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Operations Manual covers all aspects of this standard, except for flight following, however, I was advised that the unit’s policy of flight following applies to all flight activity.

Recommendations
❖ In the section of the Operations Manual covering off-shore operations, make reference to the flight following requirements in the related section of the Operations Manual.
2.1.9 Night Vision Goggles (M) – Non-Compliant

**Night Vision Goggles (NVG):** Units operating with Night Vision Goggles (NVG) shall have a written policy governing their use. At a minimum, the policy shall include:

1. Initial training and qualification in the use of night vision goggles for all crewmembers
2. NVG missions, applications and limitations
3. Weather and environmental conditions
4. Emergency procedures training, including inadvertent IMC recovery procedures
5. NVG emergencies (goggle failures)
6. Physiological factors
7. Navigation
8. Annual recurrent training
9. Mission specific currency requirements for all crewmembers on at least a quarterly basis
10. Care, maintenance, inspection and security requirements of NVGs.
11. Pilot currency tracking records, to ensure compliance with FAR Part 61.57 or applicable NAA regulations
12. FAA or applicable NAA approved aircraft lighting and radar altimeter

Units conducting NVG operations in certificated aircraft under FAR Part 91 or the most current Canadian Advisory Circular or applicable national aviation authority (NAA) shall conform to all applicable FARs/CARs related to night vision goggle operations and equipment maintenance, and utilize FAA/TC/NAA approved equipment and lighting. Units operating non-certificated aircraft modified for NVG use shall have mil-spec aircraft lighting compliant with TSO DO-275 and compatible with the NVGs being used.

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- Aviation Unit uses NVG goggles that are maintained and certified per the manufacturers’ requirements.
- Although all pilots have been trained in their use and the aircraft are NVG compliant, there is currently no policy in place in the Operations Manual covering NVG operations or training requirements.
- NVG operational procedures are also not contained in the Part 135 GOM and technically are not authorized when flying medical missions.

**Recommendations**

- Incorporate into the Operations Manual the policy and procedures relative to NVG use to include all those items found in the standard above.
- If NVGs are employed, both pilot and TFO/medic should operate under NVGs
- Also, cross reference with the training section of the manual on NVG recurrency requirements.
2.1.10 Aircraft Refueling Procedures (M) – Compliant

**Aircraft Refueling and Defueling Procedures**: There shall be a written policy regarding aircraft refueling and defueling. At a minimum, the policy shall include, but not be limited to:

1. Aircraft refueling and defueling shall be conducted in compliance with federal, state and local laws and specific procedures as outlined by the aircraft manufacturer.
2. Fuel storage, handling and dispensing on airports shall be in compliance with 14 CFR 139.321 (e) (1) and (2), CAR Part III or applicable national aviation authority as applicable.
3. A documented, verifiable training program shall be in place to ensure that all personnel who are authorized to refuel aircraft have been trained to operate the fuel supply and firefighting systems in compliance with FAA AC 150/5230-4A, dated 9/28/2012 and applicable CARs or applicable national aviation authority.
4. Smoking prohibitions.
5. Rapid refueling operations, (if permitted) including prohibiting rapid refueling of aircraft with reciprocating engines. Rapid refueling for Canadian units shall be in accordance with CAR 602.09. Rapid refueling for other than US/Canadian units shall be in accordance applicable aviation authority requirements.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Routine refueling is conducted at the Aviation Unit’s base of operations by a commercial vendor.
- The Operations Manual provides excellent policy and procedures on rapid refueling operations.
- Refueling guidance is also provided in the unit’s Part 135 GOM

**Recommendations**

- Ensure that policy guidance contained in the GOM is also included in the Operations Manual

2.2.11 Fuel Storage and Delivery (M) – Not Applicable

2.1.12 Helicopter Air Ambulance Operations (M) – Compliant

**Helicopter Air Ambulance (HAA) Operations**: If the aviation unit’s mission statement includes HAA operations, the unit shall comply with state/provincial or local medical personnel licensure regulations, where required.

In the absence of state or local regulations, aviation units should comply with Commission on Accreditation of Medical Transport Systems (CAMTS) standards regarding medical personnel qualifications, patient medical treatment and transport protocols.

**Findings**

The Aviation Unit is compliant with this Standard.
Recommendations

❖ None

2.1.13 Emergency Safety Equipment (M) – Compliant

Emergency Safety Equipment: All agency aircraft shall have an approved emergency locator transmitter (ELT) installed on all operational aircraft.

Findings
The Aviation Unit is compliant with this Standard.

Recommendations
❖ None

2.2.0 Flight Operations (Helicopter)

2.2.1 Law Enforcement Helicopter Pilot-in-Command (M) – Compliant

Law Enforcement Pilot-in-Command (PIC) Requirements: A law enforcement pilot-in-command shall hold at least a FAA/TC/NAA commercial pilot certificate, with rotorcraft category and helicopter class rating, appropriately trained, qualified and current in the aircraft being flown, and maintain at a minimum a FAA Class II medical certificate, CAR Medical Category 1 certificate or equivalent commercial category NAA medical certificate. (See pilot training requirements).

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• Current policy requires a Commercial Rotorcraft Pilot’s License (CPL), rotorcraft instrument rating, and a Class II Medical certificate for all helicopter pilots

Recommendations
❖ None

2.2.2 Weather Minimums – Helicopter (M) – Compliant

Weather Minimums: Helicopter weather minimums shall be established to ensure safe operations. These minimums shall be specified as a minimum ceiling and visibility in a written policy for both day and night operations. Air crews shall comply with their agency’s or FAR/CAR weather minima, whichever is more restrictive. Flight under Instrument Flight Rules (IFR) shall always comply with applicable FARs/CARs or applicable NAA regulations.

Findings
The Aviation Unit compliant with this Standard and the following is a summary of the findings:

• The Aviation Unit’s Operations Manual Section 3.15 adequately defines day and night weather minimums for their operating environments.
• The GOM also specifies weather minimums that must be followed when operating under Part 135.

Recommendations

❖ None

2.2.3 Helicopter Inadvertent Instrument Meteorological Conditions (IIMC) (M) – Compliant

*Inadvertent Instrument Meteorological Conditions (IIMC):* There shall be a written policy that includes the following:

1. The definition of Inadvertent IMC
2. Inadvertent IMC recovery procedures
3. Training to the recovery procedures required to maintain proficiency
4. Aircraft to be equipped with altimeter, attitude indicator, directional gyro, turn and slip, IVSI or equivalent.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• The IIMC policy and procedures are contained in the unit’s Part 135 GOM and is in complete compliance with this standard

Recommendations

❖ Incorporate the IIMC policy and procedures contained in the GOM into the unit Operations Manual

❖ Include IIMC avoidance and recovery procedures training for all crewmembers, preferably through the use of a flight simulator or flight training device and include flight medics/TFOs. Ensure at least annual IIMC recovery training is conducted and recorded in training records.

2.2.4 Flight Following (M) – Compliant

*Flight Following:* The aircrew shall exercise flight following utilizing one of the following: ATC, the unit’s home base or with the communications center of the respective agency. Otherwise, a VFR flight plan shall be filed for all cross-country flights out of the local flying area when a stopover is anticipated. In all such cases, there shall be established procedures for notifying appropriate search and rescue agencies in the event of a missing aircraft. Regarding Canadian units, dispatch systems can be included in the unit’s SMS or IAW CAR Part VII and Part VI604.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• Section 3.10 of the Operations Manual contains excellent policy and procedures relative to aircraft flight following.
Recommendations

❖ Include in the policy that this procedure also applies to all operations off-shore.

2.2.5 Aircrew Composition (M) – Compliant

Aircrew Composition: For law enforcement missions, day or night, requiring tactical observation activities (patrol, search or surveillance) the minimum aircrew shall consist of a Pilot-in-Command and at least one other crewmember performing the duties of Tactical Flight Officer, as defined in Appendix A.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• The Aviation Unit follows the letter of this standard; however, it is noted here and elsewhere that the TFO is a non-sworn flight paramedic not fully trained as a tactical flight officer.

Recommendations

❖ Divide the mission responsibilities to allow a sworn and experienced deputy sheriff, trained as a tactical flight officer to perform these duties.

2.2.6 Minimum Patrol Altitudes (M) – Non-Compliant

Minimum Helicopter Patrol Altitudes: A policy establishing minimum patrol altitudes for helicopters shall be adopted and published to ensure safe operations and minimize noise over densely populated areas. These minimum altitudes shall be specified in a written policy for both day and night operations. Aircrews shall at all times maintain an altitude that ensures avoidance of all ground obstacles and hazards and allows for a safe landing in the event of an in-flight emergency without injury to the aircrew or persons and/or property on the ground.

