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SHARING PUBLIC SAFETY HELICOPTERS

HENRY H. PERRITT, JR.*
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CHRISTOPHER L. CUE***

TABLE OF CONTENTS

I. INTRODUCTION ........................................... 503
II. COMPARISON OF ALTERNATIVE MEANS FOR MANAGING PUBLIC SAFETY INCIDENTS ...... 504
III. MISSION PROFILES ........................................... 508
   A. LAW ENFORCEMENT ........................................... 509
      1. Patrol ............................................... 510
      2. Barricaded Subjects .............................. 514

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3. Surveillance .................................................. 515
4. Collecting Evidence ........................................ 517
B. Search and Rescue ........................................... 517
C. Natural Disaster Relief ..................................... 518
D. Personnel Insertion and Extraction ....................... 519
E. Limitations on Flight Profiles .............................. 523
F. Watertown, Massachusetts: A Case Study ................ 524

IV. RESOURCE REQUIREMENTS ................................. 529
A. Aircraft ....................................................... 529
B. Equipment ..................................................... 532
1. VHF and UHF Radios Capable of Communicating on Public-Safety-Agency Frequencies .......... 533
2. Geospatial Mapping Software ................................. 534
3. High-Intensity Searchlight .................................. 536
4. High-Resolution Color and Infrared Cameras, Gimbled and Attached to the Nose of the Helicopter .......... 537
C. Personnel ....................................................... 538
1. Aircrew .......................................................... 538
2. Training of TFOs and Ground Personnel ................. 540

V. ORGANIZATIONAL ALTERNATIVES ............................. 542
A. Owning and Contracting ...................................... 542
B. Market Structure and Contract Operations .................. 546
C. ENG and Public Safety ........................................ 551
D. Mutual Aid Pacts .............................................. 553
E. State and County Helicopter Units ......................... 556
F. The AIR-ONE Model ............................................ 556

VI. EXTENDING THE AIR-ONE MODEL AND OVERCOMING OBSTACLES ........................................ 559
A. Determinants of Success ...................................... 560
1. Integration of Air and Ground Forces ....................... 560
2. Building Support in the Public-Safety Community ........ 560
B. Fear of Liability ................................................. 562
1. Sources of Liability From Using Helicopters and From Failing to Use Them ................................. 562
2. Immunity ......................................................... 569
3. Insurance ......................................................... 570
C. Labor Markets: Establishing a Pipeline for Qualified Personnel ........................................ 574
1. Engines and Limits of Volunteerism ................. 574
I. INTRODUCTION

HELICOPTERS CAN PROVIDE unique support for various kinds of public-safety activities.1 Best practices from California and other states raise the specter of liability for public-safety agencies that do not use helicopter support; yet most public-safety agencies cannot afford helicopter support services.2 Deploying helicopters to support multiple agencies on a shared basis, in addition to overcoming a cultural bias in the pilot community against smaller helicopters, would help fill the gap.

As in most areas of human endeavor, the law does not determine how helicopter technology can enhance public safety; imagination, creativity, entrepreneurship, and politically astute pragmatism are the engines of integrating technology with reality. The law, however, shapes the result by providing mechanisms for cooperation and, when well-conceived, incentives to use best available technology.3 This precept is true with respect to helicopter support for public-safety activities. The law offers structures for sharing expensive aviation assets, and it may provide incentives for using helicopters.4

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2 Some 18,000 state and local law enforcement agencies exist in the United States. Half employ ten or fewer sworn officers. Local Police, Bureau Jus. Stat., http://www.bjs.gov/index.cfm?ty=tp&tid=71 (last visited Oct. 17, 2014) (summarizing statistics). Communities with smaller populations obviously have less tax revenue to support any of their operations. Id.
AIR-ONE Emergency Response Coalition, a volunteer organization that provides helicopter support for public safety agencies in northern Illinois and southern Wisconsin, represents an attractive model for making helicopter assets more widely available.\(^5\) It demonstrates what is possible when proponents of enhanced public-safety are willing to consider new approaches and when passionate, effective advocates educate the public and the public-safety community.

This article begins by explaining how helicopters aid tactical public-safety operations, including law enforcement, search and rescue, and disaster response management. It evaluates organizational alternatives for making helicopters available on a shared basis and suggests ways to lower perceived barriers in Illinois and elsewhere. It concludes that sharing is possible almost anywhere; that smaller, cheaper, helicopters can do the job; and that flexibility is necessary to ensure a continuing supply of pilots.

The authors, two of whom are helicopter pilots, and one of whom is a Marine Corps reservist who drills with individuals trained in ground control of air assets, have had several discussions with the leadership of AIR-ONE and have participated in AIR-ONE tactical training missions. They have spoken with helicopter manufacturers, law enforcement, and Emergency Medical Services (EMS) personnel all over the country, as well as ridden on airborne patrol missions with the Los Angeles and the Fontana, California, police departments.\(^6\)

II. COMPARISON OF ALTERNATIVE MEANS FOR MANAGING PUBLIC SAFETY INCIDENTS

Helicopters play a supporting role to ground resources.\(^7\) Public-safety ground forces offer the advantage of physical proximity. Police personnel can effect physical restraint and apprehend suspects when they get close enough. They can immediately administer medical treatment to a victim of an accident, criminal attack, or natural disaster. Helicopters cannot do some of these things, but they can bring first responders to the scene faster than other means of transportation.

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\(^6\) See infra notes 41, 45.

But ground forces have limited mobility. Police officers on foot may not be able to outrun a fleeing individual; they may lose sight of their target as the target runs around corners, jumps over fences, or hides behind walls or bushes. On foot, officers cannot chase down vehicles. Ground vehicles offer the advantage of faster speeds, but they are seriously limited in their mobility, being confined to streets, alleys, and off-road terrain relatively free of obstacles. Their visual field is only slightly better than personnel on foot. Pursuing fleeing vehicles creates risks to police officers and the general public.

Helicopters easily overcome these limitations. Helicopters can fly at 130 miles per hour over traffic jams, or they can fly slowly to keep pace with a suspect fleeing on foot. They can land and take off from a place slightly larger than the dimensions of the helicopter. Helicopters are expensive, however.

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9 See generally id.
10 See generally id.
11 See generally id.
13 Both fixed-wing aircraft (airplanes) and helicopters can be invaluable adjuncts to ground-based public-safety operations, but their characteristics make them useful for different purposes. Airplanes fly faster and are better for longer-range missions. Helicopters can fly slower, down to a speed of zero (a phenomenon known as “hovering”), and are better for missions that require staying close to a scene. See Power, supra note 7 at 81, 83. Airplanes stay in the air because their wings generate lift proportional to their forward speed. Below certain speeds, an airplane wing “stalls.” When a wing stalls, air stops flowing smoothly over it, and it no longer generates lift. A stall has nothing to do with the engine quitting. Helicopters generate lift by spinning their rotors. Thus, they can fly at any speed and hover (remain stationary while flying) as long as the engine is turning the rotor.
16 Helicopter operating costs are high. See infra Part IV.A for a chart showing helicopter operating costs. Costs for fixed-wing aircraft used in public safety missions range from $140 to $190 per hour. See Aircraft Operating Costs & Aviation Services, Conklin & De Decker Aviation Info., https://www.conklindd.com/CDALibrary/ACCostSummary.aspx (last visited Oct. 17, 2014) (listing table of values computed by commercial aircraft evaluation service). Fuel costs alone are $325 to $965 per hour using the fuel consumption figures from the comparison chart and a jet A fuel price of $6.78 per gallon. Helicopters have high acquisition and maintenance costs. The state of Ohio estimates the cost of a 100-hour inspection for an AS350 at $4,541, and the cost of a 500-hour inspection at $10,180.
Ultimately, drones may displace manned helicopters for some law-enforcement patrol support because of their lower cost, but this is unlikely to happen any time soon. Use of law-enforcement drones raises vigorously debated questions about flight safety, privacy, and security.

Inherent limitations will always offset lower cost. For one thing, drone safety and utility requires maintaining the integrity of a line-of-sight wireless link. It is one thing if the ground con-

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17 The general perception is that drones will be much cheaper to purchase and operate than manned aircraft. Identifying credible prices is difficult, however, because the civilian drone industry is in its infancy. One vendor of very small rotary-wing drones with payload capability less than 1.5 kg and endurance times on the order of thirty minutes publishes prices from $20,000 to $40,000 for complete systems, including the ground control console. "Purchase a Microdrone Platform at Microdrones," Microdrones, http://www.microdrones.com/purchase/purchase-a-microdrone-platform-at-microdrones.php (last visited Oct. 9, 2014). A U.S.-based vendor of a roughly equivalent machine prices their machine at $1,200, but that vendor aims at the hobbyist/consumer market. "Buy Phantom 2 Vision," DJI Innovations, http://www.dji.com/product/phantom-2-vision/ (last visited Oct. 9, 2014). Another U.S. vendor that aims at the industrial market belittles hobbyist competitors and quotes prices of $55,000 for a fixed-wing vehicle. "FALCON UAV, Prices – Falcon Unmanned," http://www.falcon-uav.com/falcon-prices/ (last visited Oct. 9, 2014). Any estimate of operating cost would be entirely speculative, however, because too little is known about regulatory requirements, operator qualifications, and labor markets.


19 Villansenor, supra note 18, at 473–75 (explaining unique safety concerns associated with drone operations).

20 See id. at 457 (predicting that drones will "dominate the future of aviation" and analyzing safety and privacy issues); id. at 461–68 (reviewing unmanned aircraft systems technology and its history).

21 See id. at 467 (claiming law enforcement drone operating costs of $25 per hour). It is too early to tell whether drone acquisition cost will be lower. Part IV.A discusses helicopter costs.

22 See Micah Zenko, Ten Things You Didn’t Know About Drones, Council on Foreign Rel., (March/April 2012), http://www.cfr.org/drones/ten-things-you-didnt-know-drones/p27497 (reporting that drones tend to crash frequently,
controller loses communication with a military drone flying over contested enemy or ungoverned territory—the drone simply crashes, and property damage or injuries resulting from the crash can be chalked up to "collateral damage" in an armed conflict. That result would hardly be the case if a law-enforcement drone was flying over a congested area of New York, Dallas, or Chicago when communication was lost. It is very difficult to ensure 100% integrity of wireless links with moving aircraft.

Moreover, maintaining traffic separation among drones and manned aircraft is a problem yet to be solved.

Use of manned helicopters by public-safety agencies is well accepted; public controversy and the difficulty of developing an appropriate regulatory framework for drones are likely to delay their widespread deployment in public-safety applications. Eventually, however, the Federal Aviation Administration (FAA) will permit drone operations from relatively low heights when they are kept within the view of the operator and when line-of-sight radio communication is maintained. Under those restrictions, a ground-based law-enforcement unit with a skilled drone operator attached could launch a rotary-wing drone to operate often due to lost data links). "Line of sight" means that a drone's radio antenna must be within a straight line from the ground station antenna. Over-the-horizon communications are not possible.


Anyone who flies electronic news gathering (ENG) helicopters can attest to that. Co-author Sprague regularly operates the camera and downlink equipment on ENG helicopters, and deals with lost links often. Radio control links can be made more robust. Communications designs used for space-system control can be adapted to drone control, although two major challenges would need to be addressed. First, the data rate required to control space systems is small compared to the data rate needed to transmit the necessary signals to control an aircraft—particularly a rotary wing aircraft. The data rate for image transmission back to the control station is similar; it depends not on whether the system is flying in space or the atmosphere, but rather on the desired image resolution and frame rate. The line-of-sight restriction for most aircraft communication is not a problem for spacecraft because the line of sight is virtually infinite.

See Integration of Civil UAS, supra note 18, at 17–19.


Integration of Civil UAS, supra note 18, at 6.

Id. at 56–58.
in the immediate area of a barricade situation. If equipped with
color and infrared imaging, the drone could search an area too
hazardous for ground personnel, or an area obscured by struc-
tures, foliage, or terrain. But this is a far cry from drones flying
patrol over a major part of Lake County, Illinois, or the northern half of Los Angeles. Drones are incapable of missions re-
quiring insertion or extraction of personnel and cargo. For
now, drones are, at most, a supplement to ground-based public-
safety missions, although this will probably change over the next
five to ten plus years.

III. MISSION PROFILES

Three basic types of public-safety activities can benefit from
helicopter support: law enforcement, search and rescue, and


disaster relief. Equipment and flight profiles differ according to the mission type, although some common themes exist. This section analyzes the most common types of public-safety operations in which helicopter support may be useful. In each case, the analysis offers guidance on best practices and illustrates details of how helicopters can provide support. In all cases, aircrew familiarity with ground features is essential. When advance planning for a specific mission is infeasible, the Tactical Flight Officer (TFO) and pilot use enroute time to familiarize themselves with street names and major features on the ground. Inbound aircrews can get much of the geographic information they need from listening carefully to tactical ground communications while they are inbound.

A. LAW ENFORCEMENT

Law-enforcement missions comprise three broad types: patrol, incident response, and barricade situations. Only barricade and incident-response situations involve military-style hierarchical command-and-control. In most law-enforcement operations, the first responder unit is in charge.

32 Emergency medical services helicopter support is usually provided by non-governmental hospitals in cooperation with private contractors. Aviation & Operation Support, supra note 1.


34 Kevin Means, Tactical Helicopter Missions: How to Fly Safe, Effective Airborne Law Enforcement Missions 40, 55 (2007) (suggesting the TFO and the pilot become familiar with street names before the helicopter arrives on station).

35 Schonely, supra note 8, at 46.

36 See generally id.

37 While the civilian public-safety context is significantly different from the military context, what the Army and Marine Corps have learned can be given consideration and adapted to certain civilian contexts. Good police officers work on their own or in pairs and must utilize a wider range of discretion than individual soldiers. See Means, supra note 34 (detailing various law enforcement operations, few of them depending on “incident commanders” and command posts). Some public-safety missions, however, such as SAR, fire suppression, mass shooter incidents, and natural disaster relief, do benefit from hierarchical organization. In such situations, Army and Marine Corps doctrines can teach important lessons about effective deployment of civilian helicopters.

38 Anne C. Goldbach, Crime Scene Investigation, in TRYING MURDER AND OTHER HOMICIDE CASES IN MASS. 5-1 (2013).
1. **Patrol**

The best way for a helicopter to provide support for routine law-enforcement activity is for the helicopter to be airborne and act more or less as a patrol car. This provides immediate availability to detect suspicious persons, to aid ground-based units in stopping and questioning such persons, or to catch suspects fleeing from a crime scene. When helicopters are not already in the air, utility of helicopter patrol support depends on readiness of the crew and the time it takes them to get the helicopter airborne. Kevin Means articulates basic rules of thumb for helicopter patrol.

According to Means, patrol helicopters should not hover. Hovering impairs sightlines for the TFO and pilot, makes the activities of the helicopter more obvious to subjects, and raises safety concerns. Instead, Means recommends that patrol helicopters fly at or above 500 feet above ground level (AGL), and at speeds of fifty to sixty knots. Pilots should adjust orbits so that the legs from which the subject is obscured—for example, by buildings or other obstacles—are flown faster, maximizing dwell time on the legs from which the subject can be seen. Further, pilots should set up orbits so that they have an appropriate horizontal offset: typically one-to-one and a half blocks. Appropriate offsets, combined with the right speed and altitude, result in an ideal sight angle of about sixty degrees.

Actual airborne patrols in Los Angeles and Fontana, California, validate most of Means’ precepts, although experience calls

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41 On December 20, 2013, co-author Perritt, Captain David Faulkner of the Fontana Police Department, and four other members of the Fontana helicopter team, were discussing the air support operation in the small suite of offices adjoining the hanger. A radio call came over the hailing channel requesting helicopter support for ground units responding to an armed robbery of a retail store. The R66 parked on the ramp had already been preflighted. The helicopter was in the air in less than six minutes, and over the scene in another five minutes. The pilot initiated an orbit to gain an understanding of what kind of perimeter had been set up and to get a better description of the getaway car.

42 Means, supra note 34.

43 The “leg” of an orbit is one side, e.g., the upwind side.

44 Means also offers detailed protocols for effective helicopter use in vehicle chases, both high-speed and low-speed. See Means, supra note 34, at ch. 7.
into question his more ambitious assertions about reliance on infrared imagery.\textsuperscript{45}

The Los Angeles Police Department (LAPD) is an exemplar of using helicopters as airborne patrol cars. The LAPD has nineteen helicopters.\textsuperscript{46} They serve as force multipliers.\textsuperscript{47} The LAPD has two helicopters in the air twenty hours a day, with one on standby from 4 AM to 8 AM.\textsuperscript{48} The aircrew, comprising a pilot and a TFO, monitors the citywide “K-9,” the dispatch, and the car-to-car frequencies of each division\textsuperscript{49} it flies over.\textsuperscript{50} Calls

\textsuperscript{45} On December 19, 2013, co-author Perritt flew an airborne patrol in an LAPD AS350B2 equipped with a FLIR camera, NightSun, moving map display, and binoculars. The helicopter launched at its usual time of 4 PM with its pilot, TFO, and Perritt aboard. The crew monitored both the city-wide “hailing” radio channel and discrete division frequencies as the helicopter flew across division boundaries. During the mission, the helicopter responded to a reported burglary in progress, assisted in setting up a perimeter, and searched the neighborhood. The helicopter assisted with a rooftop search in another part of the city, flew the high part of a high-low mission over a barricaded suspect, and monitored traffic stops. On December 20, 2013, co-author Perritt flew a mission with the Fontana, California, Police Department, during which the helicopter searched for a vehicle fleeing the scene of an armed robbery, monitored ground officer safety during traffic stops, and watched for suspicious activity by pedestrians and vehicles.


\textsuperscript{47} See id. The LAPD has a total of 8,000 sworn officers: 17.1 per square-mile and 2.1 per thousand population. Chicago has 13,000 sworn officers: 57.3 per square mile and 4.6 per thousand population. New York has 36,000: 118.8 per square mile and 4.3 per thousand population. In 2008, New York had 36,000 sworn officers, Chicago had 13,000, and Los Angeles had 8,000. BRIAN A. REAVES, U.S. DEPT OF JUSTICE, CENSUS OF STATE AND LOCAL LAW ENFORCEMENT AGENCIES, 2008 14 (2011). In 2008, the population of New York was 8.3 million, Los Angeles was 3.8 million, and Chicago was 2.8 million. Largest US Cities by Population, Biggest U.S. Cities, http://www.biggestcites.com/2008 (last visited Oct. 9, 2014). New York’s area is 303 square miles, Los Angeles is 469, and Chicago’s is 227. U.S. CENSUS BUREAU, COUNTY AND CITY DATA BOOK: 2000 1, tbl. C-1 (2000), available at http://www.census.gov/statab/ccdb/cit1010r.txt.


\textsuperscript{49} An LAPD division is a geographic area that might be called a “precinct” in New York or Boston and “district” in Chicago.

for a burglary-in-progress, reports of shots fired, or other instances that helicopter support may aid cause the aircrew to respond on its own initiative. In some cases, the dispatcher for a division relays a request for helicopter support; more often, a patrolman in a ground unit simply asks over his car-to-car frequency, “Airship, can you come and search some rooftops?” and gives the location.

When a more serious crime requires support, another helicopter may divert from its usual patrol area, and the two helicopters fly a high/low pattern: one flying at 300 to 400 feet AGL, the other flying at 1000 feet AGL, and both using searchlights if it is at night time. When not involved in a particular call, the helicopter crew decides, just like a ground patrol unit would, where it should patrol: “Let’s see what’s going on down Crenshaw,” or “Let’s check out the projects.” When the helicopter sees a traffic stop, it orbits to determine whether the officer involved is in jeopardy. Considerable detail can be observed from 400 to 500 feet AGL. Even an untrained person would have no difficulty spotting anomalous behavior by vehicle or pedestrian.

As the helicopter patrols, moving between particular missions, the pilot may vary the helicopter’s height AGL and speed as necessary to enhance safety and mission effectiveness and typically flies faster at lower altitudes and increases height when lower

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51 See History of the Air Support Division, supra note 46.
52 The Chicago Police Department (CPD) follows the LAPD model but on a much smaller scale—Chicago has only two helicopters. Chicago also does not have crews on duty 24/7. It operates two shifts on weekdays (8 AM to 4 PM and 8 PM to 2 AM), and one shift on Saturday and Sundays (8 PM to 2 AM). The goal is to have at least one of the helicopters in the air during peak activity. Six of Chicago’s twenty-five police districts account for 85% of crime. Typically one of the CPD helicopters patrols one of these high crime areas while the pilots listen to the frequencies that serve the relevant police districts. The CPD groups its radio frequencies geographically, and two adjacent districts typically share the same frequencies and dispatcher. Interview with Sgt. Fred Harnisch (Nov. 13, 2013).
53 See Means, supra note 34, at 25.
54 See History of the Air Support Division, supra note 46.
57 Id.
speeds are appropriate.\(^{58}\) Little hovering is necessary; as Means argues, orbiting enhances perception of ground-based targets and reduces the likelihood that a structure or a terrain feature would obstruct visibility of a target.\(^{59}\)

The Los Angeles and Fontana missions provided an opportunity to bracket the operating environment—Los Angeles is obviously much bigger than Fontana and has a considerably larger air-support operation.\(^{60}\) Los Angeles flies larger turbine helicopters,\(^{61}\) Fontana flies one of the smallest turbine helicopters and a piston-engine helicopter.\(^{62}\) Nevertheless, only modest differences between the Fontana mission and the LAPD mission were apparent.\(^{63}\) For example, the Fontana TFO’s intimate familiarity with the local geography made reliance on the moving map displays less necessary.\(^{64}\) The TFO almost never referred to it. Otherwise, the Fontana and LAPD missions were flown similarly with respect to the use of the onboard equipment as well as the flight profiles of the helicopters.\(^{65}\)

In neither city was formalized, military-style, command-and-control necessary.\(^{66}\) Street officers, as they usually do, worked quickly as individuals—coordinating as necessary—without having to take the time to deploy command centers and designate incident commanders.\(^{67}\) Ground units and the helicopter air-crew communicated directly, understood each others’ needs and capabilities, and took appropriate action.\(^{68}\) The same technique worked well even when multiple ground units were on the scene—such as during a burglary situation in Los Angeles and a robbery in Fontana.\(^{69}\) In every circumstance, the helicopter crew assisted in coordinating ground crew placement and activities


\(^{59}\) Id. As the sergeant in charge of the CPD helicopters said, “We don’t need to hover. Everything is in the camera.”

\(^{60}\) See History of the Air Support Division, supra note 46.


\(^{62}\) See supra note 45.

\(^{63}\) Id.

\(^{64}\) Id.

\(^{65}\) Id.

\(^{66}\) Id.

\(^{67}\) Id.

\(^{68}\) Id.

\(^{69}\) Id.
quickly, efficiently, and without argument. By tradition, the first responding unit remained in charge of directing backup units. Philosophies differ on mission altitudes. The LAPD prefers flying low: 500 feet AGL or lower. Chicago, AIR-ONE, and San Diego prefer to fly higher: at least 1000 feet AGL for Chicago, and 600–1000 feet AGL for AIR-ONE. The dominant considerations are greater exposure to ground fire and higher risks if an engine fails at lower altitudes compared to generally better visibility and situational awareness at higher altitudes. With forward looking infrared cameras (FLIR) that sense infrared radiation and a skilled operator, heights of 700 AGL or greater and horizontal offsets of a mile or more still allow acquisition of very detailed images.

2. Barricaded Subjects

Situations in which the subject is stationary and has barricaded himself, as in an active shooter or hostage situation, require a higher degree of organization than patrol functions. A larger number of ground forces must be deployed effectively, and helicopter operations must be integrated with the ground operation. It is here that effective command-and-control is important.

While well-defined perimeters are important in many law-enforcement support operations, they are especially important in

70 Id.
71 Id.
74 AIR-ONE EMERGENCY RESPONSE COAL., INC., PIC TRANSITION SYLLABUS 11–13 (rev. ed. Sept. 29, 2011) [hereinafter PIC SYLLABUS]. AIR-ONE altitudes include the following: 600 to 1000 feet for FLIR searches for stationary objects; 500 to 600 feet for vehicle pursuits; and 400 to 600 feet AGL for foot pursuits. Id. at 11–13.
75 AIR-ONE directs certain lateral offsets and 40 to 60 knots orbit speed, and cautions against hovering. These offsets occur at 1.5 to 2 blocks for non-urgent calls and 0.75 to 1.5 blocks with “proportionate airspeed” for FLIR searches for stationary objects. Id. Lateral offsets are maintained to the right or left of a vehicle being pursued and behind the vehicle at a speed matching the vehicle’s; the caveat “all turns to the left and no hovering unless necessary” is repeated for both vehicle and foot pursuits. Id. at 12–13.
76 History of the Air Support Division, supra note 46.
77 Id.
barricade situations. Perimeters limit the movement of fleeing suspects or vehicles by providing a means for excluding civilians from areas of high risk where a shooter or bomber is located. Both ground forces and aircrews must understand the fundamentals of perimeter establishment and maintenance: solid facts must exist to place the suspect within the perimeter; the perimeter should be large enough to reflect the suspect’s speed and last-known direction of travel; and the perimeter must be tight enough to exclude the possibility that the suspect crossed it without detection. Any perimeter should be defined by how far the subject could have travelled in the time elapsed since the last contact. Identifying the boundaries of an appropriate perimeter depends on someone—the incident commander if he has been identified and is functioning, or otherwise the TFO—thinking quickly to estimate reasonable speeds, multiplying the speeds by the elapsed time, and expressing the distance in miles or blocks. Boundaries of the perimeter should be chosen, to the extent possible, to permit unobstructed lines of sight from either the ground or from the air. Either air or ground personnel must be able to spot anyone attempting to cross the perimeter boundary.

Once the perimeter is established, the helicopter can search from house to house in the nearby neighborhood both to ensure the perpetrator has not escaped and to view other possible strategies for ingress (for the police) and egress (for the perpetrator). Situational awareness in this regard is greater from the air than from the ground: the personnel in the helicopter easily see the big picture.

3. Surveillance

Surveillance, in comparison to search, begins once a target—a lost or injured person or a criminal subject the authorities are trying to apprehend—has been acquired. The most appropri-

78 SCHONELY, supra note 8.
79 Id. at 11.
80 Id. at 14–18.
82 Id.
84 O'Connor & Norse, supra note 56.
85 Surveillance can also refer to the monitoring of an area to detect suspicious activity. See Surveillance Definition, MERRIAM-WEBSTER, http://www.merriam-web-
ate flight profiles are whatever is necessary to keep the target in sight. If he is moving in a vehicle, the helicopter needs to keep pace, flying at the same speed as the vehicle. If the target is still, such as an injured or barricaded suspect, the helicopter needs to be able to hover or fly in a tight circle to watch his movements.

The Boston Marathon bombing increased interest in effective surveillance of high-risk events where large crowds assemble. Aerial surveillance has unique advantages for such missions. Overhead, observers can quickly spot unusual movements of vehicles or individuals—anything that does not match the prevailing flow of participants or audience, such as an attacker dropping a backpack and quickly walking away.

The challenge, however, is where to look. Means enumerates a number of things to watch for in any surveillance of or search for a criminal suspect. Means suggests looking for a vehicle driving much slower (on an expressway) or much faster (on residential streets) than the rest of the traffic. Along these same lines, observers should look for a vehicle disregarding stop signs and traffic signals, including a vehicle that stops occasionally midblock with no one getting out. He offers charts illustrating how far behind a target vehicle the helicopter should be flown, varying with vehicle speed. Means also suggests flying an offset of about two blocks to the right side of the target vehicle (on a helicopter flown from the right seat) and shows how to deal with

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ster.com/dictionary/surveillance (last visited Nov. 7, 2014). In this sense, surveillance has the same meaning as patrol, considered in Part III.A.1.


87 See Power, supra note 7, at 83.


89 O'Connor & Norse, supra note 56.

90 See id.

91 Means, supra note 34.

92 Id.

93 Id. at 47 (noting that aircrew should be especially alert when a vehicle stops in a dark area for no apparent reason).

94 Id.
situations in which the helicopter overruns the target vehicle or when it makes an abrupt turn.  

4. Collecting Evidence

The fact that most public-safety helicopters have sophisticated camera equipment means they can easily record captured images. This provides a rich trove of evidence of criminal activity and police conduct. Things must be done, however, to make this evidence practically useful. First, well-understood chain-of-custody requirements must be satisfied. Second, the high definition images actually captured are far more useful than substantially compressed versions of the same imagery or only periodic frames. Yet the amount of data involved in a full-motion, high-definition video image is enormous, and if the public-safety helicopter operation tries to save everything, any conceivable level of storage would soon be overwhelmed. Accordingly, some protocol is appropriate to decide what should be retained and what can be erased safely.

B. Search and Rescue

Search-and-rescue (SAR) missions can be divided into two types: missions involving search only, and missions involving rescue also. Rescue operations may involve human-load operations.
Search, as contrasted with surveillance, is used in this analysis to refer to efforts to locate the subject before he has been sighted.\textsuperscript{102} Search over a large geographic area is often conducted according to a grid superimposed on a map.\textsuperscript{103} In SAR missions, systematic searching according to established protocols is more important than in law-enforcement support, because SAR operations take more time than a typical law-enforcement incident, and because SAR traditionally employs more formal command-and-control.\textsuperscript{104} In other circumstances, however, it is more useful to search according to ground features.\textsuperscript{105} The particular search must be defined effectively. For example, "Search Memorial Drive eastbound to the on ramp for I-95," or "Search from the fishhook bend in the Fox River just east of Wilmot to the large quarry south of Route 173." Lower altitudes are more helpful for surveillance, while somewhat higher altitudes (around 2000 feet) may be more appropriate for search, since that enables the helicopter to see more territory.

\textit{Containment} is an important part of search strategy.\textsuperscript{106} It is the same idea as establishing a perimeter in searching for a fleeing felon:

For example, you might have two or three people positioned along on a long straight road. If the search subject crosses the road, they'll spot him. Bridges, wide creeks and open fields often offer the same confinement ability with a minimum of manpower. By confining the search subject, even if you only have the manpower to confine them on one or two sides, you immediately limit the area which needs to be searched.\textsuperscript{107}

\section*{C. Natural Disaster Relief}

Helicopters are especially well-suited for providing natural disaster relief.\textsuperscript{108} Often, ground-based infrastructure, such as roads and airports, is destroyed. Helicopters are the only way to get

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\textsuperscript{102} Search and Rescue, supra note 100.
\textsuperscript{103} See AIR FORCE, 91-211, USAF GUIDE TO AVIATION SAFETY INVESTIGATION (2014).
\textsuperscript{104} KY. EMERGENCY MGMT., supra note 81.
\textsuperscript{105} Id.
\textsuperscript{106} Id.
\textsuperscript{107} Interview with David Faulkner, Captain, Fontana Police Dep't (Dec. 20, 2013).
\textsuperscript{108} See generally FED. AVIATION ADMIN., INTEGRATING HELICOPTER AND TILTROTOR ASSETS INTO DISASTER RELIEF PLANNING 7–10 (Nov. 13, 1998).
supplies in quickly.\textsuperscript{109} Victims stranded by floodwaters or blizzards may not survive unless they receive food and water without long delays. In some cases, the victims need to be rescued, or they will perish. Intelligence collection is also crucial. This includes locating victims and assessing damage, viable inroads, possible delays for relief, and other disaster management issues.\textsuperscript{110} Smaller helicopters with only basic equipment can be useful for intelligence collection in natural disasters; larger helicopters with more elaborate equipment and heavier load capacities, however, are necessary for inserting relief supplies or for rescuing victims.\textsuperscript{111}

D. PERSONNEL INSERTION AND EXTRACTION

Law-enforcement and SAR missions require helicopters to insert or extract personnel.\textsuperscript{112} The most straightforward way to do this is to land and have the personnel get on or off the helicopter. Many rescue situations, such as water and high-rise fire rescues, provide no place to land, however.\textsuperscript{113} In these situations, there must be some way for the rescuers to exit and descend to the ground and for victims and rescuers to be picked up off the ground without the helicopter landing.\textsuperscript{114}

Classified as human external load (HEL) operations, these operations require a high degree of aircrew training.\textsuperscript{115} Pilots must to be able to insert and extract a load gently within a one-square-meter area on the ground as well as hover and maintain altitude precisely.\textsuperscript{116} A subcategory of external load operations, HEL operate under distinct FAA flight rules.\textsuperscript{117}

\textsuperscript{109} Id. at 7–8.
\textsuperscript{110} Id. at 7–10.
\textsuperscript{111} Id. at 20.
\textsuperscript{113} See generally id.
\textsuperscript{114} See generally id.
\textsuperscript{115} Co-authors Perritt and Cue flew on a training mission with AIR-ONE on November 20, 2013, and rode as mock victims on the end of a 100-foot load line. They observed aircrew coordination. The maneuvers, when properly performed, are gentler than one might expect.
\textsuperscript{117} See 14 C.F.R. § 133.1. Part 133 does not, however, directly address operations or flight profiles for human loads. The FAA amended the Federal Aviation Regulations (FARs) in 1999 to add provisions relating to external loads, but did not impose significantly different operating requirements. Rotorcraft Load Combination Safety Requirements, 64 Fed. Reg. 43016, 43017 (Aug. 6, 1999) (no spe-
Many different equipment configurations exist for extraction, including baskets, stretchers, and various kinds of slings. Load lines can be fixed in length, ranging from 50 to 150 feet, or they can be configured so that the load can be reeled into the helicopter while it is still in flight. The best type of extraction equipment for a particular mission depends on the condition of the extraction target.

The level of aircrew skill required for HEL is significant. The pilot must be able to control the helicopter precisely in order to avoid sudden pickups or hard setdowns that might injure the human load, and he must maintain sufficient altitude to avoid smacking the load into trees or other obstacles on the ground. In most parts of an HEL operation, the pilot cannot see the load or the load line. A TFO riding in the back must lean out, often sitting on the skids, and keep the load line and load in sight.

The TFO communicates with the pilot through the aircraft intercom, using precise terminology to direct the pilot. Typically the TFO counts down before the execution of a command or cessation of a maneuver; (e.g., “Come up with the load slowly for five: 5-4-3-2-1,” tells the pilot to begin a climb immediately and level off when the countdown ends).

Personnel being inserted assist the TFO by giving hand and leg signals (e.g., a hand motion upward to signify that the helicopter should climb, a horizontal motion with the hand to signify that it should hover, and clicking heels together with legs extended to signify that the load is ten feet above the ground on

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118 U.S. MARINE CORPS, supra note 112, at ch. 2.


121 See 14 C.F.R. § 133.37 (2014).

122 See FED. EMERGENCY MGMT. AGENCY, supra note 101; Forest Operations Equipment Catalog, supra note 119; Longline Vs. Shoreline, supra note 119.

123 Schmaltz, supra note 33.

124 Id.
a descent). The TFO in the helicopter watches the load and relays instructions to the pilot over the intercom.

A number of largely unavoidable hazards exist in HEL operations. Failure by the helicopter pilot to maneuver the helicopter precisely, or failure by other crew members to pass signals quickly and unambiguously, may result in a collision between the human load and ground obstacles. The load line or the attachment points may break or disconnect. A slack load line may entangle the main or tail rotor. The engine on the helicopter may fail during pick up, transit, or set down. The flight regime for long line operations requires prolonged hovering and other maneuvers at relatively low altitudes. At these altitudes and speeds, if the engine fails in a single-engine helicopter, the pilot needs to set the load down gently and safely, and then

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125 See generally U.S. Marine Corps, supra note 112.
126 Schmaltz, supra note 33 (recommending passive device, maintaining upright posture, and separate spotter to monitor HEL).
127 In a twin-engine helicopter that loses one engine, autorotation is not necessary. Rather, the helicopter could continue in a normal flight profile until it could safely release the load and land. Depending on gross weight and atmospheric conditions, the helicopter would enter a controlled descent, release the load, and then land. In the worst case, the rate of descent for a twin-engine would be in the low hundreds of feet per minute, as compared to a thousand or more feet per minute in a single-engine helicopter with its engine out. See Fed. Aviation Admin. Helicopter Flying Handbook: Helicopter Emergencies and Hazards 22 (2012) [hereinafter Helicopter Emergencies and Hazards], available at https://www.faa.gov/regulations_policies/ handbooks_manuals/aviation/ helicopter_flying_handbook/media/hfh_ch11.pdf. The FARs require multi-engine helicopters for most civilian SAR missions. "[T]he use of SAR modes in civil operations requires special airworthiness standards (special conditions) to ensure . . . a level of safety consistent with Category A and Instrument Flight Rule (IFR) . . . ." Installation of a Search and Rescue Automatic Flight Control System, 77 Fed. Reg. 60883 (Oct. 5, 2012) (to be codified at 14 C.F.R. pt. 29) (imposing autopilot requirements on EC225LP helicopters). Section 133.45(e)(1) prohibits Class D operations. 14 C.F.R. § 133.43(e)(1) (2014). Part 27 (for rotorcraft with gross weights less than 7,000 pounds) and Part 29 (for "transport category rotorcraft") impose special airworthiness requirements for Class D operations. 14 C.F.R. Part 27, 29. Part 27 allows only multiengine rotorcraft that meet the requirements of Appendix C to Part 127 to be type certified. 14 C.F.R. § 27.1(c). Appendix C incorporates Category A requirements. "Category A, with respect to transport category rotorcraft, means multiengine rotorcraft designed with engine and system isolation features specified in Part 29 and utilizing scheduled takeoff and landing operations under a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight in the event of engine failure." 14 C.F.R. § 1.1.
enter an autorotation to land the helicopter safely.\textsuperscript{128} Even the most skilled pilot would be hard pressed to accomplish this without injury to the load, the crew, or more likely both.\textsuperscript{129}

Search and rescue missions involving HEL require not only a higher level of proficiency, they also require larger helicopters and larger teams.\textsuperscript{130} The frequency of HEL operations is low for any particular agency.\textsuperscript{131} The best coverage for the range of public safety missions results from larger fleets of smaller helicopters, with smaller numbers of SAR helicopters available on a more widely shared basis.\textsuperscript{132}


\textsuperscript{129} See AM – 98/13, supra note 120, at 8. In a human external load operation, the pilot of a single-engine helicopter experiencing an engine failure would have little choice: he would have to establish an autorotation as soon as possible and then perform a two-stage flare maneuver. See Fox, supra note 128. The pilot would immediately lower the collective to enter an autorotation. See id. at 33. As the helicopter began to descend, he would immediately enter a flare to slow down. \textit{Id.} at 3 (explaining that a flare "increases the pitch of the rotor blades, which increases lift [and] allows the descent to be slowed"). At this point, the helicopter would be travelling about 60 knots horizontally, and 20 knots vertically (1500–1800 feet per minute). See \textit{Helicopter Emergencies and Hazards}, supra note 127, at 2. As the helicopter decelerates and the load gets closer to the ground, the pilot would flare more aggressively. See \textit{id.} at 3–4. The pilot must take into account the fact that the load will swing forward with more aggressive deceleration, increasing its distance from the helicopter as the line extends. See \textit{id.} He would hold the flare until he judged that the ground speed was low enough for the human load to tolerate touching the ground at that speed. See \textit{id.} He would release the load as soon as he judged that the load had reached the ground, and immediately drop the nose to pick up more air speed. See \textit{id.} at 6–7. The pilot cannot drop the nose too aggressively or rotor RPM would decay so much that the rotor blades would stall. \textit{Id.} at 7. He would then enter another flare to exchange the remaining airspeed for rotor RPM, and then use the remaining RPM to cushion his landing as much as possible. Id. at 6–7. The best he could hope for would be a survivable crash for the aircrew and survivable impact between the load and the ground.