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

• The Aviation Unit’s Operations Manual Section 3.18.2 adequately identifies and explains the conditions under which crews may operate at a minimum flight altitude of 500 feet AGL for helicopter operations.

• However, the PSAAC Standard requires that a minimum altitude be established for helicopter patrols and orbits for both day and night operations, with an expectation that night minimum altitudes will be greater.

• During interviews pilots confirmed their understanding that the current policy applied to both day and night operations.

Recommendations

❖ Expand the policy to include minimum altitudes for both day and night patrol operations.
2.3.0 Flight Operations (Fixed Wing) – Not Applicable

3.0.0 Safety Standards

The Aviation Unit was assessed against 13 PSAAC mandatory Safety Standards that are applicable to the unit, resulting in a compliance percentage of 30% (4 of 13).

3.1.0 General Standards

3.1.1 Safety Management System (M) – Non-Compliant

Safety Management System: The aviation unit safety program shall be a Safety Management System (SMS) based program. The SMS Program shall be incorporated into the unit’s Operations Manual and built on a foundation of operational safety management system standards.

All personnel shall be required to comply with approved safety standards. These include unit policy and procedures; aircraft manufacturer’s operating procedures and limitations; and, government regulations. At a minimum, the SMS manual shall comply with Section 3 of the ALEA Standards. The SMS shall consist of four components; (1) Safety Policy and Objectives; (2) Safety Risk Management; (3) Safety Assurance; and (4) Safety Promotion and Training. The ALEA SMS Standards follow the guidance provided by the FAA and the International Helicopter Safety Team. For Canadian units, SMS is governed under CAR 107.01 to 107.04. For other international units, SMS guidance is provided by the International Standards for Business Aircraft Operations (IS-BAO).

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit has not adopted a Safety Management System, nor is there a program in place to assess, manage and mitigate risks, educate crew members on risk assessment or communicate safe practices as a matter of everyday operations

Recommendations

❖ The Aviation Unit must make implementation of the SMS program a top priority, conduct a safety survey to gauge the lack of understanding and gaps in SMS expertise resident within the Aviation Unit, and conduct training for all unit personnel on SMS
❖ The Aviation Unit must train the assigned Safety Officer and unit supervisor in all aspects of SMS as soon as possible if this program is to be successful
❖ Conduct an external SMS specific audit within 180 days to assess progress

3.2.1 Commander’s Safety Policy (M) – Compliant

Unit Commander’s/Aviation Unit Manager’s Safety Policy: The unit commander’s/aviation unit manager’s safety policy shall mandate safety as the aviation unit’s highest priority. It shall articulate that management is committed to providing safe, healthy, secure working conditions
and attitudes with the objective of having an accident free workplace. It shall promote a “Just Culture” of open reporting of all hazards in which management will not initiate disciplinary action against any personnel who, in good faith, discloses a hazard or safety occurrence due to unintentional conduct.

A “Turn Down Policy” shall be incorporated that allows any aircrew member (including qualified non-crewmembers) the opportunity to turn down or terminate a mission task, when an aircrew member determines that the mission is unsafe and they are unable to negotiate an alternative solution to mitigate risks. Turning down a mission is one possible outcome of managing risks.

Management shall embrace the following safety principles:

1. Always operate in the safest manner possible
2. Never take unnecessary risks
3. Recognize that safe does not mean risk free
4. Hold everyone accountable and responsible for the identification and management of risk

Recognize that familiarity and prolonged exposure without a mishap leads to a loss of appreciation of risk.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Commander’s Safety Policy as stated in Section 3.3.1 of the Operations Manual does list safety as the highest priority and cautions crews against taking unnecessary risks.
- This policy statement should be displayed prominently in key areas of the unit, i.e., aircrew lounge and training room, OIC office, and maintenance hangar.

Recommendations

❖ Update and re-issue the Commander’s Safety Policy and ensure all personnel read and sign acknowledgement of the policy
❖ Ensure that Safety Policy is posted in the Aviation Unit’s operational work areas; e.g. OIC’s office, maintenance area, duty room, and pilot briefing room

3.2.2 Management Commitment (M) – Non-Compliant

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

Management Commitment & Responsibilities: The unit commander/aviation unit manager is responsible for:

1. Clearly defining the safety unit and structure. The structure should explain the responsibility and reporting relationship for safety functions.
2. Publishing the unit’s goals and objectives for the Safety Management System. Safety objectives should be developed for each functional area and be updated at least
quarterly or as they are accomplished. The goal of the unit’s SMS program is to eliminate accidents and incidents.

Findings

- Other than list the specifications for a safety officer in the section of the Operations Manual that describes duty functions, no other mention is made of the role or reporting relationship of the unit’s safety officer.

- Although safety is clearly a priority within the unit, the program has no structure or organizational basis to monitor the effectiveness of safety measures, nor is there an attempt to establish safety goals and monitor their success.

Recommendations

❖ The importance of management’s commitment to safety and the inherent responsibilities placed on everyone to know and understand the unit’s safety goals and objectives are key elements of any safety program.

❖ Management must get on board with SMS and fully implement the program by becoming its biggest advocate and implementer.

3.2.3 Appointment of Safety Personnel (M) – Non-Compliant

Appointment of Key Safety Personnel: The unit commander/aviation unit manager shall:

1. **Appoint an Aviation Safety Officer (ASO)** to manage, monitor and coordinate the SMS program throughout the unit. The Aviation Safety Officer shall:
   a. Successfully complete a formal SMS training course.
   b. Report directly to the aviation unit commander/manager.
   c. Manage the SMS for the aviation unit commander/manager
   d. Facilitate the Safety Committee meetings.
   e. Manage the unit’s Hazard Reporting Program (HRP).
   f. Coordinate safety training for unit members.
   g. Identify and evaluate safety problem areas.
   h. Review OSHA notices and disseminate information.
   i. Provide technical guidance when safety is a factor in unit operations and training.
   j. Periodic review of the hazards listed on the hazard board
   k. Conduct periodic safety inspections
   l. Conduct periodic unit safety meetings and briefings.
   m. Review unit incident and accident reports for the purpose of preventing accidents and incidents.
   n. Assist management in formulating safe operating practices and policies.
   o. Develop risk control measures (interventions) based on the SMS process.
   p. Work with unit training officer to develop training consistent with risk control measures.

2. **Appoint a Safety Committee**: The Safety Committee shall:
a. Have responsibility for:
   1) Developing programs to identify and correct hazards
   2) Reviewing procedures relative to occupational injuries
   3) Reviewing incident and accident reports and provide recommendations to the unit commander/manager.
   4) Other duties as directed by the unit commander/manager.

b. Have representatives from:
   1) Unit management
   2) Aviation Safety Officer
   3) Pilots
   4) Tactical Flight Officers or other crewmembers
   5) Training
   6) Maintenance
   7) Other unit members as needed

c. Meet at least quarterly.

d. Have a written agenda.

e. Keep and disperse minutes of the meeting.

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- Safety assignments are well established in the Operations Manual, to include assignment of an Aviation Safety Officer (ASO), and a safety officer has been assigned.
- However, the safety officer has not been trained in SMS, nor has he set up any of the programs outlined in this standard.
- A Safety Committee has not been formed that would include representatives from each segment of the unit.
- During interviews, it was clear that pilot meetings take place each quarter, but they do not involve any other members of the unit.