\textsuperscript{130} See 14 C.F.R. § 133.33.

\textsuperscript{131} See AM – 98/13, supra note 120, at 1.

\textsuperscript{132} But see Press Release, Airbus Helicopters, Mississippi DPS Purchases AS350B3e to Consolidate Helicopter Fleet 1 (Feb. 25, 2014), available at http://www.alea.org/public/pressreleases/ViewPressRelease.aspx?id=2014 (follow hyperlink for title; then follow "View PDF" hyperlink) (noting that the larger AS350 was chosen to replace three helicopters and "is also the top choice of airborne Law Enforcement in the United States"). See also The Utilization of Helicopters for Police Air Mobility, U.S. Department of Justice 12 (Feb. 1971), http://www.ncjrs.gov/pdffiles1/142085NCJRS.pdf (noting that agencies balance the performance benefits of speed and load capacity for large helicopters against the efficiency benefits of smaller helicopters).
E. LIMITATIONS ON FLIGHT PROFILES

Regardless of the mission type, helicopters have limitations.\textsuperscript{138} For example, they are not as helpful when activities take place entirely inside structures and thus are not visible from the air.\textsuperscript{134} Even if an incident begins inside a structure, however, the possibility always exists that a person of interest may exit the structure. Therefore, it may be useful to have helicopter assets in the air to detect such an exit.\textsuperscript{135}

In any helicopter operation, the most urgent emergency is an engine failure.\textsuperscript{136} Aircraft engines rarely fail in flight\textsuperscript{137} (when was the last time your automobile engine suddenly quit while you were driving on an expressway?). However, when they do quit, the pilot must immediately establish an “autorotation,” a flight regime in which the rotor spins and continues to generate lift because it is being driven by an upflow of air as the helicopter descends rather than by the engine.\textsuperscript{138} At heights of 500 feet or less, the pilot has about three seconds to establish the autorotation, select a safe landing spot within a very small glide range, maneuver the helicopter to it, and cushion the landing as best he can.\textsuperscript{139}

Autorotations at low airspeeds and low heights present more risk, but with certain flight profiles it is possible to make successful landings.\textsuperscript{140} The challenge is complicated in urban areas where landing spots free of powerlines, people, and other obstacles are few and far between.\textsuperscript{141}

These flight profile limitations, however, do not negate the fact that helicopters are extremely helpful in various support scenarios,\textsuperscript{142} and their inefficient use is evident across many spectrums. One law-enforcement scenario where helicopter capabilities were not fully utilized was in Watertown, Massachusetts.

\textsuperscript{138} See id. at 33.
\textsuperscript{134} See id.
\textsuperscript{135} See id.
\textsuperscript{136} See Helicopter Emergencies and Hazards, supra note 127, at 2.
\textsuperscript{137} See id. at 16.
\textsuperscript{138} See id. at 2.
\textsuperscript{139} See id. at 7.
\textsuperscript{140} See id. at 8.
\textsuperscript{141} See id. at 23; see also id. at 8 (showing in Figure 11-3 the hazardous area below 60 knots and 500 feet as determined by test pilot’s ability to establish autorotation).
\textsuperscript{142} See id. at 1.
Anyone who has seen the video of the apprehension of Dzhokhar Tsarnaev after the Boston Marathon attacks\(^1\) can appreciate how essential the Massachusetts State Police helicopter and its infrared imaging were in obtaining a successful outcome without injury to law-enforcement personnel or fatal injuries to the suspect.\(^2\) It is not clear why helicopters were not involved earlier in coordinating the law-enforcement response to the confrontation that occurred in Watertown after Dzhokhar and his brother Tamerlan killed an MIT policeman and carjacked a Mercedes-Benz SUV.\(^3\) Video and witness accounts used in reconstructing the scene afterwards show great confusion.\(^4\) Had a helicopter been involved in the law-enforcement response initially, Dzhokhar might not have escaped and Tamerlan might not have been killed.\(^5\) In any event, the scene would have been illuminated by high-power, helicopter-mounted searchlights and spotlights.\(^6\) In considering the possibility of earlier helicopter support, some assumptions must be made about when a helicopter would have been available. The Massachusetts State Police has five turbine-powered helicopters, primarily twin-engine Eurocopter AS-355Ns equipped with FLIR cameras, GPS synchronized mapping, interoperable communications equipment, and digital!


\(^{145}\) See id.

\(^{146}\) See David Pakman Show, *Firefight That Killed Boston Marathon Bombing Suspect*, YouTUBE (Apr. 19, 2013), http://www.youtube.com/watch?v=N10F5rm37-w (showing video of Watertown confrontation); Mass. Tea Party, *Terror in Boston—Shot Fired Suspect is Down! Found in Boat in a Trailer #manhunt*, YouTube (Apr. 19, 2013), http://www.youtube.com/watch?v=G_pQXcqA6Ag (Fox News broadcast). The news footage in the YouTube video shows a helicopter in flight, but this helicopter shot is in the daytime. The Watertown confrontation occurred the night before this news broadcast.

\(^{147}\) See Carter & Botelho, * supra* note 144 (reporting that a police chase at that carjacked vehicle was interrupted by a shootout, during which Tamerlan exited the car, and Dzhokhar ran over his brother as he drove away).

video downlink systems.\textsuperscript{149} The helicopters are based in Lawrence, Plymouth, and Westover.\textsuperscript{150} During the search for the Tsarnaev brothers, it would have been reasonable for the Massachusetts State Police to keep one or more of the helicopters airborne. If they were on the ground, ready to launch, further assumptions are required as to when they would have been called out to the search.

The murder of the MIT police officer might have triggered an opportunity for helicopter support, although the initial reports regarding the murder were quite confused.\textsuperscript{151} There was a crime scene to which the helicopter could have begun to lay out a pattern of surveillance, but it was not immediately clear that the Tsarnaev brothers were responsible.\textsuperscript{152} The initial carjacking of the Mercedes did not generate an opportunity for helicopter support because no one knew about it until the owner of the Mercedes escaped and called the police.\textsuperscript{153}

After that, however, the need for helicopter support was obvious. The authorities had a precise description of the car, and they knew the precise location for beginning a search.\textsuperscript{154} The ground scene was chaotic.\textsuperscript{155} Watertown had only five or six officers on duty, so the Boston Police and the Massachusetts State Police took control of the search.\textsuperscript{156} "[A]ctually trying to get control of the number of people, the mass of people that showed up, proved to be a challenge for the people who [were] trying to organize that event."\textsuperscript{157} "[L]aw enforcement from outside of Watertown—about 2,000 altogether—had trouble navigating the neighborhood, a labyrinth of winding streets.

\textsuperscript{152} See id.
\textsuperscript{153} See Carter & Botelho, supra note 144.
\textsuperscript{154} See id. (noting that the police were tracking the car “using its built-in GPS system”).
\textsuperscript{155} See id.
\textsuperscript{157} Id.
They got lost. According to Watertown Police Chief Ed Deveau, "they had no idea where Dexter or Laurel Ave was[,] and they had trouble finding the police."

The Lawrence airport is 19.4 nautical miles from Watertown. Assuming the aircrew was at the Lawrence airport and the helicopter was ready to go, it could have been overhead Watertown fifteen minutes after being called out. If it were already airborne, as would have been reasonable in the aftermath of the bombing, it could have been there more quickly. Even if there were no incident commander yet designated and no command post, the helicopter aircrew, using its FLIR camera, could have helped ground units navigate the dark streets through which Dzhokhar was fleeing.

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158 Martin et al., How Did Dzhokar, supra note 151.
159 Id.
161 It takes 14.5 minutes to fly 19.4 nautical miles at 80 knots. This time can be calculated using the formula $T = \frac{D \times 60}{S}$, where $T$ is the time in minutes, $D$ is the distance in nautical miles, and $S$ is the speed in knots. See Time, Speed and Distance, Univ. Alaska 1 (Mar. 10, 2014), www.uas.alaska.edu/career_ed/maritime/docs/distance_speed_time.pdf.
162 See supra note 75.
The first contact with the brothers was when the carjack victim called 911—point 3 on the map. The first step for the helicopter aircrew would be to check nearby interchanges with limited access highways if they were not already roadblocked. One familiar with the area would pinpoint the entry ramps to I-95 in Charlestown and the entry ramps to the Massachusetts Pike at Western Avenue. Quick dispatch of ground units to cover these escape chokepoints would relieve the helicopter of monitoring multiple exit points. Such assignment of ground units would depend on the availability of real-time data about their location from software, such as Spidertracks, which is integrated with the geospatial mapping software operating on the video displays in the helicopter. Map imagery, available from software such as Churchill, would facilitate identifying the likely exit points.

Once the long-distance escape routes were identified and monitored, the outlines of a perimeter would be obvious, thus allowing the helicopter to search inside the perimeter. If a perimeter search did not turn up anything, the subjects might be fleeing along other routes or hiding. That suggests the helicopter should first check other likely exit routes, and then check densely populated neighborhoods and areas of dense foliage that might conceal a vehicle.

The helicopter would come inside the implied perimeter and work up and down with its FLIR system according to a grid, from the outside in. Additionally, the noise of the helicopter might have spooked the brothers, which would have aided the search. If the brothers were hiding and ran when they heard the helicopter, they would have been easy to spot. If they were fleeing and sped up, they would have stood out as well. A car on a freeway travelling even ten miles per hour faster than the other traffic is easy to distinguish.

Once the shootout was over and only Dhzarnov was on the run, the same strategy would be adapted to this last point of contact—point 4 on the map. Thus, the use of helicopter sup-

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164 See id.
168 King, supra note 163.
port earlier in the Watertown case could have greatly assisted the ground patrol officers in capturing the Tsarnaev brothers.

The potential for helicopter support of public-safety operations in Watertown-like scenarios and more broadly depends on the particular resources available. That is the subject of the next part.

IV. RESOURCE REQUIREMENTS

A. AIRCRAFT

The types of helicopters involved in public-safety support activities span a range from relatively small, such as the Robinson R44, to much larger, like the UH-1 Huey. The following table provides a comparison of the most popular types.

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
<th>Useful load (pounds)</th>
<th>Cruise speed (knots)*</th>
<th>Direct operating cost per hour</th>
<th>Fuel consumption (gallons per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single engine:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robinson R44</td>
<td>$700–900,000</td>
<td>1,000</td>
<td>113</td>
<td>$217</td>
<td>16</td>
</tr>
<tr>
<td>AStar AS350B2 or B3</td>
<td>$2 million</td>
<td>2,270</td>
<td>133–155</td>
<td>$736</td>
<td>48</td>
</tr>
<tr>
<td>MD500e</td>
<td>$1.5 million</td>
<td>1,519</td>
<td>135–155</td>
<td>$585</td>
<td>64</td>
</tr>
<tr>
<td>Bell Long Ranger L4</td>
<td>$1.2 million</td>
<td>2,176</td>
<td>124–125</td>
<td>$722</td>
<td>40</td>
</tr>
<tr>
<td>Twin engine:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EC135/145</td>
<td>$3.9 million</td>
<td>3,296</td>
<td>137–140</td>
<td>$1094</td>
<td>61</td>
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<tr>
<td>AW139</td>
<td>$10 million</td>
<td>5,886–6,768</td>
<td>165–167</td>
<td>$2167</td>
<td>142</td>
</tr>
<tr>
<td>Bell 212</td>
<td>$3.7 million*</td>
<td>4,500</td>
<td>107–120</td>
<td>$1635</td>
<td>108</td>
</tr>
</tbody>
</table>

* "fast cruise" and VNE
* # Price for late model used; no longer sold new

An unfortunate tendency exists for public-safety agencies to convince themselves that they need larger and more complex helicopters than is actually the case. This bias drives up costs, complicates insurance coverage limitations, and makes it more difficult to recruit personnel. Two beliefs in this regard are worth evaluating.

170 See The Utilization of Helicopters for Police Air Mobility, supra note 132 and accompanying text.
171 See id.
A deeply embedded belief in the law-enforcement pilot community holds that smaller helicopters do not have sufficiently useful loads for necessary equipment and performance capabilities. A parallel belief is that nothing less than a turbine helicopter, such as a Bell 407, MD500, or AS 350, is adequate for law-enforcement support. Neither belief is valid. As airborne surveillance, navigation technologies, and helicopter design have evolved, specialized police and electronic news gathering (ENG) versions of the Robinson R44 and R66 helicopters now have similar equipment to larger Bell and Airbus helicopters, although the larger aircraft have better performance. The Textron-Bell 505 Jet Ranger X model, expected to be certificated by the FAA in 2015, will provide another small-helicopter option. The 505 Jet Ranger X offers performance comparable to the Robinson R66, and Bell expects to price it competitively with the R66.

The argument is not that the R44 or the R66 have the same capabilities as an AS350; they do not. The chart shows that. Pilots with ENG experience in both prefer the AS350. The point is that the smaller helicopters have capabilities adequate for most police operations at much lower cost. Furthermore, empirical studies call into question the validity of the belief that piston engine helicopters are less reliable than turbine helicopters. Co-author Perritt has flown with law-enforcement agencies fly-

172 See Alpert, supra note 169 ("The Miami-Dade Unit flies [larger helicopters] because they perform a variety of functions, including transportation and disaster assistance.").


174 See Alpert, supra note 169 ("The helicopters used in both units are equipped with support equipment and crime-fighting tools that assist the officers with their mission . . . .").


178 See The Utilization of Helicopters for Police Air Mobility, supra note 132 and accompanying text.

179 See Press Release, Airbus Helicopters, supra note 132.

ing AS350s and with agencies flying the Robinson R66. He observed that flight crew activities, equipment, and flight profiles were identical, with the differences in aircraft correlating to no material difference in mission performance. The acquisition and operating costs of the smaller helicopters are dramatically lower.\textsuperscript{181} Fontana acquired and currently maintains its fleet of three Robinson helicopters\textsuperscript{182} for less than the $3.8 million the Ontario, California, police department paid for one equipped AS350 B2.\textsuperscript{183}

While larger helicopters are necessary for SWAT and rescue operations, smaller helicopters, such as the Robinson R44, Robinson R66, and Bell 206B3, are suitable for law-enforcement patrol functions, SAR, and disaster relief surveillance. The higher costs of the larger helicopters means that their capability is more likely to be available through acquisition of government-surplus helicopters than by open market purchases.

On the other hand, the capabilities provided by the smaller helicopters represent a more equal trade-off between market transactions and government donations, and between purchase of new and used aircraft. A Robinson R66 has a base price of $800,000.\textsuperscript{184} Used Bell 206B3s in reasonably good condition can be obtained for $600,000–$800,000.\textsuperscript{185} The operating costs and performance of the Bells are not as attractive as those of the Robinsons, so the choice between them is basically a toss-up. If an agency can get an OH-58 through the Defense Logistics Agency Disposition Services program,\textsuperscript{186} that would seem preferable, but the costs associated with reconditioning a surplus helicopter can equalize the cost difference. Actual maintenance hours per flight hour are not likely to vary much with age because of the nearly universal requirement that parts be replaced as they reach service lives predefined by the manufacturer.\textsuperscript{187}

\begin{itemize}
\item \textsuperscript{181} See The Utilization of Helicopters for Police Air Mobility, \textit{supra} note 132.
\item \textsuperscript{182} See generally Air Support, \textit{Fontana Police Department, supra} note 62.
\item \textsuperscript{184} See \textit{R66 Turbine – 2014 Price List, supra} note 177 (listing the suggested retail price of a R66 helicopter with standard equipment as $839,000).
\item \textsuperscript{185} See, e.g., \textit{Bell 206 Classifieds, Barnstormers}, www.barnstormers.com/Bell%20Bell-206%20Classifieds.htm (last visited Oct. 9, 2014).
\item \textsuperscript{186} See infra Part V.F (explaining source of AIR-ONE helicopters).
\item \textsuperscript{187} See, e.g., 14 C.F.R. § 33.70 (2014) (requiring operating limitations for life limited engine parts).
\end{itemize}
On the one hand, load carrying capability is important for disaster relief, EMS, and SAR missions that require personnel extraction.\textsuperscript{188} Personnel extraction may not be required when ground personnel are nearby in land searches.\textsuperscript{189} Personnel extraction is central to EMS missions.\textsuperscript{190} Even if personnel insertion or extraction is not part of a disaster relief mission, helicopters are likely to be called upon to drop relief supplies.\textsuperscript{191} On the other hand, load carrying capability is less important for law-enforcement support and fire-suppression missions.\textsuperscript{192}

A belief also exists in some quarters that twin-engine helicopters are better.\textsuperscript{193} This belief is also questionable, except in the context of HEL operations.\textsuperscript{194} In a twin-engine helicopter, the two engines are interconnected through a single gearbox and control mechanism that drives the main and tail rotor.\textsuperscript{195} Their interconnections are such that if one engine fails, the pilot only notices a diminution in the amount of power (torque) available to drive the rotor.\textsuperscript{196} This is quite different from an engine failure in a single-engine helicopter in which the pilot has no choice but to initiate autorotation and land wherever he can.\textsuperscript{197}

Engine failures are quite rare, however.\textsuperscript{198} Safety can be improved more by having two crew members than by operating only twin-engine helicopters.\textsuperscript{199}

**B. Equipment**

The equipment list for any particular helicopter should depend on the range of missions for which the craft is intended.\textsuperscript{200} Any conceivable public-safety mission requires good geospatial mapping software and appropriate radio communications.\textsuperscript{201} Most law-enforcement missions also require a high-intensity

\textsuperscript{188} See The Utilization of Helicopters for Police Air Mobility, supra note 132, at 33.
\textsuperscript{189} See id.
\textsuperscript{190} See AM – 98/13, supra note 120, at 1.
\textsuperscript{191} See The Utilization of Helicopters for Police Air Mobility, supra note 132.
\textsuperscript{192} See id.
\textsuperscript{193} See id.; supra note 127 and accompanying text.
\textsuperscript{194} See id.
\textsuperscript{195} See Helicopter Emergencies and Hazards, supra note 127.
\textsuperscript{196} See id.
\textsuperscript{197} See id.
\textsuperscript{198} See id. at 1.
\textsuperscript{199} Interview with Henry Perritt and Kevin Sprague (Dec. 10, 2013).
\textsuperscript{200} See The Utilization of Helicopters for Police Air Mobility, supra note 132, at 33.
\textsuperscript{201} See supra notes 165–66 and accompanying text.
searchlight.\textsuperscript{202} Video and infrared imaging also enhances most missions.\textsuperscript{203} SAR missions require some of the same equipment as law-enforcement support: good imaging capability and good geospatial referencing systems.

1. \textit{VHF and UHF Radios Capable of Communicating on Public-Safety-Agency Frequencies}

Appropriate radio communication is essential for effective coordination of helicopter operations with ground forces and vehicles.\textsuperscript{204} There must be agreement at the outset of a mission as to what frequencies will be used for command-and-control and, when appropriate, for more direct communication with ground forces.\textsuperscript{205} Typically more than one frequency will be required.\textsuperscript{206} Frequencies must be available not only in vehicles such a squad cars but on portable handsets as well. Often in a tactical operation, the most important coordination occurs between airborne assets and individual personnel on foot in the field.

AIR-ONE, like California police departments including the LAPD, the El Monte Police Department, and the Fontana Police Department, has the capability to operate on several hundred public-safety frequencies.\textsuperscript{207} Moreover, the Illinois Law Enforcement Alarm System (ILEAS)\textsuperscript{208} has worked with the Illinois Emergency Management Agency (IEMA) and local agencies to establish common frequencies for tactical communication involving resources from multiple agencies.\textsuperscript{209} IEMA has published an Illinois Tactical Interoperability Field Operations Guide, which provides detailed lists of common frequencies and establishes procedures for coordinating communications.\textsuperscript{210} The Illinois State Police maintains an emergency radio network

\textsuperscript{202} See \textit{supra} note 148 and accompanying text.
\textsuperscript{203} See \textit{supra} note 144.
\textsuperscript{204} See CHARLES "SID" HEAL, \textit{SOUND DOCTRINE: A TACTICAL PRIMER} 44 (2000).
\textsuperscript{205} See id. at 49.
\textsuperscript{206} See \textit{id.} (explaining need for tactical, command, and logistics radio channels).
\textsuperscript{207} See \textit{AIR-ONE EMERGENCY RESPONSE COALITION, supra} note 5.
\textsuperscript{208} See 30 ILL. COMP. STAT. 105/6z-91 (2014) (establishing Illinois Law Enforcement Alarm System fund).
for inter-agency law enforcement communication. Everyone must use a common language to communicate with each other regarding movement and location.

2. Geospatial Mapping Software

As Jack Schonely, author of *Apprehending Fleeing Suspects*, put it, "always know where you are," and communicate it clearly to the air unit. A means for referencing places and objects on the ground is essential if air and ground assets are to complement each other. The SAR community has developed methods based on map grids. But for this to work effectively, ground units must also know the positions. Basic GPS capability is an efficient way to achieve this because helicopter aircrew and ground forces can communicate by references to street names and compass directions. Sophisticated proprietary hardware and software exists for public-safety missions. However, as GPS-based products improve, the necessity for systems costing in the hundreds of thousands of dollars is increasingly questionable.

The Churchill 37 FLIR Star Safire product illustrates the high end of the market. It shows latitude, longitude, elevation, and range at the top of the display screen; the exact address at which the camera is pointed at the bottom of the screen; and superimposed street names and numerical street addresses over the live full-screen image. The operator can select ground features to be displayed or suppressed, such as school and business names. The usual capability to zoom in and out is preserved, and the operator can trigger an inset with a zoomed image su-

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212 See Heal, supra note 204, at 45 (stressing essential nature of common terminology and procedures).
213 Schonely, supra note 8, at 42.
214 Id.
215 See supra note 167 and accompanying text.
217 See id.
218 See id.
219 See id. Camera azimuth and elevation are shown at the bottom of the screen.
220 See id.
A graphical image of the helicopter's heading, orientation, and camera elevation can be shown in a corner of the screen. The operator can enter an address on the touchscreen and cause the camera to slew to the targeted address.

Augmented Reality Mapping System (ARS) gives the operator access to both a physical camera mounted to the helicopter and a virtual camera linked to geospatial data. The operator can link the images generated by the two cameras, or he can select and zoom them independently.

At the low end of the market, commonly available aviation navigation systems (costing a few hundred dollars or less) superimpose maps (e.g., from Google maps) on aeronautical charts and show the position of the aircraft on map displays as the helicopter moves around. A variety of grids exist for ground-based and aerial searches. ForeFlight, the market leader in aviation cockpit navigation systems for iPads and other tablet computers, offers built-in SAR grids. It offers seven different search patterns that can be overlaid on regular aviation charts and ground maps. Similarly, the Aerocomputer software on the LAPD helicopter provides the distance, magnetic track to the target, the estimated time enroute (ETE), and the estimated time of arrival (ETA).

221 See id.
222 Id.
224 See ARS-Augmented Reality Mapping System, supra note 166.
225 See id.
227 See generally KY. EMERGENCY MGMT., supra note 81, at 1 (explaining grids, search methods, and terminology).
231 See id.
LAPD, Fontana, and Chicago personnel take their iPads with them and refer to geospatial software and images on the iPad as often as they do the more sophisticated Aerocomputers system installed on the helicopter. The TFO wore an iPad mini strapped to his thigh. He referred to Google maps on it periodically. The TFOs said that they found Google maps easier to use than the Aerocomputer mapping software, although Aerocomputer's computation of track to the target, ETA, and ETE were occasionally useful.

The need for sophisticated geospatial software and grid construction should not be exaggerated. In most cases, the following exchange between ground forces and aircrew is sufficient:

"Where did you last see him?"

"He ran into the parking lot behind the Jack-in-the-Box"

[The pilot and TFO confer. The pilot slows to a hover briefly as they try to spot the Jack-in-the-Box take-out restaurant.]

"We see it. We're checking the back."

No special equipment preplanning is necessary: only common sense identification of landmarks and aircrew whose attention is directed outside the helicopter. On the other hand, moving map displays with street addresses is of considerable assistance in finding the location of an assignment initially.

3. High-Intensity Searchlight

Helicopter law enforcement patrols depend on high-intensity searchlights at night. NightSun is such a common searchlight that it is used as a generic term. In the Fontana vehicle search, the helicopter first orbited in the vicinity of the holdup, looking for the car. Not finding it, the aircrew concluded that the car had gotten on the freeway. The helicopter then visually inspected the nearby freeways using its NightSun searchlight and binoculars. The FLIR was on, but it was not particularly useful since what mattered was visual characteristics, not heat signature.

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236 This exchange is adapted from actual radio and intercom conversations during co-author Perritt's helicopter patrol with LAPD.
4. High-Resolution Color and Infrared Cameras, Gimbled and Attached to the Nose of the Helicopter

Most public-safety helicopters are equipped with sophisticated imaging systems comprising both color video and infrared capability. Such equipment is useful in a variety of missions, but it is not necessary all the time. The FLIR UltraMedia HD is an example of a system in common use for public safety and ENG helicopters. It permits an operator on the helicopter to zoom and pan the camera while watching the image captured by the camera on a high-resolution video monitor. Typically, the TFO uses the monitor to examine detail not discernible to his naked eye or to get the enhanced images available from infrared heat signatures of vehicles and individuals. Standard FLIR video displays allow split screen presentation with a map on one side of the screen and either the infrared or color video image on the other. Alternatively, the infrared image can appear on one side and the color video image on the other.

Disagreement exists on how much airborne-patrol TFOs should rely on imagery technology as compared with looking out the window. Means overemphasizes use of infrared imag-

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237 See, e.g., supra note 144.
238 The FLIR UltraMedia HD is an imaging gyrostabilizer that houses a Sony 1500 digital camera system capable of a 1040mm zoom. See FLIR Ultra Media, FLIR, www.flir.com/legacy/view/?id=51474 (last visited Oct. 9, 2014).
239 The photographic equipment in public-safety helicopters is quite similar to that installed in ENG Helicopters, with two significant differences: newsgatherers are less likely to be interested in infrared images, while law-enforcement is likely to find infrared imagery more useful than color images in many cases; pristine image quality is important for newsgathering, so it can be broadcast with the same aesthetic levels as viewers are accustomed to in the regular programming, while that level of quality is less important for public safety operations. What matters for public-safety operations is resolution and level of detail, not so much lighting and color balance. Conversation with Erich Schmid, Nov. 10, 2013.
240 When ground commanders want to see live imagery, an appropriate microwave link must be established from the helicopter to the ground. To enable this, the helicopter must be equipped with an appropriate antenna system capable of locking onto a downlink frequency and automatically tracking the ground station antenna regardless of helicopter position or orientation. The Troll Skylink HD system is an example of what is available. See Skylink HD, TROLL SYSTEMS 1 (2010), http://www.trollsystems.com/images/Troll_DataSheetsPDF/SkyLinKD_2010.pdf. Although ENG almost always involves downlink, it is rarely used in law-enforcement, even when the helicopter is equipped with the capability.
242 Among other things, the temperatures in San Diego make FUR more useful, because hotter objects like human beings stand out more clearly from the background. This is less true when ambient temperatures are higher, as in Los
ing, however.\textsuperscript{243} Means also underrates the value of unaided visual references, searchlights for night operations, and low flight altitudes.\textsuperscript{244} The airborne patrol missions in Los Angeles and Fontana showed the superiority of outside observation with the naked eye compared to continual camera operation.

What was important in both the LAPD and Fontana missions was skilled human observation of the ground with the naked eye aided occasionally by binoculars and searchlight. The FLIR added nothing. For most of the LAPD flight, the TFO monitored the moving map display, into which he easily entered a particular address. Infrared imagery was used more as a backup than for primary reference. In both the LAPD and Fontana missions, inspection with the unaided eye out the TFO's side window\textsuperscript{245} was superior to the perspective available if the TFO had fixed his attention only on the display. As in the LAPD operations roof inspection,\textsuperscript{246} there was no need for infrared imagery; it was obvious from the search-light illuminated roof in L.A. whether anyone was on the roofs that were inspected. Similarly, the suspects' vehicles were obvious in traffic with or without the searchlight.

C. Personnel

All public-safety support operations require at least two skilled members in the aircrew: a pilot and a TFO. The pilot's job is to fly the helicopter safely; this preempts any other duties he may undertake to support the mission. He must understand instructions provided by the TFO, respond promptly to the instructions, and exercise judgment as to when the instructions are unsafe. The TFO must understand the capabilities and limitations of the helicopter so that he does not give instructions to the pilot that would result in unsafe operations.

1. Aircrew

The minimum aircrew comprises a pilot and a TFO. The pilot flies the helicopter. He must be able to go where directed by the

\textsuperscript{243} See Means, supra note 34, at 55.

\textsuperscript{244} See id.

\textsuperscript{245} The specially modified door on the port side of the helicopter has a floor-to-ceiling window for its full width. See LAPD Air Support Unit, POLICE HELICOPTER PILOT, www.policehelicopterpilot.com/lapd-air-support (last visited Oct. 9, 2014).

\textsuperscript{246} See supra note 45 and accompanying text.
TFO and incident commanders, and he must fly flight profiles that will be effective in accomplishing a particular task. In doing these things, he must exercise judgment as to what is safe. He must be attentive to his altitude, airspeed, and rotor revolutions per minute (RPM). He must look out for other traffic—a particular problem since public-safety incidents requiring helicopter support are also likely to draw ENG helicopters. The pilot is also responsible for communicating with FAA air traffic control, which may be more or less burdensome depending on whether the mission takes the helicopter into congested and controlled airspace.

The pilot is busy enough with these essential tasks, and distractions regarding equipment, communications, and general ground activity can unnecessarily crowd his bandwidth. Consequently, the TFO is an essential second crewmember. He observes the ground, cross-checks the moving map display, handles radio calls with ground units, and suggests flight directions to the pilot. He is primarily responsible for operating the camera and the searchlight. Doing the job well requires street-cop skills, including geographic knowledge of the patrol area, knowledge of what constitutes suspicious activity, experience with how someone might flee or hide, and familiarity with the likely behavior of responding officers.

For the most part, the TFO makes the decision about where to go, but sometimes the pilot asks, “Do you think we ought to go check that out?” The TFO and pilot communicate over the aircraft intercom and do not need many words to fly the mission in the right way: both likely have access to the same moving map display, either on separate or shared video displays. The TFO may say, “They want us to leave Sector A and go over head the southwest corner of sector B,” or “They want us to orbit the McDonald’s,” or “Fly a heading of 300° and drop down a hundred feet.” Intercrew communications in Los Angeles and Fontana were succinct. As with any two-member aircraft crew, the two members assisted each other with targets on the ground: “See that high school football field? It’s just to the north and a bit west of the house with the solar cells on the roof in the swimming pool of the backyard.” “Slow down at this off ramp.” “Right pedal” meant the TFO wanted the helicopters slowed so that he could get a better view out the side window with binoculars. The TFO asked, “Can you come down a little bit?” when he needed a closer view from a lower height. In general, throughout this part of the mission, the helicopter remained at 500 to 600 feet AGL.
at a speed matching that of the traffic on the freeway. At one point, the pilot told the TFO that he was climbing a few hundred feet to remain well above some electric transmission line towers that were hard to see in the dark.

The distinction between the roles of pilot and TFO does not mean, however, that they do not constantly back each other up, and the TFO is constantly helping with navigation. He must be aware of the basic capabilities and limitations of the helicopter, and he should supplement the pilot’s lookout for other traffic. Similarly, the pilot must understand the mission tasks and make competent suggestions about how to meet these tasks.

A larger crew is necessary for load operations, especially those involving personnel insertion or extraction. Pilots must be able to fly at precise altitudes and speeds and control the helicopter so that the load does not swing. The pilot must also be able to follow intercom instructions immediately and precisely, especially in a single-engine helicopter where the pilot must have a strategy for managing the extremely demanding situation that would result from an engine failure.

TFOs for load operations must also have carefully honed and frequently practiced skill sets. These skills include monitoring the load; communicating with the pilot through hand signals; and securing load lines, tethers, and personnel vests.

Other crew members for load operations include a copilot to reduce pilot workload and additional crewmembers in the back to monitor the load and relay signals to the crew chief or pilot. Rescue personnel—who may themselves become human loads—may also be necessary. Recruitment and training of pilots and TFOs are considered in Part IV.C.2.

2. Training of TFOs and Ground Personnel

Public-safety agencies must have an appreciation of when and how helicopter assets can be helpful. AIR-ONE’s current training program is a good model. Participants in the AIR-ONE training session included approximately twenty-five officers from northern Illinois police departments, including several from the Northern Illinois Police Alarm System (NIPAS), its

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247 Co-authors Perritt and Cue participated in TFO and GSO training on November 20, 2013, involving personnel insertion and extraction via human load operations. See AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5. Co-author Perritt participated in an indoor training activity on December 10, 2013. The details presented in this subsection are based on that participation.
Emergency Services Team, and Mobile Field Force\textsuperscript{248} and the Illinois State Police. A representative from the FBI also participated. The training session began with a two hour PowerPoint presentation covering basic helicopter operations, helicopter safety, and survival.\textsuperscript{249} The following were specifically discussed in the presentation: tactical team mobilization; insertion of personnel through hover step-off, hoist, rapeling, and spy rigging;\textsuperscript{250} rapid extraction of injured persons; tactical emergency medical operations; unstable platform sniper; logistical support via cargo haul; FLIR and NightSun; and K-9 support\textsuperscript{251}

Safety was emphasized as the paramount value. AIR-ONE never launches without final signoff by its Safety Officer. The session included an overview of procedures for mission coordination, including availability of suitable electronic or paper maps, communication plans and frequencies, and designation of one mission coordinator for ground forces.

The training included basic, practical tips such as “avoid the tail rotor” and “don’t shoot through the rotor discs.” In addition, the training reviewed common errors, such as tensing up when the helicopter banks, which increases the risk of sliding free of restraints and falling out of the helicopter; losing situational awareness and thus knowledge of where a victim is when the helicopter lands; and becoming distracted by various sources like “the-lights-and-siren-are-so-cool!” syndrome felt by every law-enforcement officer from the first time he participated in an emergency response.

\textsuperscript{248} See id.

\textsuperscript{249} The presentation included guidance on how on-board personnel can position themselves to minimize injury in the event of a crash resulting from an engine failure or loss of tail rotor control. The presenters noted that, although two AIR-ONE Huey helicopters are equipped for long line operations, the organization prefers its twin-engine UH-1N to its single-engine UH-1V helicopter for human-external load operations and training. See generally Tactical Flight Officers Course 2013, AIRBORNE L. ENFORCEMENT ASS’N 1, www.alea.org/assets/cms/files/Conference/2013/501\%20TFO\%20Course.pdf (last visited Oct. 9, 2014).

\textsuperscript{250} The FBI cautioned against use of or training on fast-rope operations, as its risks are considerable. Long-line and short-line human-load operations can meet almost all of the needs addressed by fast-rope operations at less risk. See generally Helicopter Rope Suspension Techniques (HRST) Operations, U.S. MARINE CORPS 53, www.quantico.marines.mil/Portals/147/Docs/Range%20Management\%20Branch/PubInfo/3570/MCRP%203-11-4A.pdf (last visited Oct. 9, 2014).

\textsuperscript{251} A number of K-9 dogs have flown in AIR-ONE training missions. They usually exited the helicopter with their tails wagging. Careful preparation is necessary, however, to prepare the dogs for the noise and movement of the helicopter. See generally AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5.
Static drills in the AIR-ONE helicopters followed the presentation. The drills included armed officers dressed in their tactical gear. The purpose of the exercises was to build muscle memory on basic procedures and to make safety and effective deployment instinctive.

Although this particular training activity was obviously aimed at large scale operations, its basic coverage of helicopter safety and capabilities, and coordination between ground personnel and aircrews, is appropriate for a broad spectrum of public-safety personnel. Two components of a training initiative are appropriate: one aimed at current personnel and the other aimed at new officers. A similar training segment should be added to police academy curricula so that all law-enforcement officers appreciate how helicopters complement conventional forces in various tactical situations.

The theme of this article is that helicopter support for public-safety operations can be more widely available if mechanisms exist for sharing. This applies to aircraft, equipment, personnel, and training. The next part considers organization structures the law makes available for helicopter sharing.

V. ORGANIZATIONAL ALTERNATIVES

More communities could benefit from helicopter support of public-safety operations if helicopters were shared among multiple agencies. A variety of ways exist to accomplish such sharing. One agency may own air assets and enter into agreements with other agencies; multiple agencies may contract with a single private operator; a separate organization like AIR-ONE can be established as a kind of mutual aid pact. Alternatively, the Civil Air Patrol\(^2\) (CAP) can be adapted to cover all or part of the need.

A. OWNING AND CONTRACTING

Public-safety agencies can get access to helicopter support in four basic ways: they can buy one or more new helicopters;\(^3\) they can buy one or more used helicopters; they can obtain sur-


\(^3\) Leasing is another possibility, but this Part does not consider leasing separately because a lease can be structured to be almost indistinguishable from a purchase, such as a twenty-year dry lease for a helicopter alone, without associated services. See generally Helicopter Leasing: Dry Lease vs. Wet Lease, MILESTONE AVIATION GRP., http://milestoneaviation.com/helicopter-leasing/helicopter-leasing-dry-lease-vs-wet-lease (last visited Oct. 9, 2014). Or it can be structured to be
plus government helicopters through the Defense Logistics Agency program, or they can contract for services from a private operator.

With any of these options, the agency may unbundle the responsibility for keeping the helicopter well-maintained, safe, and operational. For example, the agency could own the helicopter and contract with a private operator for maintenance; it could own the helicopter and contract with a private operator for pilots and TFOs; or it could do everything itself. Cost drives much of this decision-making. If contracting costs are less than owning a helicopter, then contracting is an attractive option.

In the law-enforcement community, culture and experience are important as costs. As Part VI.C.3 explains, it is easier for a TFO who has significant on-the-ground law enforcement experience to do a good job flying a mission and coordinating with ground forces. That also may be true of the pilot, but less so. Not only does an experienced law-enforcement officer instinctively know how to provide good support, but ground personnel are also more likely to trust him.

Public-safety organizations with sufficient budgets can buy one or more helicopters and perform all operational functions themselves. Examples include the LAPD, the Chicago Police Department, the Federal Bureau of Investigation, the Mary-

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almost indistinguishable from the contract for services, say a six-month lease for a helicopter with crew and maintenance support. Id.