Recommendations

❖ Aviation Unit must train the ASO in in SMS management and implementation
❖ The safety officer must take an active role and be fully supported and empowered by the Aviation Unit Commander
❖ Appoint a Safety Committee representing deputy pilots, medics and civilian members of the unit, and require the unit supervisor to be a part of the committee.
❖ Conduct a Safety Committee meeting as soon as possible; these meetings should be conducted at least quarterly and minutes must be documented and distributed to all Aviation Unit members
3.2.4 Emergency Preparedness and Response (M) – Compliant

**Emergency Preparedness and Response:** The aviation unit shall have a written plan detailing the procedures and notifications to be followed in the event of a precautionary landing, overdue aircraft, serious incident or accident. The plan shall be incorporated into the unit’s policy mandating compliance in the event of an accident or serious incident involving substantial damage to aircraft, injury or death of crewmembers, passengers or persons on the ground. The accident plan shall also address aviation ground accidents and incidents not involving aircraft flight operations. The plan shall include, but not limited to:

1. Individual actions that shall be taken in the event of an accident.
2. Initiate log of events and actions
4. Current contact information for all unit personnel.
5. Immediate response checklist and notification procedures, including telephone numbers for:
   a. EMS/fire/rescue/law enforcement
   b. Command notification (including unit commander/manager)
   c. Forensics/Crime Lab
   d. FAA/TC/NAA Air Traffic Control facilities
   e. Other law enforcement units
   f. Medical care facilities
   g. NTSB/TC/NAA
   h. Legal advisor/risk manager
   i. Medical Examiner/Coroner
   j. Aircrew family notification
   k. Aircraft manufacturer
   l. Other equipment manufacturers, if applicable
   m. Media/Public Information Officer(s)
6. Request of the NTSB or investigating agency to be a party to the investigation and assign an agency representative to serve in that capacity.
7. Accident/incident investigation kit with responsibilities and procedures
8. Accident witness statement forms
9. Availability of services at key locations
10. Procedures for follow-up family care
11. Implementation of Critical Incident Stress Management for all personnel involved in the incident/accident
12. Damaged aircraft recovery procedures
13. All unit personnel shall be trained in the implementation of the unit accident/emergency response plan. There shall be a record of the training in the unit member’s training records.
14. The plan shall be reviewed and updated at least annually.
Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit has a very detailed Aircraft Mishap and Emergency Plan.

Recommendations
❖ None

3.2.5 SMS Documentation & Records – (M) Non-Compliant

**SMS Documentation & Records:** The purpose of SMS documentation and data information management is to ensure that procedures are in place to ensure compliance with SMS policies, procedures, and goals. To accomplish this the unit shall:

1. Publicize the unit’s safety policies, objectives, and SMS procedures.
2. Document and publicize the unit’s mission, goals, and objectives.
3. Ensure every employee has access to the SMS Manual.
4. Identify the safety regulations that govern the unit. A copy of these regulations shall be maintained in the SMS library.
5. Control all safety related documents.
6. Promptly remove obsolete documents.
7. Conduct periodic reviews of the SMS.
8. Maintain safety related data, including the minutes of safety meetings, information on hazard and risk analysis, risk management, remedial action, incident and accident investigations, and audit reports.
9. Change control procedures are in accordance with unit procedures for manual changes.

Findings
The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit does not have an SMS or Safety Manual that contains all that is required of this standard
- The unit has identified mission goals and objectives that are listed in the Operations Manual
- The unit has adopted much of the Part 135 requirements relative to safety practices but has no way of monitoring their effectiveness
- Safety or pilot meeting minutes are not kept or otherwise distributed to unit personnel

Recommendations
❖ Ensure that the unit’s safety polices, goals and objectives are widely disseminated and known throughout the unit
❖ Begin the process of implementing an SMS program as soon as possible
❖ Establish a safety committee, meet regularly, take minutes and publish the minutes for everyone in the unit.

3.3.0 Safety Risk Management

3.3.1 Hazard Identification and Analysis (M) – Non-Compliant

**Hazard Identification & Analysis**: The unit shall establish procedures to collect data and investigate hazards, incidents, accidents, and instances of potential regulatory non-compliance to identify root cause and recommend risk control measures. Reporting and analysis shall consist of the following:

1. **Occurrence & Hazard Reporting**: Procedures shall include:
   a. Occurrence Reporting: A scheme to report mandatory occurrences.
   b. Hazard Identification: A collection system that is available to all personnel to report hazards in any area of the unit. This shall include a Hazard Reporting Form (HRF) and tracking system.
   c. Clearly defined responsibilities for personnel, the Aviation Safety Officer and the Safety Committee to follow in reporting and mitigating hazards.

2. **Incident Investigation & Analysis**: An investigation shall be conducted for all serious hazards and mandatory occurrence reports. The purpose of the investigation will be to determine root cause and corrective actions.

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- There is no formal hazard reporting process in place. During interviews, pilots indicated that they would pass along hazard information to the next shift or report it to the unit supervisor. Medics simply said they would let the pilot know.

- Hazard reporting requires a systematic approach that allows for complete communication and follow up to ensure the hazard is reported and mitigated. That system is not in place. This is a principal responsibility of the unit safety officer and unit commander.

**Recommendations**

❖ Hazard reporting forms must be readily available and managed by the safety officer and Aviation Unit Commander; Command must support in policy and require use of these forms

❖ Empower the safety officer to record and follow on hazard reporting, bringing them to the attention of the unit supervisor and safety committee, once formed; ensure that aircrew members are included and aware of the hazard reporting system
❖ Include procedures for investigating and analyzing incidents and hazards; document root causes and capture lessons learned

3.3.2 Safety Risk Assessment and Mitigation (M) – Non-Compliant

**Safety Risk Assessment & Mitigation**: The unit shall develop and maintain a formal process that ensures analysis, assessment and control of the safety risks in operations. The unit shall also determine and analyze the risk factors related to the severity and likelihood of potential events associated with known hazards and identifies appropriate risk mitigation strategies. At a minimum the unit shall:

1. Use a risk management strategy that considers the severity and probability of a hazard.
2. Identify, assess and calculate an overall level of risk associated with the hazard.
3. Determine when to elevate the decision for risk acceptance to a higher level.
4. Analyze the risk and develop mitigation measures (Flight Risk Management Tool, or FRAT) to reduce the risk to as low as reasonably practical (ALARP).
5. Develop a means to track corrective actions and their effectiveness.

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- Although the Part 135 GOM references the required risk management procedures and components, the risk assessment form used by the unit only marginally assesses and manages risks associated with a flight profile and it is only used when conducting medevac flights pursuant to Part 135 requirements
- There is no evidence of a flight risk assessment tool or any type of risk assessment performed by the aircrew
- Since no quantitative risk assessment is performed and no formal mitigation strategy is followed, there is no means of tracking performance or measuring and mitigating risks

**Recommendations**

❖ Develop a Flight Risk Assessment Tool (FRAT); require its completion by all members of the crew at the beginning of each shift, record and track scores and implement an approval process for moderate or high risk missions
❖ The Flight Risk Assessment Tool (FRAT) should be used for all flights and should also be modified to measure risks associated with each flight or mission to determine high, moderate, or low risk
❖ Restructure the risk assessment matrix to provide a numerical risk hierarchy that requires approval of moderate and high risk missions

3.4.0 Safety Assurance
3.4.1 Safety Performance Monitoring & Measurement (M) – Non-Compliant

Safety Performance Monitoring & Measurement: The unit shall monitor operational data from the SMS to ensure the effectiveness of safety risk controls and assess system performance. At a minimum, the aviation unit shall:

1. Track and measure the accomplishment of each section’s Safety Objectives at least quarterly (Reference 03.02.02, item 2) and ensure they are current.

2. Track and measure the accomplishment of each mitigation method (Reference 03.03.02, item 5).

3. Conduct a periodic external safety audit and an annual Internal Evaluation Process (IEP) consistent with SMS of the entire aviation unit. This audit should be a systems analysis to determine if all areas of the unit are functioning properly and the SMS is effective.
   a. The ASO shall form a team with representatives from each section to conduct the IEP.
   b. Findings and corrective actions from the IEP will be documented and results given to the aviation unit commander/manager, Safety Committee, and available for all personnel to review.

4. Conduct quarterly safety inspections.
   a. Safety inspections shall be conducted by unit supervisors or his/her designee responsible for areas within the unit.
   b. The results of these inspections shall be forwarded to the Aviation Safety Officer with corrective actions taken.

5. Contractor Assessments: Contract activities in the unit shall be monitored on a regular basis and inspected annually to ensure compliance with the expected standard.

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- There is no system in place to establish safety related goals and objectives or monitor and measure the effectiveness of safety controls. This process does not exist in the unit
- The theory and concept of performing and documenting hazard mitigation efforts have not been implemented, thus mitigation efforts are not being tracked due to lack of risk assessment and mitigation design elements
- There is no record of internal safety inspections by the unit supervisor or safety officer ever being conducted

Recommendations

❖ Establish unit safety goals and objectives; post these objectives in the unit’s work areas, and make sure everyone knows what they are
The safety officer should conduct quarterly safety inspections and no-notice inspections; these findings and recommendations must be reviewed at the unit supervisor (and Safety Committee once formed) and steps taken to resolve any safety issues revealed during the course of the inspection.

3.4.2 Management of Change “MOC” (M) – Non-Compliant

Management of Change: The unit shall establish a Change Management Process to assess risks associated with changes in operational procedures, processes, training, documentation, equipment, or any other significant change. At a minimum, the unit shall:

1. Use a change management form.
2. Include all individuals affected by the change and ensure they have an opportunity to review the change and provide their comments.
3. Conduct appropriate risk assessments of the recommended changes.
4. Determine who is responsible for approving the change and put the change into effect.
5. Maintain a change log that is available in the SMS library.

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- This is a byproduct of an SMS program designed to assess and mitigate risks associated with significant changes in the unit’s command structure, operational procedures, mission structure or any other significant changes to the unit’s operation
- Since the unit has not implemented an SMS program for safety, this program is not in place

Recommendations

- Begin the process of implementing an SMS program in the unit
- Become educated on the Management of Change process and its importance in maintaining a safe and seamless change in operations. Include agency leadership and all critical sworn and civilian personnel in the education process
- Develop and use a Management of Change Form when contemplating any significant changes in personnel, procedures or equipment

3.4.3 Continuous Improvement of SMS (M) – Non-Compliant

Continuous Improvement of the SMS: The unit will promote continual improvement of its SMS through recurring application of Safety Risk Management and Safety Assurance, and by using safety lessons learned and communicating them to all personnel. To accomplish this, the unit shall conduct an annual SMS evaluation. The SMS evaluation shall include:

1. Safety Audits
2. Safety Surveys
3. Safety Inspections

4. The Aviation Safety Officer shall provide the unit commander/manager with an annual update on the accomplishments of the SMS.

5. This can include:
   a. Accomplishment of performance objectives.
   b. Accomplishment of actions taken following the annual safety audit.
   c. Accomplishment of actions taken following routine safety inspections.
   d. The return on investment assessment.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The process is specific to an SMS program and since the SMS program has not been implemented, any attempts at improving the system would not have been started
- External audits are being conducted by the FAA to ensure on-going compliance with the unit’s Part 135 certificate, however, it is not focused on an SMS Program.
- There is no tracking performed on safety mitigations or hazard reports; thus, there is no information available to review and assess

Recommendations

❖ Begin the process of implementing a SMS program
❖ Include continuous improvement of the SMS program as a unit safety goal
❖ Schedule a SMS safety audit within one year to review compliance progress

3.5.0 Safety Promotion and Training

3.5.1 Training and Education (M) – Compliant

Training & Education: At a minimum, the following safety associated training shall be conducted no-less-than semi-annually or as needed based on assignment of personnel:

1. Risk Control Measures: The Aviation Safety Officer and unit training officer(s) shall work together to develop a training component to every risk control measure (intervention) that is developed during the Risk Management Process. As an example, this training can include, but is not limited to required readings, one-on-one or group classroom training, flight training, contractor training or similar training.

2. SMS Indoctrination Training: Safety Indoctrination Training shall be provided to all members of the aviation unit and shall address the purpose of the SMS, individual responsibilities, and general hazards associated with unit operations.
   a. All unit personnel.
b. Initial training shall be completed within 30 days following the implementation of the unit’s SMS.

c. Training shall address the purpose of the SMS, individual responsibilities, and general hazards associated with unit operations.

d. All training shall be documented.

3. **New Personnel Safety Orientation Training**: Shall be conducted for all new personnel and include all topics from 03.05.01 (1)
   a. All new personnel.
   b. Completed before assuming their duties.
   c. All training shall be documented.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of our findings:

- The unit conducts regularly scheduled unit safety meetings, and some safety topics are included in the training.
- The unit also provides a robust safety orientation training for newly assigned personnel.
- The unit is conducting and documenting initial and recurrent training for unit personnel on safety related topics

**Recommendations**

- Continue developing and implementing a SMS training program for all Aviation Unit personnel; all personnel must receive initial and annual refresher training to include Crew Resource Management (CRM), Aeronautical Decision Making (ADM) and SMS
- SMS training must also include pilots, medics, and support personnel
- Aviation Unit supervisor and safety officer must receive specific aviation safety management training as soon as possible; check with ALEA for special safety training incentive programs
- Unit supervisor must take an active role in implementing the SMS program as soon as possible
- Implement a Safety Incentives and Rewards programs

3.5.2 **Safety Communications (M) – Compliant**

**Safety Communications**: The unit shall have a Safety Communications System. The Safety Communications System shall be accessible to all unit personnel and shall include, but not be limited to the following internal and external aviation mission, and special mission related documents:
1. Safety bulletins
2. Safety reading file including precautionary landing advisories, incident and accident histories, and change notices
3. Safety Committee Meeting minutes
4. SMS library
5. Safety bulletin board
6. Hazards board
7. Hazardous material list

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:
- The Aviation Unit utilizes safety bulletins, reading files, hazards map and bulletin boards
- Aviation Unit policy allows the safety officer to bring serious safety concerns directly to the unit supervisor level

Recommendations
❖ Maintain an active library on safety related publications, accident reports and safety related bulletins published by the FAA and NTSB
❖ Implement an anonymous reporting system for Aviation Unit personnel to submit safety/hazard reports if required
4.0.0 Training Standards

The Aviation Unit was assessed against eight PSAAC mandatory Safety Standards that are applicable to the unit, resulting in a compliance percentage of 50% (4 of 8).

4.1.1 Unit Commander Initial Training (M) – Non-Compliant

**Unit Commander/Manager and Supervisor(s) Initial Training:** Unit commanders/managers and supervisor(s), shall successfully complete a formal training program, to include:

1. Fundamentals of Airborne Law Enforcement and Aviation Unit Management.
2. Applicable Federal Aviation Regulations (FARs) or Canadian Air Regulations (CARs) or applicable national aviation authority (NAA) regulations.
4. Aviation Safety, specifically the role of the Safety Management System (SMS)
5. Liability and Legal Issues

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- There is no policy in place requiring unit supervisors and commanders to receive training in accordance with this standard, nor has the current unit supervisor ever attended such training
- The PSAAC Standard in this area requires a specific policy statement in the Operations Manual and conformance by all newly assigned supervisors

**Recommendations**

- Aviation Unit managers and supervisors should attend training in aviation management such as courses offered by ALEA or HAI during their respective annual conferences
- These training requirements must be included in the Aviation Unit Operations Manual

4.1.2 Completion of Training (M) – Non-Compliant

**Completion of Training:** The unit commander/manager and supervisor’s training program shall be completed within one year after being assigned to the unit.

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- No policy is in place requiring that unit managers and supervisors receive aviation related management training within one year of being assigned to the Aviation Unit
Recommendations

❖ The training requirement deadline must be included in the Aviation Unit Operations Manual to follow this standard

4.2.0 Tactical Flight Officer Training

4.2.1 Tactical Flight Officer (TFO) Initial Training (M) – Non-Compliant

**Tactical Flight Officer (TFO) Initial Training**: Tactical Flight Officers (TFO) assigned to the aviation unit in a full time or part time capacity shall, within six-months of being assigned to the unit, successfully complete a formal and documented TFO training program. The training can be conducted in-house or by an outside entity. There must be documented and objective performance standards for the training. The training shall include, but not be limited to:

1. **Aircraft Issues**: Normal operating procedures relevant to the TFO’s duties, including:
   a. Aircraft pre-flight procedures
   b. Aircraft re-fueling procedures
   c. Aircraft fire guard/safety watch starting procedures
   d. Proper use of aircraft checklists
   e. Sterile cockpit procedures
   f. Passenger briefing, including, but not limited to:
      i. Loading and unloading of passengers while the aircraft is operating and not operating. (With specific attention on the hazards associated with rising terrain)
      ii. Seatbelt and shoulder harness operation
      iii. Hazards associated with loose objects in the cabin
      iv. Carrying/Securing firearms or hazardous chemicals/agents (Mace/CS/OC gas, etc…if permitted)
      v. Passenger door operation
      vi. Passenger inter-communications systems (ICS)
   g. Unit Standard Operating Procedures
   h. Terrain and weather
   i. Tactical and aircraft navigation systems
   j. Orientation to airports
   k. Risk management
   l. Aeronautical decision making (ADM)
   m. Crew resource management (CRM)
   n. Safety Management System (SMS)

2. **Mission Training**: The following shall apply to all full time and part time TFOs:
a. All TFOs shall be trained on the proper use of all mission equipment in the aircraft that he/she is expected to operate. (This includes, but is not limited to, tactical equipment, rescue equipment and communications equipment.

b. Patrol tactics

c. Legal issues

3. **Emergency Procedures Training**: TFOs shall be trained on the following emergency procedures:

   a. Passenger briefing for in-flight and ground emergencies
   b. Water egress procedures for all occupants (if applicable)
   c. Location and use of aircraft emergency/survival equipment
   d. Emergency tactical and aircraft radio communications operations and procedures
   e. In-flight fire considerations
   f. Crew resource management (CRM)
   g. Crew member responsibilities during an in-flight emergency

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of our findings:

- The unit does not have a formal TFO training program containing all the elements listed in this standard
- The unit employs Fire Command flight paramedics who are not trained law enforcement officers and thus only receive basic training on how to use specific mission equipment such as the thermal imagining camera, radios and search light
- The only other training received is aircraft related safety training and passenger briefing

**Recommendations**

- Develop a formal tactical flight officer training program that includes all the training topics included in this standard
- Employ deputy sheriffs as TFO who are trained in law enforcement tactics and procedures and can communicate directly with ground units.
- Develop a training program based on known tasks related to the position, stating the conditions wherein the tasks are to be performed, establishing a standard of proficiency for each task, and a method by which the trainee can be evaluated and deemed qualified as a fully trained TFO.
- Require all newly assigned deputies to complete this training and become competent TFOs before entering a pilot apprentice program.