255 See generally, Helicopter Leasing: Dry Lease vs. Wet Lease, supra note 253.


258 Id.


land State Police, the California Highway Patrol, and some smaller departments such as the El Monte and Fontana police departments. But most agencies cannot afford to own helicopters.

Nor is it easy for small police departments to contract for helicopter support. Some functions are so specialized that public-safety departments are unlikely to find the requisite capability in the marketplace. Economies of scale that might exist for flight activities such as rides and tours, executive charter, and flight training do not exist for law-enforcement support. A fair amount of specialized equipment is necessary for effective law-enforcement support. Installation of such equipment in a helicopter makes it less suitable for the other flight activities. Moreover, a private operator is less likely to have access to a labor market from which the most desirable TFOs and pilots should be recruited. Therefore, a law-enforcement agency that organizes helicopter support internally has more options


266 Air Support, FONTANA POLICE DEPARTMENT, supra note 62.

267 In 2007, the United States had about 13,000 local police departments, 3,000 sheriffs' offices with primary law enforcement jurisdiction, and 49 state police agencies. Andrea M. Burch, Sherrifs' Offices, 2007 – Statistical Tables, BUREAU JUS. STAT. 6 (Table 1) (Dec. 6, 2012) available at http://www.bjs.gov/content/pub/pdf/so07st.pdf. Only seven percent of sheriffs’ offices used aviation assets, although the number rose to 59% for offices serving populations of one million or more, and 31% for populations of 500,000 to less than one million. Id. at 12 (Table 21). The percent drops to twelve percent and continues to decline in proportion to size for populations of 250,000 or less. Id. Those using aviation assets use helicopters more than fixed-wing aircraft. Id. at 13 (Table 26).

268 Part V.B explains economies of scale and scope.


270 See generally Lee Roskop, A Plea to Personal/Private Helicopter Operations, IN'TL HELICOPTER SAFETY TEAM, http://www.ihst.org/portals/54/essay/Essay_Fnl3_Personal_Flying.pdf (last visited Oct. 9, 2014) (illustrating private operators have more accidents and need more training).
for integrating the helicopter support with its regular law-enforcement activities.

On the other hand, it is not inconceivable that a national, more specialized operator might emerge. Such an operator would have a better understanding of best practices and good examples from other jurisdictions and could draw from a pool of seasoned TFOs and pilots who have the requisite law-enforcement experience. The lack of such operators may have less to do with economics (considered more broadly in Part V.B) than with law-enforcement culture that is skeptical of commercial operators' capacity to understand public-safety and law-enforcement needs.

The Fontana Police Department provides an example of the internalization of a helicopter support operation formerly performed by a contractor.271 Fontana contracted with a private operator to fly dedicated helicopter support for Fontana with two R44s.272 The private operator was owned by an airline pilot who managed the operation remotely. It flew with part-time pilots, each one assigned a day of the week. Over time, the contract operation was increasingly unsatisfactory, largely manifested in poor housekeeping of both the hanger space and the helicopters. Although no threats to safety were evident, the problem seemed to be that no one involved with the private operator had sufficient personal involvement in the operation to take any real pride.

Captain David Faulkner of the Fontana Police Department had unsuccessfully lobbied two previous chiefs to make a change in the private operator. He finally went to the third chief, himself an airplane pilot, and said, “We’re paying $500,000 a year to the private operator. Make the $500,000 available to me, and I’ll show you that we can set up our own operation, and that it will meet our needs much better.” With some trepidation, the chief agreed and allowed Faulkner to sell the idea to the city council.273

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271 The facts in the remainder of this subsection result from an interview between co-author Perritt and Capt. David Faulkner, Fontana Police Department. Interview with David Faulkner, supra note 107.
272 Air Support, FONTANA POLICE DEPARTMENT, supra note 62.
After the city council approved the project, Faulkner shopped aggressively for used R44s; he knew that he could not set up operation with his $500,000 and use a larger helicopter. He was familiar with the R44 capabilities from his flying with El Monte, and the city was familiar with the aircraft through the relationship with the contract operator. Faulkner found a law-enforcement R44 with only 140 hours on it. Its previous owner, an Australian agency, had never flown it on a mission due to local personnel hostility to Robinson helicopters. Faulkner purchased it and put another $100,000 into refurbishing and adding appropriate radio equipment.\(^{274}\) The aircraft flew some 1300 hours in its first year of operation and was down for maintenance for only three days of promised availability. During the first year, the air support unit was under budget. Now the Department flies the R44, an R66 turbine model, and has another R66 on order. Part IV.D recounts Faulkner’s leadership.

B. Market Structure and Contract Operators

Whether public-safety contract services are available depends on the market structure of the helicopter industry. The structure of the helicopter industry, as for any industry, is determined by economies of scale,\(^{275}\) economies of scope,\(^{276}\) and


\(^{275}\) Economies of scale exist when a larger seller is more efficient than a smaller seller because of its size. When economies of scale exist in an industry, one expects to see consolidation: fewer, larger sellers reflecting concentration. When economies of scale do not exist or if diseconomies of scale exist, one expects to see more, smaller operators, reflecting fragmentation. George J. Stigler, Monopoly, CONCISE ENCYCLOPEDIA ECONOMICS, http://www.econlib.org/library/Enc/Monopoly.html (last visited Oct. 9, 2014).

\(^{276}\) Economies of scope exist when a seller with a wider range of products is more efficient than a seller with a more limited range. Economies of Scale and Scope, ECONOMIST (Oct. 20, 2008), http://economist.com/node/12446567. Economies of scope exist when a seller can lower his per-unit costs by offering more than one product line. Id. For example if the seller of peanut butter also sells jelly and bread, its costs per unit sold are lower than if it sells peanut butter alone. Peanut butter, jelly, and bread are complementary products and are usually sold together. One sales call and one delivery trip can provide all three products to retailers at the same cost for providing peanut butter alone. When economies of scope exist, diversification is the norm. When economies of scope do not exist, specialization is the norm.
economic barriers to entry. These are not entirely independent concepts. If one market can be served effectively only with a $3 million helicopter, the cost of that asset represents a barrier to entry. Its cost also suggests economies of scale: if the market supports only ten flight hours per month, and the helicopter is too specialized to be useful in other market segments, the rate of return will be far too low to justify investment. On the other hand, if the market supports one hundred flight hours per month, the investment can be justified. The larger scale of the hundred-hour market drives the economics into positive territory.

Whether economies of scale exist and whether they can be captured by an enterprise are two different questions. An operator might have a helicopter that needs one-hundred flight hours per month to break even, but he may lack the number of pilots needed, or lack the marketing capacity to pull in that many customers. Another firm with the same helicopter, more marketing muscle, and more pilots could realize the economies of scale.

The industry structures of different segments of the helicopter services market illustrate these economic considerations. EMS is dominated by large national operators. Air Methods has more than 400 helicopters deployed at some 300 operating

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277 See R. Preston McAfee et al., What is a Barrier to Entry?, Am. Econ. Rev. 94(2), 461, 463, 465, available at http://pubs.aeaweb.org/doi/pdfplus/10.1257/0002828041302235. Barriers to entry can be direct and monetary in nature or they can be indirect and involve time or psychological values. For example, a person might choose between earning a living as a newspaper route deliveryman or starting up a helicopter service, say by buying a helicopter and offering rides and tours. The barriers to entry are vastly different. If he chooses the aviation option, he has to buy or lease a helicopter and become trained as a pilot, which requires both substantial time and substantial money. If he chooses the newspaper delivery option, the barriers to entry are close to zero, especially if he already has a car.

278 Depending, of course, on what price per flight hour buyers are willing to pay.

bases. Most of Air Methods' helicopters serve more than one healthcare institution. Air Evac is only slightly smaller and performs a similar role. In some cases, EMS helicopters are shared through a non-profit organized by healthcare providers. For example, CareFlite is a Texas 501(c)(3) nonprofit controlled by five Dallas-area hospital systems. “CareFlite responds to requests from hospitals, fire departments, EMS agencies, and law-enforcement within a service area of more than 100 counties in a 150-mile radius of the Dallas/Fort Worth Metroplex.”

Some large regional or national operators serve other markets in addition to EMS. Large oil-and-gas operators, for example, also have a presence in the EMS market. One such operator, PHI, Inc., bills itself as the “total helicopter company,” flying offshore oil-and-gas, air-medical, and onshore mining missions. Based in Lafayette, Louisiana, PHI flies 165 helicopters for offshore oil and gas missions out of 45 PHI heliports around the world. Deepwater oil and gas activity is its strategic fo-

280 About Air Methods, supra note 279.
283 About Us, CAREFLITE, supra note 282. CareFlight responds to requests from “Texas Health Resources (Harris Methodist, Presbyterian and Arlington Memorial Hospitals), Methodist Health System, Baylor Health Care System, Parkland Health and Hospital System, and the JPS Health Network.” Id.
284 Id.
286 Id.
287 Id.
288 Id.
289 Id. PHI flies a fleet of Bell 206Ls, Bell 407s, AS350B2s, BK117s, EC-145s, EC135s, Bell 222s, Bell 430s, Bell 212s, Bell 412s, Sikorsky S-76As, Sikorsky S-76 Cs, AW 139s, and Sikorsky S-92s. Our Fleet, PHI, Inc., http://www.phihelico.com/phi-general-info/information/our-fleet (last visited Oct. 9, 2014); see also Annual Report, PHI, INC. (2012) [hereinafter Annual Report, PHI, INC.], available at http://www.phihelico.com/docs/Investor%20Relations/2012/2012%20Annual%20Report.pdf (listing numbers of specific helicopter models operated by PHI).
Era Helicopters, LLC is a somewhat smaller operator—170 helicopters—serving the "offshore oil-and-gas transport, air medical services, SAR, firefighting, flightseeing, and disaster relief" markets. Most of its revenue comes from oil and gas activities, with only seven percent from air medical services in 2012.

Helicopter ENG is another segment where concentration is high. U.S. Helicopters, based in North Carolina, and Helicopters, Inc., based in St. Louis, dominate this market. Both provide full-service, turnkey contracts to local stations. Although ENG helicopters are typically branded to one station and wear the livery of that station, resources are shared in the sense that the contractor is responsible for recruiting, training, and dispatching pilots and equipment operators and for maintaining the helicopters. Industrial helicopter operations are also concentrated, although operators tend to be regional rather than national. Haverfield and Air 2 are examples.

At the other end of the size spectrum, hundreds of air-taxi and flight-training operators exist, each typically with two or three helicopters. Most of these operators offer rides and tours, executive-charter, and aerial photography. This industry prompts two questions: (1) why are some parts of the industry fragmented while other parts are consolidated, and (2) why do public-safety agencies not contract for helicopter support as...
hospitals and television stations do? In a perfect market, users of helicopter services, including public-safety agencies, would contract out (i.e., purchase the services in the marketplace) if doing so is more efficient than performing the services internally.

Several factors inhibit contracting with private operators for public-safety helicopter support. Diseconomies of scope discourage operators from seeking to penetrate this market. A small commercial operator does not need a FLIR camera, a searchlight, or radio communications on public safety frequencies to conduct its rides, tours, and executive charters.\(^\text{301}\) It does not need TFOs. The operator could invest in these additional items of physical and human capital, but the market advantages from doing so are unclear. The equipment and skills useful for public-safety support would go unutilized in the operator's original line of business.

Diseconomies of scope, however, account only for the absence of smaller operators. Why do larger national or regional EMS, industrial, ENG, or oil-and-gas operators not have a piece of the public-safety market? Why is a private-contract sharing model so robust for ENG and EMS,\(^\text{302}\) and almost entirely absent for SAR, natural disaster, counter-terrorism, and law-enforcement support? The economies of scale are substantial for all of them. For example, Air Methods dispatches most of its community-based locations and some hospital-based locations from a centralized dispatch facility in Omaha, Nebraska.\(^\text{303}\) Maintenance for a larger fleet can be organized more efficiently than for one or two helicopters.

One answer is the lower elasticity of demand in healthcare, commercial broadcasting, and oil-and-gas exploration—customers find it easier to justify paying the full cost of helicopter support. The debate over health care reform has long recognized that price resistance is almost entirely absent in the market for healthcare services. Eighty percent of Air Methods revenue involves fixed monthly fees, and twenty percent results from hourly flight fees. This revenue does not depend on when or if customers are reimbursed by patients, healthcare insurers, or the federal government.\(^\text{304}\) Indeed, most of the reforms over the


\(^{302}\) See, e.g., About Us, CareFlite, supra note 282.

\(^{303}\) Air Methods 2012 Report, supra note 281, at 2.

\(^{304}\) Id. at 1.
last twenty years have focused on trying to introduce incentives to control price and quantity of consumed services.\textsuperscript{305}

As with other medical services, when a healthcare provider decides that helicopter transport is necessary to save a life, he simply orders the service, and it is provided; reimbursement details are worked out later. Similarly, an ongoing ratings war drives the behavior of broadcasters.\textsuperscript{306} If one station in a market flies a helicopter to provide viewers with overhead photography of traffic congestion and emergency incidents, every other station in the market is likely to follow suit if sufficient financial resources are available.

These forces do not operate in the broader market for public-safety support. Tight law-enforcement budgets are controlled at the local level where helicopters are often perceived as expensive toys. A contract with even a small operator is likely to cost an agency about $500,000 to $700,000 per year.\textsuperscript{307} At that price an agency could buy a Robinson R44.\textsuperscript{308}

There is less resistance, however, to devoting resources to homeland security and natural disaster relief. Accordingly, to the extent that helicopter assets can be useful for these purposes, it is more likely that support can be obtained for them.

This analysis of industry structure suggests that the market is unlikely to provide the level of public-safety helicopter support that would be optimal from a public-interest standpoint, and, as Part V.A observes, law-enforcement culture militates against contracting out law-enforcement support services.

C. ENG AND PUBLIC SAFETY

Journalism and public safety have an uneasy relationship in a free society. On the one hand, both are attentive to threats to public safety. Law-enforcement, firefighters, emergency


\textsuperscript{308} Id.
preparedness agencies, and paramedics seek to reduce such threats while news-gathering organizations cover these threats and governmental responses. Public-safety and ENG helicopters are often overhead the same incidents. Moreover, ENG helicopters are well-equipped for police support. ENG flight crews have similar capabilities as police helicopter aircrews, and police and ENG helicopters are often interested in the same incidents.

Explicit sharing arrangements between police and ENG operators are unlikely, however. Too much mistrust exists between the media and law-enforcement. Few law-enforcement agencies would be willing to share all their video with news organizations due to security and liability concerns. ENG operators are flying to do a job (e.g., gather news in video form for a TV broadcast) for which they are getting paid. They are not getting paid to aid in public safety or to assist law-enforcement helicopters. In certain scenarios the station will relay information to law enforcement.

On the other hand, cooperation already exists. Both sides understand the need to share the sky. ENG operators yield right of way to law-enforcement helicopters, and law-enforcement does not establish a temporary flight restriction (TFR)\textsuperscript{309} that would impede helicopter news gathering. An unwritten code exists between pilots and operators. If ENG operators are first on the scene and a law-enforcement helicopter comes in, the ENG helicopter will back off or climb higher. Typically, law-enforcement helicopters need to fly lower than do properly equipped ENG helicopters, which can use zoom lenses to gather video. The ENG pilot communicates with the police-pilot—usually over a Common Traffic Advisory Frequency (CTAF) frequency\textsuperscript{310} and provides basic details about the scene and the ENG pilot’s intentions. If ENG is second on the scene, the ENG pilot does not expect details from the police; he simply does what he does best: captures the moment without the help of law enforcement. As long as the ENG pilot stays out of the way, there is no friction between the two.

On occasion, cooperation is deeper. ENG helicopters have supplemented surveillance or search, kept alert for a fleeing vehicle or suspect, plugged holes in a perimeter, or stayed on sta-


tion while the law-enforcement helicopter refuels. Such assists are spontaneous. The possibility of formalizing them is remote.

Certain sensitive missions, such as barricade situations, are endangered by contemporaneous broadcasts of news imagery. Law-enforcement agencies and ENG operators could agree on a protocol for designating certain situations in which broadcast would be delayed. In exchange, the public-safety operator might provide video imagery and recorded radio communications to news organizations after-the-fact.

D. Mutual Aid Pacts

Given the small size of most municipalities, local units cooperate on many public-safety matters. Since the early 1970s, local governments have explored mechanisms for coordinating the resources and activities of local law enforcement, firefighting, public health, public works, and private-sector actors. They often do so via a legal structure of long standing known as a "mutual aid" pact. Mutual aid pacts may be authorized by ordinance or statute, expressed in intergovernmental contracts, or created informally. Such pacts permit or obligate public-safety agencies to come to one another's assistance upon request. Usually, the responding personnel work under the

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513 Id. at 491 (describing early efforts in California relating to major wildland fires).
514 Id. at 504, 541.
516 ILEAS has published a standard mutual aid agreement on its website. Id. § 1.
517 The Illinois agreement gives law-enforcement agencies the option to respond to requests with "personnel, equipment, facilities, or services," that are "available." Id. § 3.
command of the requesting agency. In larger incidents, the state police and the FBI may get involved as well.

In Illinois, for example, law-enforcement agency interest in mutual aid agreements grew after the success of Mutual Aid Box Alarm Systems (MABAS), a system for statewide mutual aid for fire, EMS and associated special operational services. Concretely, ILEAS requires member agencies to maintain data on numbers of officers and supervisors, types and number of vehicles and specialty equipment, and translators in an ILEAS database. When a member agency requests assistance through the ILEAS dispatch center, the dispatcher enters it into the database, which creates an "alarm card" that forms the basis of requests for assistance. ILEAS is based on the success of NIPAS which was formed in 1983 and now comprises some ninety-three municipalities in five northern-Illinois counties.

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318 "Law enforcement personnel from the aiding agencies shall report to and shall work under the direction and supervision of the stricken agency," and are to be made available without reimbursement. Id. § 3.


321 Id. at 7.


323 Id.

324 See NORTHERN ILL. POLICE ALARM Sys., http://www.nipas.org (last visited Oct. 10, 2014); see also The Northern Illinois Police Alarm System Emergency Services Team, MILITARYPHOTOS.NET (Feb. 8, 2006), http://www.militaryphotos.net/forums/showthread.php?71843-Nipas-Est (featuring a 2006 article on NIPAS recruitment, training, and equipment). "The requesting agency's incident commander contacts the system's dispatching center, Northwest Central Dispatch System," a consortium of sixteen police and fire departments in northwest Cook County, "and identifies the level of response needed." See NORTHERN ILL. POLICE ALARM Sys., supra; Agency Profile, NORTHERN CENT. DISPATCH Sys., https://www.nwcds.org (last visited Oct. 10, 2014). "There are ten levels, each one calling for an additional five officers to respond according to a pre-determined alarm plan. Thus, Level 1 requires five officers to respond; Level 10 requires fifty. The dispatch center quickly sends the appropriate number of fully equipped officers to a pre-selected mobilization point within the requesting agency’s jurisdiction. The incident commander also deploys a personnel officer, who records each officer’s arrival and assigns each one as required." NORTHERN ILL. POLICE ALARM Sys., supra.
In 2002, Congress mandated nationwide adoption of “incident management systems” and charged the Department of Homeland Security with the responsibility of developing a National Response Plan and National Incident Management System (NIMS). The National Response Plan requires the establishment of “local, state, and Federal Emergency Prevention and Preparedness Councils” (PPCs). “Both NFPA 1600 and state law require local emergency-management agencies” to maintain local disaster-emergency plans. Mutual aid agreements are an essential part of these plans. FEMA assists local agencies with training.

The Incident Command System (ICS) is part of NIMS and provides a method of unified command in which all responders operate under the direction of the person in charge of the incident. It has a brief section on organization of air operations.