**4.3.0 Law Enforcement Pilot**
4.3.1 Law Enforcement Pilot Initial Training (M) – Compliant

**Law Enforcement Pilot Initial Training:** In addition to the requirements of the Federal Aviation Regulations, Transport Canada, and/or the respective NAA, before a pilot may act as pilot-in-command (PIC) or second-in-command (SIC) of any aircraft performing law enforcement missions, they shall receive training and demonstrate proficiency in no less than the following training subjects:

1. Terrain and weather considerations specific to the unit’s geographical area.
2. Orientation to airports, heliports, heli-spots or any approved landing zones in the local operating area.
3. Orientation to the controlled airspace in the local operating area.
4. Judgment and decision making
5. Flight risk assessment and hazard mitigation
6. Aeronautical decision making
7. Crew resource management
8. Recovery from Inadvertent Instrument Meteorological Conditions (IIMC) *(NTSB Recommendation A-11-57)*
9. Aviation human factors
10. Stress management for all phases of flight
11. Interpersonal communications between crewmembers, to include:
   a. Delegation of responsibilities
   b. Prioritization and crew coordination
   c. Workload management
   d. Situational awareness
12. Pilots shall successfully complete a training program on safe and effective flight profiles while performing missions that are relevant to the unit’s mission statement and scope of service (i.e. patrol operations, thermal imagery search missions, SAR, etc.).
13. In all cases, the following shall apply:
   a. The safe operation of the aircraft throughout all phases of flight shall be the primary concern of the pilot in command during all missions. All other mission requirements shall be secondary in priority.
   b. An in-house training program should be coordinated with an external training program, if available, to ensure, to the greatest possible extent, the most up-to-date training.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit’s pilot training manual contains all the required topics listed in this standard.
Recommendations

❖ None

4.3.2 LE Pilot Recurrent Training (M) – Compliant

Law Enforcement Pilot Recurrent Training: In addition to FAA/TC mandated flight evaluations and flight reviews, units shall have an annual formal flight evaluation program to evaluate the practical performance of pilots for unit missions. The evaluation program may be progressive throughout the year and shall include documented and objective performance standards relevant to the duties of the pilot, the unit’s mission statement and scope of service. The following shall apply:

1. The safe operation of the aircraft throughout all phases of flight shall be the primary concern of the pilot during all missions. All other mission requirements shall be secondary in priority.

2. Pilots shall demonstrate proficiency by successfully completing a recurrent flight evaluation at least once each year administered by an appropriately rated FAA/TC Certified Flight Instructor (CFI) in each aircraft for which the pilot is qualified to fly and perform unit missions.

3. The recurrent flight evaluation will include, but not limited to, the following:
   a. The proper and effective use of aircraft checklists
   b. Effective cockpit communications
   c. Effective crew coordination
   d. Demonstrated proficiency of tasks associated with the missions performed by the unit for which they are qualified.
   e. The safest and most effective flight profile when tactical equipment is being used.
   f. Unit policies and procedures
   g. Demonstrated pilot proficiency in the operation of the aircraft in accordance with the applicable Pilot’s Operational Handbook (POH), and standard maneuvers performed to FAA/TC Commercial Pilot Standards.

4. Hazard identification & risk management which includes:
   a. Judgment and decision making
   b. Human factors
   c. Stress management in all phases of flight
   d. Interpersonal communications between crewmembers, to include prioritization and crew coordination.
   e. Workload management
   f. Cockpit distractions

5. Situational awareness

6. Inadvertent Instrument Meteorological Conditions (IIMC) and recovery procedures (NTSB Recommendation A-11-57)
7. Emergency Procedures/Recurrent Training:
   a. Shall be conducted annually. **However, it is strongly recommended that emergency procedures training be conducted at least twice annually.**
   b. Includes an oral exam on the aircraft limitations and emergency sections of the aircraft’s flight manual.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Although all the requisite recurrent flight training subjects are not listed in the Operations Manual section related to Recurrent Training, credit is given towards compliance with this standard in that recurrent training is conducted annually by a factory representative and the unit’s Part 135 check airman.
- Currently, the unit is minimally meeting the requirements of this standard. Based on my observation, aircraft availability and staffing shortages have reduced the training opportunities to simply remaining current on essential piloting skills as opposed to maintaining proficiency.

Recommendations

- To refine compliance with this Standard, ensure that all the required training subjects associated with this Standard are included in the Pilots Training Manual.
- Additionally, and most importantly, the current schedule should be adjusted to allow for training days to be available each week to cycle unit pilots through a monthly or at least quarterly training session with the unit CFI.
- This training is needed to maintain proficiency in perishable piloting skills such as emergency procedures, NVG flying, inadvertent instrument meteorological conditions (IIMC) recovery procedures and confined area landings. Every effort should be made to provide this training.
- Provide funding each year for selected members of the unit to attend regional and/or national training seminars on law enforcement aviation operations to enhance and improve upon the safety and proficiency of their respective skills as pilot and TFO.

4.3.3 Unit Flight Instructor Requirements (M) – Compliant

**Unit Flight Instructor Requirements:** Aviation unit flight instructor(s) shall, at a minimum, be a qualified and current Certificated Flight Instructor (CFI), check airman, authorized instructor, or designated examiner for the appropriate flight discipline, licensed or authorized by the FAA/TC or appropriate equivalent aviation regulatory authority having jurisdiction. The flight instructor shall be designated by the unit manager as a training pilot and qualified in the appropriate category, class and type (if applicable) of aircraft in which instruction will be conducted. Canadian units shall be in compliance with CAR Part 604 in addition to the above.

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Qualifications and training required by this Standard are adequately defined in the Aviation Unit’s Operations Manual Section 2.7.2

**Recommendations**

❖ None

### 4.4.0 Night Vision Goggles (NVG)

#### 4.4.1 Night Vision Goggles Training (M) – Non-Compliant

**Night Vision Goggles (NVG) Training**: If NVGs are utilized by unit pilots and aircrew members, they shall successfully complete an NVG training program and demonstrate their proficiency in NVG operations prior to performing mission duties in unit aircraft under night vision goggles. At a minimum, the training shall include:

1. NVG missions, applications and limitations
2. Weather and environmental conditions (including recovery from inadvertent IMC)
3. Emergency procedures training
4. NVG emergencies (goggle failures)
5. Physiological factors
6. Navigation
7. Annual recurrent training and evaluation
8. Periodic currency requirements
9. Care, maintenance, inspection and security requirements of NVGs.

**Findings**

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- Qualifications and training required by this Standard are not found in any Operations Manual or Part 135 Training Manual

**Recommendations**

❖ A complete training syllabus for training and qualifications in NVG operations, including currency requirements, must be developed and included in the unit Training Manual.

❖ This should be done regardless of any attempt to comply with these standards.

❖ Require quarterly training flights to maintain proficiency in NVG flying.

### 4.5.0 Training Records

#### 4.5.1 Training Records (M) – Compliant
**Training Records:** The aviation unit shall, for each person required to receive initial and recurrent training, establish and maintain a record of all training received. These training records shall include the following information:

1. Name, pilot certificate number and a listing of all ratings, if applicable;
2. For pilots, a record of the current medical certificate, class and expiration date;
3. The training records indicating successful completion and date of initial qualification training as unit pilot and Aircrews and/or Qualified Non-Crewmembers training or certifications;
4. The documentation or checklist used to record at a minimum the last three pilot proficiency check flights or examinations and Aircrews and/or Qualified Non-Crewmembers evaluations and certifications, where applicable;
5. Documentation related to any training failures or inability to successfully complete any required training, including check flights, and what remedial action was taken to satisfactorily complete the required training;
6. The make, model and type of aircraft or flight training equipment used to conduct the training.