The Illinois Emergency Management Agency Act authorizes the establishment of IEMA.

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327 Id. at 501-02.
328 Id. at 540.
329 Id. at 541.
332 Id. at 89.
333 Id. at 101-02.
335 Id. § 2(a)(1); ILL. EMERGENCY MGMT. AGENCY, http://www.state.il.us/iema/ (last visited Nov. 11, 2014); see also Fla. Office of the Attorney Gen., Advisory Legal Opinion-AGO 99-22 (April 28, 1999), available at http://www.myfloridalegal.com/ago.nsf/Opinions/1DFC2FBB064AB97D85256761006D4C6D; N.C. DEPARTMENT OF JUSTICE, L. ENFORCEMENT LIASON SEC., MUTUAL AID AGREEMENTS BETWEEN LAW ENFORCEMENT AGENCIES IN NORTH CAROLINA (February 2009),
E. STATE AND COUNTY HELICOPTER UNITS

One obvious institutional mechanism for providing shared helicopter assets to smaller public-safety agencies is to have the state or county provide them. The Maryland State Police is an example. The Massachusetts State Police is a more modest example. The Massachusetts State Police makes available one of its helicopters to fly overhead patrols for the Boston Police Department. The limitation on this approach is uncertain availability to meet local demands, as the Fontana Police Department experience with the San Bernardino Sheriff’s Department shows.

F. THE AIR-ONE MODEL

AIR-ONE operations are headquartered at the Waukegan airport, in the northeast corner of Illinois. It uses volunteers to pilot a fleet of seven helicopters, which were available at http://www.ncsheriffs.org/documents/Mutual-Aid-Agreement-Oct 2008.pdf.

According to AIR-ONE’s website, AIR-ONE is a 501(c)(3) non-profit corporation organized under the laws of Illinois. AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5.


"Aircraft," AIR-ONE EMERGENCY RESPONSE COALITION, http://www.whpd.org/leac/aircraft.html (last visited Oct. 10, 2014) [hereinafter Aircraft, AIR-ONE EMERGENCY RESPONSE COALITION] (detailing helicopters donated to AIR-ONE including: Bell OH-58C N79PD (received in 2006; operational; registered to Winthrop Harbor Police Department); Bell OH-58C N92PD (received in 2007; operational; registered to Byron, Illinois Police Department); OH-58C N62PD (received from the Department of Defense in January, 2007; refurbishment and equipment additions underway; registered to Stephenson County, Illinois Sheriff’s Office); OH-58C N581WC (received in 2012; refurbishment and equipment additional underway; registered to Winthrop Harbor Police Department); Bell UH-IV N67PD (received in 2009; refurbishment and equipment additional underway; registered to Winthrop Harbor Police Department); and Bell HH-1N N88SD (received 2011; refurbishment and equipment additions underway; regis-
donated to Air-One by the Department of Defense surplus program for law enforcement. Air-One resources are dispatched by the Winthrop Harbor Police Department. Air-One’s helicopters are formally registered to police and sheriff’s departments in Illinois and Wisconsin. Air-One provides the operational infrastructure. This arrangement is to allow Air-One’s helicopters to qualify as “public aircraft.”


345 AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5.

346 See Aircraft, AIR-ONE EMERGENCY RESPONSE COALITION, supra note 343.

347 See AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5.

348 “Public aircraft” is statutorily defined as “(C) An aircraft owned and operated by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, except as provided in section 40125(b).” 49 U.S.C. § 40102(41) (2012). 49 U.S.C. § 40125(b) divests an aircraft of its public aircraft status if it is used for commercial purposes or to carry an individual other than a crewmember of qualified non-crewmember. Id. § 40125(b). 49 U.S.C. § 40125(a) allows aircraft to be used by one governmental entity on behalf of another with reimbursement without losing its public aircraft status. Id. § 40125(a)(1). This is subject to a proviso “that no service by a private operator is reasonably available to meet the threat.” Id. The FARs define “civil aircraft” to exclude “public aircraft” and define “public aircraft” as “an aircraft owned and operated by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments; or an aircraft exclusively leased for at least 90 continuous days by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments,” but only when such aircraft are “not being used for a commercial purpose or to carry an individual other than a crewmember or qualified non-crewmember.” 14 C.F.R. § 1.1 (2014). In addition, the FAA Administrator may exempt a federal, state, or local government from any regulation if he finds that the exemption is necessary to prevent an undue economic burden and that the unit of government has an effective and appropriate aviation safety program. 14 C.F.R. § 11.103. “The distinction between civil and public aircraft is that public aircraft are excepted from many FAA regulations.” Revision of Public Aircraft Definition, 68 Fed. Reg. 25486-02 (May 13, 2003). For example, airworthiness, flight manual, and placard requirements only apply to “civil aircraft.” See 14 C.F.R. §§ 91.7, 91.9. The same is true of the prohibition against dropping objects that may create a hazard to persons or property. See 14 C.F.R. § 91.15. The maintenance requirements in Subpart E apply only to “civil aircraft.” 14 C.F.R. § 91.401(a). On the other hand, basic flight rules apply to all aircraft. See 14 C.F.R. § 91.101. This includes VFR weather minimums. See 14 C.F.R. § 91.155 (“no person may operate an aircraft”).
AIR-ONE flies public-safety missions throughout northern Illinois and southern Wisconsin. Local departments are not charged for these operations. AIR-ONE covers its operating costs through a combination of private donations, grants from government agencies, and the flow of equipment donations from the federal government. Its organization and personnel are closely integrated with law enforcement and public safety departments.

The AIR-ONE model offers significant advantages over the alternatives considered in this Part. It also has some shortcomings, which are analyzed in Part VI. Because AIR-ONE uses volunteer aircrew personnel, it reduces personnel costs. The availability of AIR-ONE’s support does not obligate public-safety agencies to enter into contracts, and as a result, it provides flexibility to the agencies. Also, AIR-ONE helicopter services are available on-demand without requiring public-safety agencies to own their own helicopters, so it significantly reduces political barriers to use.

The relationship between AIR-ONE and public-safety agencies is not, however, entirely at arms-length, which provides another advantage. Most of the members of AIR-ONE’s board of directors are public safety personnel, ranging from the sheriffs of Lake County, Illinois and Kenosha County, Wisconsin, to police chiefs and other senior law-enforcement personnel from the two states. AIR-ONE’s operational supervision is also conducted mainly by people holding positions in the municipal law enforcement agencies. Beyond this means of integration between service provider and service user, the integration is strengthened further by the policies of some public-safety agencies who are making their on-duty sworn personnel available to

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350 Id.
351 AIR-ONE EMERGENCY RESPONSE COALITION, supra note 5.
352 See generally Our People, supra note 342.
353 Id.
354 See id.
355 See id.
serve on AIR-ONE aircrews. Also, some public-safety agencies pay the cost of fuel for specific missions.

The AIR-ONE model offers the same advantages as those presented by the contract provisions of helicopter services for EMS and ENG. At the same time, the AIR-ONE model avoids the EMS and ENG barriers for use of private-sector models by relieving public-safety users of the cost of helicopter acquisition, wages, and maintenance costs. The question, of course, as Part VI.C.1. considers, is whether this volunteer model is sustainable. While a volunteer model is sustainable for volunteer fire departments and the CAP, both organizations receive substantial subsidies from different levels of government.

VI. EXTENDING THE AIR-ONE MODEL AND OVERCOMING OBSTACLES

Despite the attractive nature of the AIR-ONE model, its services are not being used as intensively by Illinois and Wisconsin public-safety agencies as they could be. This part identifies the barriers that stand in the way of greater utilization of the AIR-ONE model and suggests ways to overcome them, in light of the achievements of other public-safety helicopter operations involving shared resources.

The major barriers to wider use of the AIR-ONE model, both in its existing service area and in other states, relate to educating potential requesting agencies about the utility of helicopter support and the way to use it most effectively. Otherwise, any operator like AIR-ONE will be either ignored or besieged with unsuitable requests that lead to disappointment. Illinois and

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357 See Agency Contributions, AIR-ONE EMERGENCY RESPONSE COALITION, http://www.whpd.org/leac/support8.html (last visited Oct. 9, 2014) (describing agency donations that contribute to AIR-ONE's ability to provide air-support services).


Wisconsin are not like California, where helicopter support of public safety has been well-accepted for years.\textsuperscript{360} To encourage use of public-safety helicopters, agencies must understand the determinants of success. In some cases, AIR-ONE exemplifies these determinants; in other cases, it has more work to do.

A. DETERMINANTS OF SUCCESS

1. Integration of Air and Ground Forces

Effective coordination of helicopter and ground assets is essential for effectiveness.\textsuperscript{361} This can be accomplished by direct communication between aircrew and individual ground units, as in patrol support, or it can be accomplished by more formal, military-style command-and-control protocols.\textsuperscript{362} The keys to good coordination are well-trained and experienced TFOs and an appreciation by ground personnel of the power of helicopter assets.

2. Building Support in the Public-Safety Community

Training police personnel to utilize both helicopter assets and an AIR-ONE doctrine would greatly increase the effectiveness of helicopter assets. What the public sees on television—long automatic weapons, armored vehicles, helmets and vests—are less important than more mundane matters relating to communication and coordination.\textsuperscript{363} To a considerable extent, good coordination of air and ground forces is a function of good basic training for public-safety departments.\textsuperscript{364}

\textsuperscript{360} See Air Operations, PASADENA POLICE DEPARTMENT, \url{http://www.cityofpasadena.net/police/air_operations_home} (last visited Oct. 10, 2014).

\textsuperscript{361} TONY L. JONES, SWAT LEADERSHIP AND TACTICAL PLANNING 31 (1996) (stressing need for effective command to assure members work as a team); see HEAL, supra note 204 (describing effective command-and-control structures for civilian law-enforcement). "[Helicopters] with [their] reconnaissance and security assets can assist the force commander by providing accurate information in virtually all environmental conditions and throughout the full spectrum of conflict." U.S. ARMY, FIELD MANUAL No. 1-100, ARMY AVIATION OPERATIONS, FM 1-100 (1997) [hereinafter U.S. ARMY, ARMY AVIATION OPERATIONS], available at \url{http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/fm1_100.pdf}; see also U.S. ARMY, FIELD MANUAL 3-04.113, UTILITY AND CARGO HELICOPTER OPERATIONS, FM 3-04.113 (FM1-113), at B-3, available at \url{http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/fm3_04x113.pdf} [hereinafter FM1-113] (specifying methods of coordinating air and ground assets).

\textsuperscript{362} See U.S. ARMY, ARMY AVIATION OPERATIONS, supra note 361, at 27-28.

\textsuperscript{363} See HEAL, supra note 204.

\textsuperscript{364} See JONES, supra note 361, at 75 (explaining elements of tactical chain of command).
Competition and game playing exists in the public safety community, just like everywhere else. In one case, a helicopter support unit declined to respond to any calls after 11 PM, even though it had resources available. When the helicopter unit from an adjoining jurisdiction responded to a backup call after the first unit refused, a minor bureaucratic turf war ensued because the first unit intended its unresponsiveness to build pressure from political authorities to provide additional resources. Adopting the AIR-ONE model would reduce such gamesmanship.

In addition to offering a good framework for helicopter operations in support of public-safety agencies, the Air-One model makes it more likely that training will take place on a statewide basis. When public safety agencies own helicopter assets separately and use them only for their own missions, they have no incentive to train the personnel of other departments. Many public-safety agencies protect their independence from each other; for instance, the Chicago police and fire departments maintained separate helicopter operations. The AIR-ONE model also provides a stronger justification for state-funded training. For example, the model enables state legislatures and executive agencies to say, “Do, and pay for, your own training.”

Public-safety personnel must think of helicopters when they might be useful; at the beginning of a crisis. It does little good to wait and request helicopter support twelve or so hours after a search has begun. Thinking, “We tried everything else and it hasn’t worked. Let’s see if the helicopter can help out,” is not an effective approach. In AIR-ONE’s case, adding representatives to its board from the firefighting community increased AIR-ONE’s willingness to embrace new ideas for deploying and managing public safety resources.

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366 See Our People, supra note 342 (listing Fire Chief Mark Kirschhoffer as a member of AIR-ONE’s Board of Directors).
Concern about increased liability is a major barrier to sharing helicopter resources. Nearly every requesting agency already is concerned about liability and has insurance coverage to protect against the risk.\footnote{See Michael A. Brave & Steven D. Ashley, \textit{Law Enforcement Jurisdictional Issues}, \textsc{Pub. Risk}, May–June 1996, at 11, available at http://www.ecdlaw.info/outlines/Brave%20-%20Article%20-%20Managing%20the%20Risk%20of%20Jurisdictional%20Problems.pdf (discussing risk management and other issues when law-enforcement officers operate outside their primary geographic boundaries, pursuant to mutual aid pacts and otherwise).}

1. \textbf{Sources of Liability from Using Helicopters and from Failing to Use Them}

Naturally, when an agency is presented with an idea for new capabilities, especially if they are to be shared, the question arises whether the assisted municipality might incur liability that would not be covered by insurance and/or whether the assisting entity would have insurance coverage. To some extent this concern may be a red herring; all public safety agencies face liability concerns, especially with respect to allegations of police violation of civil rights.\footnote{See, e.g., Garcia v. O'Keefe, 825 N.Y.S.2d 38, 38 (N.Y. App. Div. 2006) (reversing $206,000 judgment for plaintiff on police brutality claim); see also \textit{Heal}, supra note 204, at 20–21 (reviewing indications of increasing liability exposure for civilian law enforcement).} Liability associated with these missteps probably far exceed liability for a helicopter mishap. But careful economic analysis and quantification of risk may not matter. Municipal decision-makers, already worried about liability for police misconduct, may simply be risk-averse when it comes to any new liability source.

There is little doubt that entities contracting for helicopter support may be liable for injuries resulting from crashes.\footnote{In re Sept. 11 Litig., 280 F. Supp. 2d 279, 291–93 (S.D.N.Y. 2003) (extensively reviewing caselaw establishing duty to persons on the ground).} In \textit{Talbott v. Roswell Hospital Corp.}, for example, the New Mexico intermediate court affirmed judgment on a jury verdict for the victim of a helicopter crash during a public-safety training exercise.\footnote{Talbott v. Roswell Hosp. Corp., 192 F.3d 267, 269, 275 (N.M. Ct. App. 2008).} Among other things, the evidence showed that the hospital defendant failed to make inquiry that would have revealed “internal problems and leadership issues” in the operation of its
SHARING PUBLIC SAFETY HELICOPTERS

independent contractor helicopter operator that would jeopardize safe operation.371

Conflicting demands on both sides need not prevent an agreement. Illinois law expressly permits local public entities to shift liability pursuant to an agreement.372 Such agreements are usually common in the context of mutual-aid pacts. The relevant topic for negotiation is not speculation over liability exposure, but how it should be insured against, as considered in Part IV.B.3.

Instead, what should be in the spotlight of risk management is the possibility that a public-safety agency’s liability may be increased by failure to use helicopter assets.373 While it is plausible that a public-safety agency may be liable for mishaps resulting from helicopter support of its operations, it is also plausible that it might be liable for not using helicopter support.

Sovereign immunity is not the barrier it once was. In Prough v. Madison County, the estate of a victim sued for damages, claiming that the sheriff’s department improperly released a shooter from custody.374 The court explained the replacement of absolute common-law sovereign immunity in Illinois by a limited statutory waiver.375 Now, a unit of local government may be liable in tort to the same extent as a private party, unless it can establish an immunity under the state Tort Immunity Act.376

A plaintiff’s argument could comprise three elements: (1) The public safety agency had a duty to avoid foreseeable risks of harm to the public; (2) Failure to employ helicopter support was a wanton and willful disregard of best practices; and (3) Employment of best practices would have prevented the harm to the plaintiff. Public-safety agencies have the same duty that anyone has to avoid foreseeable injury resulting from affirmative acts.

Whether an agency also has a duty to act—a duty to protect a potential victim—depends on whether the defendant law-enforcement agency has a “special relationship” with the victim.377

371 Id. at 274.
373 See generally Heal, supra note 204, at 7–10 (describing law enforcement “fiascos” and their potential to lead to increased liability).
375 Id. at 1182–83.
376 Id. at 1183.
377 See Beers v. Corp. of President of Church of Jesus Christ of Latter Day Saints, 316 P.3d 92, 98–100 (Idaho 2013) (explaining special relationship re-
Physicians and surgeons have a special relationship with their patients, resulting in a heightened standard of care. Similarly, in the law-enforcement context, law-enforcement agencies regularly avoid liability to members of the general public under the "public duty doctrine," which can be overcome by showing that a public agency had a special relationship with the victim.

A plaintiff seeking to base liability on the public-safety agency's failure to use helicopter support could establish a special relationship and premise breach on the agency's failure to use best practices to protect the public, of which the victim was a member. Alternatively, a plaintiff could focus its breach argument on what the public-safety agency did instead—conducting a high-speed vehicle chase on the ground, for example. That would premise the plaintiff's breach theory on affirmative acts creating a foreseeable risk of harm.

Public-safety agencies have a duty, circumscribed by sovereign immunity, to avoid foreseeable risks of harm arising from the affirmative conduct of their employees and contractors. That public-safety agencies may also have a duty to avoid foreseeable risks of harm arising from a failure to act is arguable.

Plaintiffs in medical malpractice cases regularly recover based on evidence that the defendants failed to use best practices in providing care. In *Rosa v. Lawrence and Memorial Hospital*, for example, the Connecticut intermediate court affirmed a multimillion dollar verdict for malpractice against an anesthesia provider for using the wrong device to administer anesthesia. Medical malpractice caselaw can be extended to the public-safety context only by establishing a "special relationship" between public-safety agencies and members of the public who are injured by their practices.

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583 Id. at 541, 559 (summarizing expert testimony on the standard of care).
Plaintiffs recover for law-enforcement "fiascos," with the courts evading an explicit decision on whether a special relationship was established. In such cases, avoiding sovereign immunity flows from establishing breach of duty under a heightened standard. In *Rivera v. Garcia*, the Illinois intermediate court reinstated a jury verdict and held that the parents of a teenager were entitled to recover damages for injuries and death resulting from a high-speed police chase. The evidence showed that police officers had used an unmarked vehicle, contrary to Chicago Police Department policy. Gunfire ensued and intensified as other police vehicles responded. At trial, the plaintiff introduced police-department procedures on pursuits and the testimony of an expert to show that the defendants were "reckless, dangerous and nonconforming with applicable police practices and that the overall management of the pursuit exhibited a conscious disregard for the safety of others," thereby constituting willful and wanton conduct—the standard necessary to overcome the statutory immunity. On the outcome-determinative issue of proximate causation, the appellate court held that the harm to the victims was reasonably foreseeable.

A plaintiff must therefore answer two questions to establish the first element in proving a public-safety agency's liability for failure to use helicopter assets. The first question is when would a foreseeable risk of harm arise from failure to use helicopter assets, giving rise to a duty. The second question is the standard according to which facts would establish a breach of the duty under the willful-and-wanton standard, which is usually necessary to overcome sovereign immunity.

The basic standard is a familiar one: a duty to avoid foreseeable risks of harm. In *Commonwealth v. Peterson*, the Virginia Supreme Court applied this standard and reversed a damages judgment in favor of the estates of victims of the 2007 Virginia Tech shootings. The administrators of the estates had filed actions under the Virginia Tort Claims Act for breach of the duty to warn arising after a foreseeable risk of harm occurred.