The unit shall retain these records and copies of all pilot proficiency check flights, crewmember evaluations and certifications for a minimum of five years after the individual leaves the agency or longer if required by law.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of our findings:

- Training records for Aviation Unit personnel are maintained in accordance with this standard and with requirements placed on the unit by their Part 135 certification.

**Recommendation**

- Although training records are being kept in accordance with the standard except for duration, the Aviation Unit should retain the records for a period of five years rather than two.

### 5.0.0 Maintenance Standards

The Aviation Unit was assessed against 17 PSAAC mandatory Maintenance Standards that are applicable to the unit, resulting in a compliance percentage of 76% (13 of 17).

#### 5.1.1 Certified Maintenance Standards (M) – Compliant

**Certificated Aircraft Maintenance Standards:** Aviation units operating certificated aircraft shall maintain them in accordance with applicable Federal Aviation Regulations, Canadian Aviation Regulations or equivalent national aviation authority (NAA) having jurisdiction and OEM maintenance requirements.

**Findings**
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Aviation Unit aircraft are all maintained in accordance with applicable Federal Aviation Regulations (Parts 43, 91 and 135) and Airbus factory maintenance requirements.

Recommendations

❖ None

5.1.2 Non-Certificated Military Surplus Aircraft (M) – Not Applicable

5.1.3 Continued Airworthiness Program (M) – Compliant

*Continued Airworthiness Program*: For all certificated aircraft, there shall be a written policy that outlines the unit’s continued airworthiness program to include manufacturers’ maintenance requirements and applicable Supplemental Type Certificates and/or Field Approvals from an applicable national aviation authority.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The continued airworthiness program in place complies with the maintenance prescribed by the original equipment/aircraft manufacturers (OEM) and includes equipment added with a Supplemental Type Certificate.

Recommendations

❖ Maintain strong liaison and coordination with OEM representatives and local FAA maintenance inspectors in the region

5.1.4 FAA Airworthiness Directives & Safety Bulletins (M) – Compliant

*Federal Aviation Administration (FAA), Transport Canada (TC) Airworthiness Directives (AD), National Aviation Authority (NAA) Directives and/or Military Safety of Flight Bulletins*: There shall be a system in place to ensure that the unit follows all applicable FAA/TC/NAA ADs and Military Safety of Flight Bulletins. Additionally, compliance with Service Bulletins or Military Advisory Bulletins should be accomplished in a timely manner.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- By policy, the unit maintenance technicians maintain compliance with Airworthiness Directives and Safety Bulletins issued by FAA for all aircraft operated by the Aviation Unit.

Recommendations

❖ None
5.1.5 Pilot Authorized Maintenance (M) – Compliant

**Pilot Authorized Maintenance:** In accordance with applicable regulations, there shall be a written policy that outlines what maintenance, if any, pilots may perform. Pilots shall receive instruction from a maintenance technician/engineer on authorized maintenance procedures and a record kept of this training. The pilot shall also receive an annual review of this training.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Per the Operations Manual, pilots are authorized to perform pre-flight, post-flight and foreign object damage (FOD) inspections only
- By policy, pilots are not authorized to perform maintenance on unit aircraft

**Recommendations**

- Although well intended, the above referenced policy is exceedingly restrictive in that, by policy, a pilot is prohibited from performing ANY maintenance on an aircraft, which would include replacing a light bulb or removing/replacing an aircraft door
- Perhaps rewriting the policy section may be warranted, to include which maintenance actions a pilot MAY perform when properly trained and authorized

5.1.6 Outsourced Maintenance (M) – Compliant

**Outsourced Maintenance:** If the unit outsources aircraft maintenance, the unit shall have a written policy assuring that the maintenance contractor, at a minimum, complies with all applicable maintenance standards in this section. Additionally, the unit shall appoint a unit member with knowledge of the maintenance contract requirements, to be responsible for oversight of the maintenance contractor. This individual shall conduct periodic audits of the maintenance performed by the contractor and at least annually, submit the findings of the audits to the unit commander. For the purpose of accreditation, the unit shall provide documentation verifying that the maintenance contractor is in compliance with the Standards as outlined in this section.

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit’s Director of Maintenance (DOM) has full responsibility to oversee maintenance that is outsourced to any maintenance vendor, overhaul facility or the OEM.
- The DOM verifies that the vendor to whom the work has been outsourced is remaining in compliance with the terms of its contract or to validate the quality and accuracy of the work performed.
- However, in making this observation, it was also noted that the Maintenance Section of the Ops Manual does not address the process of quality assurance of
all work performed on unit aircraft, whether external or performed internally, who is authorized to sign off work performed, certifications required to do so, or establishing the authority within the unit to return aircraft to service.

Recommendation

❖ Add a section to the Maintenance section of the Manual that addresses the duties and responsibilities associated with quality assurance as outlined above.

5.1.7 Operational Check Flights (M) – Compliant

Operational Check Flights: An operational check flight or return to service test flight shall be performed by a pilot appropriately trained and qualified to validate the maintenance that was performed and ensure that all results of the operational check flights are documented in the appropriate maintenance records.

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

• A Maintenance Officer is designated by duty position in the Operations Manual and has been trained to validate the maintenance performed on the aircraft.

Recommendations

❖ None.

5.2.0 Aircraft Maintenance Technicians/Engineers

5.2.1 Aircraft Maintenance Technicians/Engineer Requirements (M) - Compliant

Aircraft Maintenance Technician/Engineer Requirements: Maintenance technicians shall meet the following minimum requirements:

1. Maintenance technicians/engineers, not operating under an FAA/TC/NAA Repair Station Certificate, must possess at least a current Airframe and Powerplant (A&P) certificate (or equivalent in countries outside the United States). An Inspection Authorization (IA) certificate is strongly encouraged.

2. Maintenance technicians/engineers shall be trained to install, maintain, remove and replace any specialized equipment in accordance with the manufacturer’s maintenance standards.

3. Maintenance technicians/engineers shall receive annual formal training on human factors, maintenance error reduction and recurrent training on aircraft specific maintenance requirements.

4. Maintenance technicians/engineers should be factory trained (or equivalent) in an approved program on each type of aircraft they are required to maintain.

Findings
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- All maintenance technicians are A & P licensed mechanics and the DOM is IA certified and all have been trained and qualified to perform the duties they provide.
- There is no evidence of additional maintenance training provided to the maintenance staff in accordance with the PSAAC Standards, other than what is required to maintain their certifications.

**Recommendations**

❖ Include maintenance technicians in the unit’s annual recurrent training plan to receive additional training on mission specific equipment, OEM updates, human factors, and maintenance error reduction training.

### 5.3.0 Maintenance Facility

#### 5.3.1 Maintenance Facility (M) – Compliant

*Maintenance Facility:* The aircraft maintenance facilities shall be appropriately maintained and adequate to meet the maintenance needs of the unit. All of the following shall be verified:

1. **Appropriate ventilation shall be installed to clear the maintenance facility of hazardous fumes, such as solvents, oils, adhesives and cleaners, which are common to the aviation environment.**

2. **The hangar shall be maintained in a clean and orderly manner.**

3. **Hand cleaners, disinfectants, latex or latex free gloves, eye wash bottles/station and a well-equipped first aid kit shall be readily available. All unit members will know their locations.**

4. **A fire suppression system or an adequate supply of certified and current fire extinguishers, suitable for the types of fire hazards the unit is likely to encounter shall be readily available.**

**Findings**

The Aviation Unit is compliant with this Standard and the following is a summary of our findings:

- The maintenance facility at Ft. Lauderdale Executive Airport is adequate to meet the current needs of the unit but has reached its maximum capacity for the number and type of aircraft assigned.
- Sharing space with two other specialized units has taken away valuable storage space from the Aviation Unit that could be utilized for storage of spare parts such as rotor blades that currently are taking up space on the hangar floor.

**Recommendations**
❖ When feasible, find alternative space of at least one of the specialized units, thereby freeing up space to properly store high dollar aircraft parts and components.