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585 *Id.* at 1238.
586 *Id.* at 1239.
587 *Id.* at 1240.
588 *Id.* at 1242–43.
590 *Id.* at 308.
because of initial shootings in a Virginia Tech dormitory.\textsuperscript{392} After the jury was instructed, "[they were] told that if they found that the university employees should have reasonably foreseen that injury arising from the criminal conduct of a third party might occur but failed to warn students, the Commonwealth should be found negligent."\textsuperscript{393} The jury awarded $4 million to each plaintiff.\textsuperscript{394}

The Virginia Supreme Court, without contesting the basic principle, found that the plaintiffs had not established breach of the duty.\textsuperscript{395} The court held that the university had no basis, after the dormitory shootings, to know or reasonably to have foreseen the possibility of harm to other students.\textsuperscript{396} The initial investigation indicated that "the shooter had fled the area and posed no danger to others."\textsuperscript{397} Under the Virginia Supreme Court's construction of the duty to avoid foreseeable risk of harm, a public-safety agency would be in a different, and less favorable, situation if it claimed it had no reason to know that a high-speed car chase without helicopter support would risk injury to the public.

To prove the third element in a plaintiff's argument to establish liability for a public-safety agency's failure to use helicopter assets, the plaintiff must demonstrate that use of best practices would have prevented the plaintiff's harm. Litigation over the 1993 Branch Davidian conflict near Waco, Texas illustrates this point. The court in that case rejected the plaintiff's claims that the government's decisions to use tear gas and tanks, and its failure to plan for fire, all fell within the discretionary function exception to the Federal Tort Claims Act (FTCA).\textsuperscript{398} Two things are notable about the litigation. First is the basis on which the district court rejected the plaintiff's claim that the absence of firefighting equipment should result in FTCA liability.\textsuperscript{399} The district court rejected this argument based on the absence of proof that available armored firefighting vehicles would have been effective during that conflict. Second is the use of record-

\textsuperscript{392} Peterson, 749 S.E.2d at 310.
\textsuperscript{393} Id. at 310 (describing jury instruction).
\textsuperscript{394} Id.
\textsuperscript{395} Id. at 307.
\textsuperscript{396} Id. at 313.
\textsuperscript{397} Id.
\textsuperscript{398} Andrade v. Chojnacki, 338 F.3d 448, 452 (5th Cir. 2003).
\textsuperscript{399} Andrade v. United States, 116 F. Supp. 2d 778, 785 (W.D. Tex. 2000).
ings from a FLIR camera mounted on an FBI helicopter to re-
ject certain factual claims.\textsuperscript{400}

By negative implication from the first finding, a tort plaintiff
could recover against a public-safety agency if he could show
that helicopter assets were available and would have prevented
harm if they had been used in a particular way. In a number of
cases, plaintiffs have sought to recover under section 1983 or
under common law principles based on evidence that public
safety agencies failed to use best practices. In \textit{Ewans v. Wells Fargo
Bank, N.A.}, the Fifth Circuit, in an unpublished opinion, af-
firmed summary judgment for a bank that reported a suspicious
(but innocent) customer to the police, resulting in a substantial
overreaction by the police.\textsuperscript{401} The court held that the evidence
did not show that bank employees had breached their duty of
care: "[O]ur holding is unaffected by either side's testimony of
'best practices.' Negligence law is concerned with reasonable
practices, not best practices."\textsuperscript{402}

These cases demonstrate how difficult it is to succeed on such
claims, but they also illustrate the analytical framework is for re-
covery based on failure to use helicopter assets appropriately.

Establishing causation is likely to be the greatest challenge in
such claims. In \textit{Glass v. City of Philadelphia}, for example, victims
of alleged police brutality in Philadelphia sued under section
1983.\textsuperscript{403} The plaintiffs claimed that one of their sons was beaten
and that the police retaliated for the resulting lawsuit by harass-
ing and intimidating them.\textsuperscript{404} Among other things, the plaintiffs
alleged a cover-up conspiracy and a failure by the police depart-
ment to investigate their complaints.\textsuperscript{405} The court's analysis of
the plaintiffs' claims detailed the internal organization and pro-
cedures of the police department.\textsuperscript{406} Among other things, the
court reviewed in detail procedures for handcuffing arrestees,\textsuperscript{407}
the steps taken to investigate complaints,\textsuperscript{408} and the computer-
ized system for tracking outstanding warrants.\textsuperscript{409}

\begin{itemize}
  \item \textsuperscript{400} Id. at 785–86.
  \item \textsuperscript{401} Ewans v. Wells Fargo Bank, N.A., 389 Fed. App’x 383, 385–87 (5th Cir. 2010).
  \item \textsuperscript{402} Id. at 390.
  \item \textsuperscript{403} Glass v. City of Phila., 455 F. Supp. 2d 302, 310 (E.D. Pa. 2006).
  \item \textsuperscript{404} Id. at 310–11 (reviewing allegations).
  \item \textsuperscript{405} Id. at 312.
  \item \textsuperscript{406} Id. at 312–14.
  \item \textsuperscript{407} Id. at 320 n.20.
  \item \textsuperscript{408} See, e.g., id. at 334 & n.53.
  \item \textsuperscript{409} Id. at 329.
\end{itemize}
The court applied the familiar standard for determining municipal liability under section 1983: "[P]laintiffs must identify a municipal policy or custom that amounts to deliberate indifference to the rights of people with whom the police come into contact."410 And, of course, "the plaintiffs must prove causation."411 In this particular case, the plaintiffs' theory was premised on flaws in the "sufficiency and legitimacy of the process employed" by the police department to investigate complaints.412 The court held that the "system was commensurate with the 'best practices' employed by other police departments of similar size."413 The court found liability for certain constitutional violations involving detention without probable cause and for common law false arrest, but rejected the other claims.414

Establishing the breach-of-duty element would depend on evidence that sound practices established in the public-safety community involve effective deployment of helicopter assets in similar situations. Such evidence is abundant from California, where the use of helicopter assets and procedures for coordinating air and ground forces has been widely established.415

In Kleisch v. Cleveland State University, for instance, the Ohio intermediate court, in an unreported opinion, rejected a negligence claim by a victim of a rape on a university campus.416 The plaintiff claimed that an understaffed campus police department coupled with a failure to use available security technology breached the defendants' duty of care to her as a business invitee.417 The court held that the evidence showed that the defendant "had acceptable standards and best practices in place at the time of plaintiff's rape," sufficient to support the trial court's judgment against the plaintiff.418 This case demonstrates the essentiality of testimony that failure to deploy helicopter assets effectively could be a failure to employ best practices.419

410 Id. at 341 (internal quotations and citations omitted).
411 Id. at 342.
412 Id. at 343.
413 Id. at 344.
414 Id. at 367.
417 Id. at *5.
418 Id. at *7.
419 See id.
In *McCoy v. Hatmaker*, the Maryland intermediate court affirmed summary judgment for a municipality. A victim's estate sued for wrongful death, premised on the failure of paramedics to use CPR after the victim was stricken by an apparent heart attack. The evidence showed a delay in the arrival of an ambulance because of confusion related to the exact location of the victim's vehicle and the paramedic's conclusion that the victim already died, and thus that resuscitation efforts were inappropriate. The court found that the plaintiff had failed to establish the wanton and reckless disregard conduct necessary to overcome the qualified immunity granted public-safety personnel by a state statute.

Negligence law does not hold anyone liable for failing to do the impossible. The cost of helicopter support is a factor that gets figured into the negligence calculus. But it gets figured in, not in terms of the most expensive way to provide helicopter support, but in terms of what is a reasonable way is to provide it, as less expensive helicopters are available on a shared basis.

2. Immunity

Common-law or statutory immunity for governmental entities reduces liability exposure, and public-safety agencies may insure against liability. The caselaw on governmental liability, analyzed in Part VI.B.3 explores the role of qualified immunity under federal and state law. Federal immunity and insurance coverage may also be available for assisting personnel—"second responders"—under the Federal Volunteer Protection Act. The statute exempts operation of an aircraft from its liability, but limits the exclusion for aircraft to those "for which the State..."
requires the operator or the owner of the vehicle, craft, or vessel to: (A) possess an operator's license, or (B) maintain insurance."\textsuperscript{428} States are preempted from imposing such requirements by the Federal Aviation Act.\textsuperscript{429} The Federal Volunteer Protection Act preconditions immunity on proper state licensing, certification, and authorization of the volunteer activities.\textsuperscript{430} It also limits immunity to volunteers of 501(c)(3) organizations.\textsuperscript{431} Additionally, the Federal Volunteer Protection Act preempts state law except to the extent it extends immunity for volunteers, but allows states to opt out of the immunity if they do so explicitly.\textsuperscript{432}

3. Insurance

Two concerns about insurance confront sharing operators, including AIR-ONE. First, will AIR-ONE or a requesting agency have uninsured liability exposure because of the joint nature of the missions? Second, will the use of safety pilots or pilots-in-training, as described in Part VI of this article, jeopardize insurance coverage? The answer to both questions is "no."

Any insurance policy is a contract between the insurer and the insured which obligates the insurer to pay the insured if certain events occur.\textsuperscript{433} Insurance policies are "aleatory contracts."\textsuperscript{434} Any conceivable insurance policy limits the risks that it covers. For example, a policy might provide liability\textsuperscript{435} and hull\textsuperscript{436} coverage for mishaps that occur during search and rescue missions, while excluding mishaps that occur during personnel insertion or extraction even if they are incident to a rescue. Similarly, a policy might include mishaps that occur during operations within a certain geographic area, and exclude mishaps that oc-

\textsuperscript{428} Id.
\textsuperscript{429} Id. § 14502(a).
\textsuperscript{430} Id. § 14503(a)(2).
\textsuperscript{431} Id. § 14505(4)(A).
\textsuperscript{432} Id. § 14503(d).
\textsuperscript{433} See Black's Law Dictionary 870 (9th ed. 2009) (definition of "insurance").
\textsuperscript{434} In re Texas Ass'n of Sch. Bds., Inc., 169 S.W.3d 653, 658 (Tex. 2005) (describing an "aleatory contract" as a contract in which promise is conditioned on the happening of an "event of chance").
\textsuperscript{435} Liability insurance obligates the insurer to pay civil judgments to which the insured may be subject and to pay the insured's costs of litigation. See Black's Law Dictionary, supra note 433, at 873 (definition of "liability insurance").
\textsuperscript{436} Hull insurance obligates the insured to compensate the insured for the value or replacement cost of a helicopter that is damaged or destroyed. See Hull Coverage, IRMI, http://www.irmi.com/online/insurance-glossary/terms/h/hull-coverage.aspx (last visited Nov. 11, 2014).
cur during operations outside the area. Other limitations, particularly relevant in the helicopter-sharing context, might cover a specific helicopter only when it is flown on missions for the agency to which it is registered and not when it is flown on missions for other agencies. These are not direct limitations on helicopter operations; they do not obligate the insured to use the helicopter in any particular way. Rather, they leave the helicopter operator exposed financially to potential liability when it operates outside the coverage limits of the policy.

The aviation insurance market right now is very competitive as to price and other policy terms. It is easier for a new operator or a long-term operator entering a new market segment to get insurance coverage at a reasonable price. Then, if the operator proves that it has a safe operation, the insurer will renew the policy without insisting on whatever restrictions it imposes on new customers after the market has become tighter. Insurers are hungry for business, and therefore are more willing to accommodate the plans of potential customers.

A typical policy has a limitations-on-use section early in the policy language. This section typically excludes coverage for certain operations and usually limits use of the covered aircraft to named pilots and other pilots within the scope of an Open Pilot Warranty (OPW). A limitations-on-use section might exclude flight training, or it might exclude law-enforcement support missions. Alternatively, it might limit law-enforcement support to support of particular agencies. It certainly is not feasi-

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438 Id.
440 See id.
441 Interview with Dan Ferguson, Claims Adjuster, U.S. Aircraft Ins. Grp. (Nov. 21, 2013).
442 “'Limitations on Use:' To be covered under this policy the aircraft must be owned, maintained or used only for the purpose shown on the Coverage Summary page and described below and flown only by a pilot or pilots described on the Coverage Summary page.” Schneider Leasing, Inc. v. U.S. Aviation Underwriters, Inc, 555 N.W.2d 838, 839 (Iowa 1996) (quoting language from policy and finding triable issues of fact).
ble to add a requesting agency as a named insured after a request for support is received.

On the other hand, a straightforward solution is within reach: an operator like AIR-ONE can confirm that the named insureds cover all public-safety agencies within the relevant territory. AIR-ONE, for example, could include all public-safety agencies in northern Illinois and southern Wisconsin. There is no reason to suppose that this would cause a material increase in premiums; the risk of a mishap is the same, and the damages and injuries likely to result from a mishap are the same.444

Most aviation insurance policies also limit coverage to flights commanded by named pilots and other pilots meeting the requirements of an OPW.445 In Old Republic Insurance Co. v. Gormley, for example, the district court granted a declaratory judgment to a helicopter insurer.446 The court held that the insurer was not liable under the policy because the pilot in command was not a named pilot in the policy and did not meet the requirements of the OPW.447

Two interpretations of pilot limitations are of interest in public-safety support helicopter operations. The first interpretation favors the insured. In some states, coverage extends beyond flights flown by named pilots and those meeting OPW requirements, unless the insurer can prove that the unqualified pilot caused the loss.448 In AIG Aviation, Inc. v. Holt Helicopters, Inc.,449 the court refused to enforce the limitations of an OPW in the absence of proof that the pilot's lack of experience to meet the requirements of the warranty was the cause of the accident.450

444 Interview with Dan Ferguson, supra note 441.
445 A typical insurance application requires each named pilot to indicate the type of helicopter pilot certificate and rating; the amount of logged PIC hours (the total aircraft, reciprocating, turbine hours); the hours flown in the helicopter to be insured; the total time last twelve months; and the estimated helicopter time for the next twelve months. See Application for Helicopter Hull and Liability Insurance, GLOBAL AEROSPACE, http://www.global-aero.com/wp-content/uploads/2014/04/G-31H-20140521-application.docm (last visited Oct. 17, 2014).
446 Gormley, 77 F. Supp. 2d at 709.
447 Id. at 707 (quoting OPW and noting that the pilot of the helicopter, who died in the crash had total flight time of only 250 hours in helicopters).
450 Id. at 287–88. The OPW stated: "[a]ny commercial pilot with rotary wing ratings properly certified by the FAA having a minimum of 1,000 logged flying
The second interpretation is a trap that favors the insurer: the language of the policy, as in Gormley, may exclude coverage when anyone but a named insured or someone meeting the OPW requirements "manipulates the controls" or "operates" the aircraft.451 There is no reason that an insurer should want such language; the only thing a rational insurer cares about is whether the pilot-in-command (PIC) is qualified.452 If, on the other hand, the language limits coverage to qualified pilots serving as "pilot in command," coverage would exist even if the PIC lets his unrated nephew fly straight-and-level and make gentle turns. If the language is "manipulates the controls," it would not. Close attention to such policy language is necessary for any helicopter operation that establishes a pilot recruiting pipeline such as the one proposed in Part VI.C.2.c.

The turbine-time requirement is likely to be the most significant barrier, as Part VI.C.1 explains. The most effective way for an operation like AIR-ONE to deal with its insurance concerns regarding pilot coverage is to recruit a limited number of well-qualified pilots who do not meet the turbine-time criterion and to list them on the policy as named pilots. The insurance carrier will reevaluate his underwriting decisions according to the detailed data submitted by the named pilot. The operator can expect a premium increase, but it may not be as great as anticipated, and the operator will not be confronted with the uncertainty of whether its coverage is valid.

Insurers are likely to have a benign attitude toward such an approach. First of all, requiring significant turbine time for helicopters makes little sense. It is a requirement that mindlessly got carried over from fixed-wing insurance practices.453 It is experi-

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451 "Most policies state that the aircraft may only be OPERATED by a current and appropriately rated pilot who is either named on the policy or one who meets the Open Pilot Warranty." Facts and Observations, Aviation Ins. & Risk Mgmt., available at www.airmmagazine.com/airm/2008/AIRMHeli_08.pdf (explaining named-pilot and OPW limitations may apply to any pilot operating the aircraft, not just to one serving as pilot in command); see also FAQ, Avion Ins., http://www.avioninsurance.com/QandA.php (last visited Oct. 10, 2014) (asserting that named pilots is the preferred approach, explaining that an OPW covers pilots meeting certain defined requirements, and observing that most common reason for denying claims is that an unapproved pilot was flying the aircraft).

452 Interview with Dan Ferguson, supra note 441.

453 Id.
ence in type or similar size and characteristics that makes a safer pilot, not total turbine time.

There is no reason that any insurer in its right mind would oppose letting a low-time guy fly in the left seat and log the time, whether as a safety pilot or second-in-command or a student. Having any kind of pilot there is always better than having an empty seat. At the very least, the left-seat guy can work the radios and perform other non-flying duties, thus reducing the load on the PIC. No one would increase the rates for this or deny coverage. Everyone in the industry knows this is how people build turbine time. The only issue would be if the left-seat guy is paying for dual instruction; that puts the operation in a different underwriting category. If he’s not paying for it, and if it’s even arguably mission related, there should be no impact on coverage or premiums.454

Fixed criteria as to the qualifications of named pilots do not exist. Commercial policies involve enough money that there are actual negotiations over the terms of the policy.455 It is less likely that an insurer will refuse coverage than it would increase the premium if the insured wants more flexibility. As one claims adjuster stated, “I could be a named pilot for a Huey even though I don’t have a helicopter rating, but the premium would be astronomical.”456

C. LABOR MARKETS: ESTABLISHING A PIPELINE FOR QUALIFIED PERSONNEL

Any helicopter operation depends on an adequate supply of skilled personnel, especially pilots and mechanics. Attention to the labor supply is particularly critical for a volunteer enterprise: what incentives exist for volunteers, despite the absence of compensation?

1. Engines and Limits of Volunteerism

Volunteerism has its limits. Volunteer fire departments are struggling all over the United States as lifestyles and work patterns change.457 When most people worked on farms or in small

454 Id.
457 See, e.g., Kathleen Ronayne, Small Town Fire Departments Struggling to Find Volunteers, CONCORD MONITOR (Aug. 12, 2013), available at http://www.concord
shops and businesses near where they lived, it was not difficult for a volunteer firefighter to put down his work to respond to a fire. Now, it is more likely that one's job is remote from residential communities, increasing travel distance to respond. Moreover, employers are less likely to have a stake in ensuring emergency services in communities other than where they operate, and therefore they are less likely to tolerate a sudden request for time off to go fight a fire.

Any helicopter support organization that either does not keep helicopters in the air or on-duty pilots proximate to the helicopter a significant part of the time can provide only limited assistance to the patrol function and for incidents such as robberies, muggings, or shootings that emerge during patrol or as a result of 911 calls. It simply takes too long to gather a crew and get the helicopter to the scene. On the other hand, a volunteer operation has no significant limitations for assisting in barricade situations for law enforcement, SAR, and disaster relief. A degree of planning is inherent in such missions. The volunteer organization can train alongside other public safety personnel, participate in their planning, and coordinate deployment. Thirty minutes or so to launch the helicopter makes little difference in these pre-planned missions.

2. Pilots

As the availability of Vietnam-era military-trained helicopter pilots diminishes, an organization like AIR-ONE can reinforce its pipeline with a pile of volunteers by taking advantage of certain plateaus in the career pathways for civilian helicopter pilots. As the following subsections explain, the solution lies in maintaining high standards for PICs, while developing a pipeline for less-experienced pilots to gain experience and training necessary to meet the PIC requirements.

a. Requirements

High standards for pilot qualifications are important for the demanding missions of public-safety helicopter support. Many

monitor.com/home/8024486-95/small-town-fire-departments-struggling-to-find-volunteers.