5.3.2 Maintenance Distractions (M) – Non-Compliant

Maintenance Distractions: There shall be a written policy to reduce the likelihood of interruptions and distractions to the maintenance technician.

Findings
The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:
- There is currently no policy in place to avoid distractions and interruptions of mechanics actively engaged in maintenance

Recommendations
❖ Develop and implement a maintenance distraction policy for maintenance personnel as soon as practicable. This policy should include prohibitions against use of cell phones and intentional interruptions of maintenance activities by all personnel

5.3.3 Organizational Equipment, Parts, and Tools Storage (M) – Non-Compliant

Organizational Equipment, Parts, Tools and Specialized Tool Storage: Storage of equipment, parts, tools and specialized tools shall be secure, orderly and clear of fire hazards and in compliance with Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), appropriate national and local regulations. There shall be a written policy that covers inventory control procedures of equipment, parts and tools. All flammable materials shall be stored in a flame proof cabinet.

Findings
The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:
- Organizational equipment and special tools owned by the Aviation Unit are stored securely in the maintenance area of the unit’s hangar facility
- However, repair parts are not securely stored, nor have they been inventoried or controlled under a computerized inventory system. This system of spare parts storage is hazardous and does not meet industry and PSAAC standards.

Recommendation
❖ Completely renovate the spare parts storage area to make better use of the space available, and conduct a full inventory of all spare parts on hand.
❖ Purchase a computerized maintenance software program designed to track all maintenance activity and track the location number and condition of spare parts on hand.
Hire an Aircraft Inventory Supply Specialist responsible for managing the maintenance software program, inputting data, tracking, ordering, receiving, stocking, and distributing all spare parts in the unit’s inventory. This action requires immediate attention.

5.3.4 Inventory & Parts Control (M) – Non-Compliant

Inventory and Parts Control: There shall be a system in place to track time limited parts and expiration dates on shelf items.

1. All parts shall be properly tagged and environmentally protected.
   a. Parts shall be wrapped or boxed in a manner that prevents damage or contamination.
   b. Open ends of fabricated or bulk lines and hoses shall be capped or covered.
   c. Serviceable parts shall be kept in a separate area from unserviceable parts and tagged appropriately.
   d. A system shall be in place to segregate SAE and metric parts.

2. Parts shall be inspected to ensure that an approved vendor provided them and that the required certification documentation is included.

3. Parts shall be inspected for airworthiness acceptance prior to entering them into inventory.

Findings

The Aviation Unit is non-compliant with this Standard and the following is a summary of the findings:

- The Aviation Unit maintenance section has no system to record and track all spare parts to include those that have time limited shelf life.
- The DOM admits that the current system is broken and inefficient and does not provide an accurate accountability of parts on hand.
- The lack of accountability for spare parts is directly attributed to the lack of available man-hours required to perform such tasks due to the work demand of keeping three aircraft in service.
- There is no policy in place to direct the disposition of life limited parts once they have been timed out.

Recommendations

- Proper and accurate accountability of spare parts is a fundamental responsibility of a sound maintenance management program. The recommendations made above in the previous standard also apply here.

5.3.5 Tool Control Policy (M) – Non-Compliant

Tool Control Policy: There shall be a written tool control and inventory policy that ensures proper accountability of all special tools and individual technician tools.

Findings
The Aviation Unit is **non-compliant** with this Standard and the following is a summary of the findings:

- There is currently no policy in place requiring strict accountability of individual and/or special tools or a process of inventory control to ensure that all tools are properly accounted for and not inadvertently left on an aircraft.

**Recommendations**

❖ Each mechanic should have a shadow toolbox to verify the location of each tool. In addition to the shadow toolbox, a thorough inspection and tool inventory must be conducted after each phase of maintenance prior to releasing an aircraft for flight.

### 5.3.6 Tool Calibration (M) – Compliant

**Tool Calibration:** There shall be a method to maintain and track tool calibration status consistent with the tool manufacturer’s requirements and Federal Aviation/Canadian Aviation/NAA Regulations. The policy shall include, but not be limited to:

1. Tools, which require calibration, shall have documentation or tags on the tools that list the last calibration date and the next calibration date.
2. A system to ensure that employee owned tools are currently calibrated.
3. Tools not in calibration shall be segregated from all other tools to ensure that they are not utilized for aircraft maintenance.

**Findings**

The Aviation Unit is **compliant** with this Standard and the following is a summary of the findings:

- The Aviation Unit’s tools requiring calibration are tagged and the record of calibration is maintained by the maintenance staff.
- Individual technician tool calibration is also maintained by the unit and documented in the maintenance system data base.
- Although this is a verified practice of the Aviation Unit, there is no policy that covers tool calibration in the Operations Manual.

**Recommendations**

❖ Continue the current practice of maintaining compliance with tool calibration requirements; however, include in the Operations Manual a policy that requires accountability of tool calibration activities and record keeping.
❖ In the absence of a DOM, the Aviation Unit supervisor should conduct spot checks routinely of tool calibration records to ensure compliance with calibration requirements.

### 5.4.0 Aircraft Maintenance Records

#### 5.4.1 Aircraft Maintenance Records (M) - Compliant
**Aircraft Maintenance Records:** There shall be a written policy that assigns responsibility for maintaining aircraft maintenance records. Logbook entries shall be made in accordance with the Federal Aviation/Canadian Aviation/NAA Regulations.

**Findings**
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- Aircraft logbooks, work orders, historical records, and general paperwork are all being maintained to industry standards by the DOM
- The unit is also providing an electronic maintenance tracking system for all aircraft, which allows for accurate maintenance tracking, planning and forecasting

**Recommendations**
❖ Update the current maintenance and parts tracking program to ensure all maintenance is properly recorded and time limited parts, inspections and TBOs are tracked accurately

**5.4.2 Maintenance Discrepancy Reporting (M) – Compliant**

**Maintenance Discrepancy Reporting:** There shall be a written policy that outlines procedures for reporting aircraft discrepancies or “squawks”, taking aircraft out of service, tracking repairs and providing feedback to reporting persons. The policy must also mandate that discrepancy reporting comply with Federal Aviation/Canadian Aviation/NAA Regulations and/or applicable military maintenance standards

**Findings**
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- The ASU has incorporated a policy in the Operations Manual under Section 3.16.1 to document and report all aircraft maintenance discrepancies
- If the aircraft discrepancy is a grounding condition, a notification policy is in place to alert the unit supervisor and DOM of the grounding condition

**Recommendations**
❖ None

**5.4.3 Deferred Maintenance (M) – Compliant**

**Findings**
The Aviation Unit is compliant with this Standard and the following is a summary of the findings:

- There is a practice is in place to defer some maintenance items, to include maintenance inspection overflights.
Recommendations

❖ Develop a clear policy on deferred maintenance practices and seek input from the maintenance staff in the development of this policy.

❖ Part 135 maintenance requirements are very specific in this area and should be incorporated into the maintenance section of the Operations Manual as a matter of policy

5.5.0 Maintenance Requirements for Specialized Mission Equipment

5.5.1 Specialized Mission Equipment Maintenance (M) – Compliant

Specialized Mission Equipment Maintenance: Units shall have a policy that ensures that all special mission equipment is inspected and maintained in accordance with the prescribed guidance issued by the manufacturer, FAA or other regulatory authority. The following are examples of special mission equipment:

1. Hoists, including all components (cable, hook, etc.)
2. Cargo Hooks and redundant/secondary systems
3. Multi-Sensor Camera Systems
4. Night Vision Goggles
5. Night Vision Imaging Systems, including aircraft lighting.
6. Life Safety Equipment (short haul, ropes and rappel equipment; restraint straps, flotation devices, etc.)

Findings

The Aviation Unit is compliant with this Standard and the following is a summary of our findings:

- The maintenance staff ensures proper maintenance and inspection of all special mission equipment to include thermal imagery cameras, searchlights and night vision goggles
- The policy requires that this special equipment be maintained in accordance with manufacturer requirements and guidelines

Recommendations

❖ None
## Final Tabulation

<table>
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<tr>
<th>Unit</th>
<th>Admin</th>
<th>Operations</th>
<th>Safety</th>
<th>Training</th>
<th>Maintenance</th>
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<tr>
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<td>85%</td>
<td>88%</td>
<td>31%</td>
<td>50%</td>
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**Overall Assessment**

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<tbody>
<tr>
<td>BSO Aviation Unit</td>
<td></td>
</tr>
</tbody>
</table>
Exhibit E: Summary & Conclusions

The Broward Sheriff’s Office Aviation Unit is very well run. It was clearly evident that the members of the Aviation Unit take great pride in their unit and the services they provide to the deputies and citizens of Broward County. I was particularly impressed with the cooperative and appreciative attitude displayed by Sergeant Christine Ponticelli when suggestions or recommendations were made to improve the unit.

I was also impressed at what I perceive to be a healthy unit culture of safety; however, serious consideration must be given to separating the unit’s two mission responsibilities, DLE and Air Rescue, to maximize the air unit’s effectiveness, but also assign deputy sheriffs as TFOs to perform the law enforcement mission in support of the deputies on the ground. All of these observations weighed heavily in my recommendations to determine the best course of action for the unit.

As I mentioned in my report, the current EC135 model helicopter operated by the Aviation Unit is capable of adequately serving the needs of a single Air Rescue mission, provided it is configured properly and is an updated variant. If a decision is made to split the mission, the best course of action is to obtain two single-engine helicopters to perform the DLE mission, and sell or salvage the oldest EC135 and EC130B4. The remaining two EC135s can adequately serve the needs of the Air Rescue mission for the next two or three years; however, they will need to be replaced soon in order to meet the needs of Air Rescue if that mission is continued.

Based on interviews with members of the Aviation Unit, I conclude there is tremendous pride in the work being done by the unit and an impressively strong desire to serve the community and assist their fellow deputies on the street. I strongly urge agency executives to take all necessary steps to keep this unit vital and to grow its capability and usefulness to the citizens and deputies it is committed to support.

Jim Di Giovanna, Owner/Principal Consultant
Law Enforcement Aviation Consultants, LLC
On behalf of the Airborne Law Enforcement Association
## Exhibit F: Glossary of Terms

1. **Accident** – Any occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which any person suffers fatal or serious injuries as a result of being in or upon the aircraft or anything attached thereto or the aircraft receives substantial damage. (NTSB Part 830)

2. **AC** – Advisory Circular

3. **AD** – Airworthiness Directive

4. **ADM** – Aeronautical Decision Making

5. **Aided Flight** – The use of Night Vision Goggles while flying in dark environments

6. **A & P** – Airframe and Powerplant Mechanic

7. **ASTM** – American Society for Testing and Materials

8. **ATC** – Air Traffic Control

9. **CAR** – Canadian Air Regulations

10. **CFI** – Certificated Flight Instructor

11. **CRM** – Crew Resource Management

12. **EMS** – Emergency Medical Services

13. **EPA** – Environmental Protection Agency

14. **FAA** – Federal Aviation Administration

15. **FAR** – Federal Aviation Regulations

16. **FLIR** – Forward Looking Infrared

17. **FOD** – Foreign Object Debris, or Foreign Object Damage

18. **HAZMAT** – Hazardous Material

19. **HMS** – Helmet Mounted Systems

20. **IA** – Inspection Authorization

21. **IAW** – In accordance with

22. **ICAP** – Interagency Committee for Aviation Policy

23. **ICS** – Intercom System

24. **IFR** – Instrument Flight Rules

25. **IIIMC** – Inadvertent Instrument Meteorological Conditions

26. **IMC** – Instrument Meteorological Conditions
27. **Incident** – An occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operations.

28. **(M)** – Compliance is mandatory.

29. **Mishap** – A general term used to include both accidents and incidents

30. **NFPA** – National Fire Protection Association

31. **NTSB** – National Transportation Safety Board

32. **NVG** – Night Vision Goggles

33. **NVIS** – Night Vision Imaging Systems

34. **OIC** – Officer-in-Charge

35. **OSHA** – Occupational Safety and Health Administration

36. **PFD** – Personal Flotation Device

37. **PIC** – Pilot-in-Command

38. **POH** – Pilot Operational Handbook

39. **(R)** – Compliance is recommended

40. **SAE** – Society of Automotive Engineers

41. **Shall** – Requires mandatory compliance with the standard

42. **Should** – Compliance is recommended

43. **SMS** – Safety Management System

44. **STDS** – Standards

45. **TFO** – Tactical Flight Officer. The crewmember whose duties are typically associated with the non-flying tactical operations of the aircraft.

46. **TC** – Transport Canada

47. **Unaided Flight** – Not using Night Vision Goggles during flight in dark environments

48. **Unit Commander** – Individual who has command responsibility of the unit whether directly assigned to the unit or remotely assigned and having overall responsibility for several units.

49. **Unit Manager** – Individual directly assigned to the unit who has managerial responsibility for the aviation unit, but answers to a Unit Commander who is remotely assigned.

50. **Unit Supervisor** – Individual(s) directly assigned to the unit who oversee the day-to-day operation of the aviation unit.

51. **VFR** – Visual Flight Rules
JAMES A. DI GIOVANNA

James (Jim) Di Giovanna is recognized as an expert in aviation law enforcement by the Airborne Law Enforcement Association and the National Transportation and Safety Board. As one of the founders and currently the Chief Executive Officer of the Public Safety Aviation Accreditation Commission, he participated in the development of standards for airborne law enforcement, aerial firefighting and airborne search and rescue units. Mr. Di Giovanna continues to assist agencies in the U.S. and abroad in assessing and developing their aviation safety, unit management, and training programs in addition to conducting safety audits and internal investigations.

Mr. Di Giovanna is a career law enforcement officer and military aviator specializing in assessing and mitigating operational risks for airborne law enforcement units worldwide. As the owner of Law Enforcement Aviation Consultants, LLC, Mr. Di Giovanna has consulted agencies in the U.S. and abroad on a variety of aviation safety, unit management and aviation training issues.

He currently conducts loss prevention aviation safety audits for a major U.S. based aviation insurance underwriter, and is senior consultant for the Airborne Law Enforcement Association’s Technical Assistance Program.

Professional Experience:

- Chief Executive Officer, Public Safety Aviation Accreditation Commission, 2015 – Present
- Loss Prevention Consultant, QBE North America, Inc. Insurance Underwriters, 2012 – Present
- Member, International Association of Chiefs of Police (IACP), Aviation Sub-Committee, 2014 – Present
- President, Airborne Law Enforcement/Public Safety Aviation Accreditation Commission, 2007 – 2015
- Director of Education, Training and Special Programs for Airborne Law Enforcement Association, 2002 – 2012
- Captain (Retired), Los Angeles County Sheriff’s Department, 1971 - 2006; Unit Commander, Aero Bureau 17+ years
- Colonel (Retired), United States Army, California Army National Guard and US Army Reserves, 1966-2001; Master Army Aviator.

Education and Training

- Mr. Di Giovanna’s education includes a bachelor’s degree in Criminal Justice and Public Administration as well as certification in Aviation Safety and Systems Management from the University of Southern California and the U.S. Army’s School of Aviation Safety and Accident Prevention. He is also trained and certified as an Aviation Lead Auditor through ARGUS/PROS, Denver, CO.
Curriculum Vitae

- Advisor to Abu Dhabi National Police Air Wing, 2012 – 2016 (through Lexington Group), and Botswana National Police, 2010
- Co-authored and instructed the All Hazards Aviation Group Supervisor Course and the Introduction to Air Operations Course for FEMA.
- Past President of the California Professional Helicopter Pilots Association (PHPA) and in that capacity served on a variety of commissions and committees, including the ad hoc public service aircraft subcommittee to establish guidelines for public service and media aircraft
- Co-authored and instructed the Airborne Law Enforcement Association’s Unit Manager’s Course, serving as lead instructor for over ten years
- Authored the Military Aviation Support to Civilian Authorities Class and was charter instructor for the Counterdrug Manager’s Course, National Interagency Counterdrug Institute (NICI), San Luis Obispo, CA

Pilot Certificates and Ratings

- Commercial Pilot, Rotorcraft; Instrument; Type Rated, SK-58 (VFR)
- Over 5700 hours as pilot-in-command, helicopter

Awards

- International Association of Chiefs of Police Individual Excellence Award for excellence in police aviation – 2012
- Los Angeles County Sheriff’s Department Distinguished Service Award for 35 years of outstanding and distinguished service to the residents of Los Angeles County, the County of Los Angeles and to the Sheriff’s Department – 2006
- The Order of California, the highest award given to a member of the California National Guard, for exceptionally meritorious service over a period of 35 years in a series of increasingly challenging and responsible command and staff positions culminating as the Director of Army Aviation and Safety for the State of California and Army National Guard – 2006
- Commendation and Scroll from the Los Angeles County Board of Supervisors for outstanding performance as law enforcement administrator and personal and professional integrity during 35 years of service – 2006