458 See id.

459 Interview with Jim Swartz, President & CEO, CareFlite (Nov. 29, 2013).

public-safety support missions take place at night in rural areas where ground lighting is scarce, and the pilot cannot count on moonlight.\footnote{See, e.g., Skip Robinson, Punching Above Its Weight, VERTICAL MAG., http://www.verticalmag.com/news/article/Punching-above-its-weight (last visited Oct. 9, 2014).} Flight conditions in such circumstances are largely indistinguishable from instrument meteorological conditions (IMC).\footnote{Under the Federal Aviation Regulations, IMC means weather conditions below the minimum allowed under the Visual Flight Rules for flight. 14 C.F.R. § 170.3 (2014).} Moreover, effective utilization of helicopter capabilities require flying low and slow—flight regimes in which the skill level to effect a successful autorotation landing in the event of an engine failure are high. Sworn peace-officer status is necessary for pilots to be able to participate in classified anti-terrorism briefings.\footnote{See, e.g., Counterterrorism Units, N.Y. POLICE DEPARTMENT, http://www.nyc.gov/html/nypd/html/administration/counterterrorism_units.shtml (last visited Oct. 8, 2014) ("The NYPD’s partnership with the FBI through the [Joint Terrorist Task Force] not only provides the NYPD with access to national level classified intelligence, but it is also the means by which NYPD can disseminate its own intelligence and analysis at the federal level and to other law enforcement agencies.").}

At the same time, high standards diminish the supply of potential volunteer pilots. Setting and maintaining stringent standards for pilots in command, however, is not inconsistent with providing training and development opportunities for less-experienced pilots to keep the pipeline of potential pilot volunteers flowing.

AIR-ONE publishes two requirements for its volunteer pilots: (1) volunteers must also be professional first-responders, (2) with a minimum of 1,500 hours as PIC in rotorcraft, 250 hours as PIC in turbine-powered rotorcraft, and hold a commercial-rotorcraft certificate with instrument-rotorcraft rating as well as a current FAA Class-I or Class II medical certificate.\footnote{See Our People, supra note 342.} Pilot recruitment poses somewhat different problems from recruitment of TFOs and other personnel. As the minimum number of hours increases, the pool of available pilots shrinks rapidly.

The pool of helicopter pilots with this level of experience who are sworn law-enforcement officers is even smaller. Accordingly, a program of pilot recruitment that does not dilute the standards for PICs, while opening up the field for more candidates is desirable. Practices and philosophies about personnel vary
widely, especially in the law-enforcement community, on whether it is easier to "make a cop out of a pilot," or make a "pilot out of a cop."

The LAPD, for example, likes to make pilots out of cops. So does the Fontana police Department. LAPD requires at least five years experience as a ground patrol officer, a private rating in either airplanes or helicopters, and 100 hours of flight time before selection as a pilot. Once an officer is selected as a pilot, however, the department pays for his commercial flight training and conducts ground school and certain parts of his flight training.

The Maryland State police, in contrast, regularly advertise for civilian pilots. In 2010 and 2011, most of its helicopter pilots were civilians.

b. Career Pathways

An organization like AIR-ONE can benefit from a plateau that exists in the career development for professional helicopter pilots. It could offer well-trained but less experienced pilots the opportunity to build turbine time by volunteering to fly in the left seat of AIR-ONE helicopters.

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467 See LAPD Air Support Unit, supra note 465.
471 Most helicopters are flown from the right seat, although some are flown from the left seat. See Paul Hoversten, Why Do Helicopter Pilots Sit in the Right Seat?, Air & Space Mag. (Nov. 16, 2011), http://www.airspacemag.com/need-to-know/why-do-helicopter-pilots-sit-in-the-right-seat-243212/?no-ist. The discussion that follows assumes that the pilot in command is in the right seat and opposite of the copilot position in the cockpit.
The goal of an aspiring helicopter pilot, typically, is to qualify for a flying job that pays $80,000 to $100,000 annually. Such salaries are available in jobs comparable to public safety support—emergency medical services and industrial operations such as transmission line patrols and oil-and-gas exploration but such positions typically require 2,000 to 3,000 hours total time, and 1,000 hours turbine time.

First, the pilot must obtain a rotorcraft rating. This requires total flight time of forty hours—usually it takes forty-five to sixty-five hours—of flight instruction and solo time. The result is a private pilot certificate. Then, the pilot must obtain a commercial rating, which requires total flight time of 150 hours. These two steps are obtainable for civilians only by paying for a professional pilot-training program. The cost is comparable to that of a college education. The most popular primary helicopter trainer, a Robinson R22, costs about $300 per hour for dual time and $250 for solo time. So the aspiring

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473 See, e.g., JUSTHELICOPTERS.COM, http://www.justhelicopters.com/tabid/255/category/1/Default.aspx (last visited Oct. 10, 2014) (Air Medical Resource Group EC135 pilot requirements: 3,000 total, 1,000 turbine; MedTrans Bell 207 pilot requirements: 2,000 total, 1,000 turbine; PSEG electrical line patrol pilot requirements: 2,000 total, 1,000 turbine).
474 Id.
477 See 14 C.F.R. § 61.109(a).
478 Id. § 61.129 (setting aeronautical experience requirements for commercial rating).
479 Unless the aspiring pilot owns his own helicopter, which is unlikely.
pilot must have the means to pay $75,000 or more for flight training.\textsuperscript{481}

During this phase, the pilot would also obtain an instrument rating, which requires another forty hours of dual instruction,\textsuperscript{482} some of which may be concurrent with the requirements for the commercial rating.\textsuperscript{483} Now, the pilot has some 200 hours, all of it likely in piston-driven helicopters. From this point forward, the pilot can begin earning modest compensation for flying—maybe $35,000–$45,000 per year at first.\textsuperscript{484} His immediate goal is to build total time and to gain experience.

The opportunities at this stage for turbine helicopter jobs are few and far between, so most pilots get their certified flight instructor (CFI) rating\textsuperscript{485} and build time giving flight instruction, flying rides and tours in piston-driven helicopters, or a combination of the two.\textsuperscript{486} A flight instructor at a reasonably busy flight school can expect to fly seventy to eighty hours per month and acquire a thousand hours total time after a year to a year-and-a-half.\textsuperscript{487} Then, the focus shifts to building turbine time, which can be obtained mainly by flying with larger tour operators that fly turbine helicopters.\textsuperscript{488} Once the pilot has about 500 turbine


\textsuperscript{482} 14 C.F.R. § 61.65 (specifying aeronautical experience for instrument rating).


\textsuperscript{485} No additional flight time is required for a CFI rating, but a written and flight test are. 14 C.F.R. § 61.183.


hours and 1,500 to 2,000 total hours, jobs in other, more demanding, sectors become available, such as executive charter, ENG, EMS, and industrial applications, such as powerline and pipeline patrols and oil-and-gas drilling.\footnote{See \textit{Aircraft}, TEMSCO HELICOPTERS, INC., http://www.temescoair.com/aircraft.php (last visited Oct. 10, 2014).}

c. Safety Pilots as Recruitment Pipeline

One possibility adopted by AIR-ONE’s leadership is creating a new position of “safety pilot,”—essentially a copilot, although none of AIR-ONE’s helicopters requires two-pilot operation.\footnote{See, \textit{e.g.}, \textit{HeliJobs Around the World}, http://helijobs.net/2013/07/multiple-eng-positions-florida-texas-wisconsin-california-pennsylvania-and-colorado (last visited Oct. 10, 2014) (indicating Helicopters Inc. ENG full-time and part-time pilot requirements: 1,500 total and 250 turbine).} Helicopter pilots with several hundred hours and a private rating would qualify. They are allowed to build time in the public safety helicopters as copilots or safety pilots, building turbine hours while undergoing further AIR-ONE tactical training. Once a safety pilot is selected, he or she might be sworn in as a reserve deputy sheriff. Police academy training would ensue in due course, interleaved with tactical AIR-ONE training, thus qualifying the pilot to be a sworn peace officer.\footnote{Co-author Perritt wrote the safety-pilot job description and was present at the board of directors meeting when it was adopted.}

After a safety pilot completes a certain number of hours and passes an internal check ride, he or she would be available to fly ferry and demonstration missions in visual flight rule (VFR) conditions—relieving the fully qualified AIR-ONE pilots from those missions. This role has not been accepted yet, however, by the AIR-ONE leadership. This approach has precedent. The Maryland State Police, for example, recruits civilian, second-in-command pilots with a minimum requirement of 1,200 helicopter hours without a specific turbine time requirement.\footnote{\textit{Creating Aviation Opportunities}, JSFIRM, LLC, http://www.jsfirm.com/job/Pilot-Rotary+Wing+Civilian+Helicopter+Pilot+I/Middle+River-Maryland/jobID_185466 (last visited Oct. 17, 2014).}

Even though AIR-ONE is not subject to Part 135 of the Federal Aviation Regulations, which is applicable to commercial operators such as air charter and air taxi operators in the private

\footnote{VFR conditions exist when weather conditions permit an aircraft pilot to visually inspect the aircraft’s trajectory, the ground, and other aircraft. See \textit{14 C.F.R.} 91.157 (2014).}
sector, Part 135 requirements for pilot training would be a useful template for the details of AIR-ONE’s safety pilot program. As Part V.B.3 explains, insurance limitations are not likely to be a barrier: a trained pilot in the left seat is better than a non-pilot. In this scenario, AIR-ONE would recruit volunteers from helicopter pilots who have their commercial ratings or pilots and who may be working as flight instructors. In exchange for their time and for undergoing training for flight duties and public safety responsibilities, pilots would have the opportunity to build turbine time without paying for it.

d. Reservations About Civilian Pilots

Some public-safety agencies deal with the pilot shortage and their preference for all aircrew members to have law enforcement experience by accepting relatively low-time pilots. For example, Captain Faulkner of the Fontana Police Department is open to low-time street-officer pilots. One TFO of the Fontana Police Department has a private helicopter rating that he earned on his own after he became a TFO. He now has received police department support to work toward his commercial rating. At the time of the authors’ visit, he was about ready to take the flight test. Another TFO working toward his private helicopter rating had a total of twenty-five hours. In Faulkner’s opinion, four reasons exist for why substantial experience as a street officer is necessary for TFOs and pilots.

First, only an experienced police officer can function effectively in an airborne patrol car. Only he can relate to the needs of the ground officers that the helicopter is supporting and understand how to most effectively fly the mission.

Second, and at least as important, is the traditionally proud and insular law-enforcement culture. This culture is characterized by the feeling that if “you put a kid in the cockpit who has had no experience or only a year or two of experience as the street officer, then you invite derision: ‘pretty boys aviators.’”

Third, experience shows that some low-time civilian pilots without law-enforcement experience demonstrate a lack of concern for police work. Despite his conviction that low-time pilots

495 Ducheck, supra note 486.
496 Interview with David Faulkner, supra note 107.
497 Id.
can do the job, Faulkner’s experience convinces him that a model of recruiting low-time civilian pilots cannot work.

It’s well understood that what they really want—all they want—is to build flight time toward the magic thousand hours. We tried it once or twice, and found that such pilots were so eager to fly that they were willing to make safety compromises with the weather. When they got up, they could fly the flight profile requested by the TFO competently, but they were zoned out. They simply weren’t interested in law enforcement; they were interested only in flying.498

Finally, pilots without much ground experience may not have the peer respect that is necessary to integrate ground and air-support operations. It would not do any good, in Faulkner’s opinion, to recruit low-time civilian pilots and send them to the police academy, because this would not earn the respect of the rank-and-file ground officers. Only street time earns that. “You have to earn it,” is the mantra.

3. Tactical Flight Officers

More than pilots, TFOs must have intimate familiarity with the missions to be supported. Experience and training as a law-enforcement officer, an emergency medical technician, or a firefighter is essential for this job classification. Almost everyone agrees that relevant experience as a street cop, followed up by intensive TFO training is necessary for the aircrew member who is going to be most involved in both coordinating with ground personnel and suggesting appropriate flight profiles to the pilot. Active-duty, public-safety personnel are ideal because that opens up the possibility of resource sharing through their employing agencies.

The supply of such personnel is ample because the qualifications they need are those of the requirements of their pre-helicopter jobs. Usually the novelty and excitement of flying helicopter support operations represents an adequate incentive for them to volunteer. If they are not assigned as a part of the regular duties, of course, the usual calculus as to whether someone wants to volunteer for any activity applies—weighing the excitement and novelty against family and educational obligations and other alternatives for spending leisure time.

498 Id.
4. Recruiting Mechanics

Volunteer mechanics are also desirable for the same reasons that volunteers are desirable to fill other positions. But mechanics do not have the same incentive to volunteer that pilots do, as pilots need to earn flight time to qualify for employment. If pilots cannot fly in paid positions, many are willing to do it by volunteering. Mechanics, like those in any other skilled profession or trade, enhance their career prospects by gaining experience, but opportunities for mechanics to gain paid experience in entry-level positions abound. 499

One possibility is to explore the possibility of internships with airframe and power plant rated (A&P) mechanic schools, 500 so that A&P students during the last part of their training would be placed in public-safety helicopter support and work under the supervision of more senior, already-qualified A&P mechanics. 501 That would have the effect of extending the mechanic manpower available on a volunteer basis.

D. Leadership and Marketing

Charismatic, resourceful leadership makes all the difference between success and failure. Captain Faulkner is an example of the kind of leadership necessary when air-support operations are first established. 502 Dan Bitton, commander of AIR-ONE, 503 and the rest of the AIR-ONE leadership are others. Cole Burdette, Chief Tactical Flight Officer of the LAPD, is an example of leadership necessary to keep it going and to grow it. The job goes far beyond buying helicopters, recruiting personnel, and supervising them. Effective marketing and promotion to the right constituents is essential.


501 See Terry Palmer, High-Tech Economy Drives Demand for Technicians, Rotor, Fall 2013, at 22, 24 (urging helicopter operators to develop relationships with A&P students, including internships).

502 The main question about the future of the Fontana operation is whether it is well enough established to survive Faulkner's retirement, most likely in the first part of 2015.

503 See Our People, supra note 342.
The most important constituency is the ground force to be supported by helicopters. The helicopter-support operator must anticipate a natural reaction of an officer on the street: “You’re going to steal my call.” The operator must demonstrate—not just promise—that the first unit responding still remains in charge, while helicopter support functions as a special kind of backup.

Marketing is part of the equation. As with any type of marketing, it must begin with an identification of an unmet need and a matching of the actual capabilities of the helicopter operator with the need; if an operator is not capable—financially or in terms of human resources—to fly airborne patrol to support law enforcement, the operator should focus on what else it can do to be helpful. Doing these things well will build support as an air-support operation builds capability to broaden its missions, including airborne patrol if so desired.

Helicopter-support operators must resist an approach/avoidance conflict, characterized by lamenting the fact that too few agencies appreciate what helicopters can do, coupled with a reluctance to undertake an aggressive public education and public-safety-training program for fear that doing so might stimulate requests for support they cannot meet, given their limited resources and limited budget. The problem, of course, is that public support for more resources, including financial resources, depends on both the public and the public-safety community’s awareness about helicopter operations, their capabilities, and wanting more.

As agencies are strengthening their understanding of what helicopter support can do, the helicopter-support unit should be proactive instead of waiting to be called out. For example, when a natural disaster occurs, the helicopter unit should not only increase its readiness to respond to a call; it should at least reach out to the incident commander to offer intelligence and other types of support that it knows it can provide.

Effective marketing, however, does not mean seizing the limelight. It is far better if the usual ground personnel and their commanders get the credit for successful mission in the press and media and then say, “We couldn’t of done it without the helicopter support,” than if the helicopter unit is the first to give a press conference bragging about its actions.

The Fontana Police Department Air Support Unit provides a good example of how resourceful leadership sells helicopter support and makes good decisions about affordability. It shows
how effective public-safety helicopter support can begin. Its history illustrates some of the crucial ingredients: a passionate, charismatic, articulate, and resourceful advocate; good sense about cost, benefits, and how to create a win-win situation for crucial constituencies; and an alignment of political stars.

Historically, the Fontana Police Department had received air support from the San Bernardino County Sheriff’s Department, which patrolled the whole county. The availability of a helicopter for the western part of the county where Fontana is located was sporadic because of a shortage of aircrews. Faulkner, a sergeant at the time, persuaded Fontana and several surrounding municipalities to offer to assign observers in exchange for the Sheriff’s department assigning a helicopter to the western part of the county. Each agency agreed to participate assigning an observer to fly one day per week. The Sheriff’s department agreed with alacrity. Faulkner was flying R44s as a part-time pilot with the El Monte Police Department’s air-support unit.

Because Faulkner was familiar with El Monte’s sharing operation, he embarked on a campaign to enlist some surrounding municipalities, beginning with the senior officers he already knew. His pitch was that Fontana would provide helicopter support in exchange for in-kind contributions. Rialto, California, contributed hanger space. Colton, California, contributed $16,000 worth of gasoline. Redlands, California, promised to fly its fixed-wing airplane over Fontana when the Fontana helicopter was not in the air. Everyone contributed at least one body—a pilot or TFO.

Faulkner’s mantra from the beginning was that any air-support operation must justify its existence by the quality of the services it provides to officers on the street. He was and remains

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504 The facts in this following section result from an interview between co-author Perritt and Capt. David Faulkner, Fontana Police Department. Interview with David Faulkner, supra note 107.
507 Id.
508 Id.
509 Id.
convinced that the key to any support operation is the quality of TFOs. If they are not enthusiastic and resourceful in making their experience as street policemen palpable to ground forces, success is impossible. It does not matter what kind of equipment is available.

Recruiting an initial team was not a problem. Faulkner had a robust network of pilots and TFOs who flew for El Monte. Faulkner heard that Robinson was developing a turbine version of the R44, but was not yet sure whether it would offer a law-enforcement option. He went to see Kurt Robinson, president of Robinson Helicopter Company. Together they went to the factory floor to see the first R66, as it was being assembled. Faulkner turned to Robinson and said, "You're going to sell me that helicopter." Robinson protested and said that it was far too early to know who the first purchaser would be. "No," Faulkner repeated. "Listen to me. I'm telling you you're going to sell me that helicopter." Robinson was interested in having a police department to showcase the new model, and they made a deal.

In the experience of the Fontana unit, the first responding ground unit is perfectly happy to have air support set up the perimeter, relieving them of a difficult task and later criticism for doing it incorrectly. Also, intellectually, everyone understands that a better perimeter can be established from the air than from the ground.

Marketing morphs into politics. Politics obviously will determine whether funding is available at all and, if it is, the functions it is available to support. It is well understood in political science that public-policy decisions in a democratic society depend not only on numbers in support and opposition, but also on how strongly members of one or the other camp feel about an issue and how focused they are. If one side is diffuse and the other concentrated, the concentrated side almost always wins.

That is a particular problem for mobilizing governmental support for public-safety helicopter operations. The opposition is concentrated and passionate; supporters are diffuse and relatively indifferent. Opponents fall into two roughly defined camps: (1) residents of the area who are concerned about noise and the risk of a crash and (2) those who are concerned about

invasions of privacy and are instinctively wary of any increase in law-enforcement capability.\textsuperscript{512} The second camp is particularly concerned about the law-enforcement drone issue.\textsuperscript{513}

It is not clear whether anything can be done to reduce opposition from these two camps, but proponents can be proactive to reduce the persuasiveness of their opposing arguments by explaining how tight procedures and intensive training risks of accidents and reduces noise pollution over populated areas.\textsuperscript{514}

On the favorable side, proponents of more robust helicopter support for safety operations can ensure that the public discourse over disaster relief, SAR, and counterterrorism includes accessible and evocative materials on what helicopters can do. In this regard, proponents should be opportunistic, issuing press advisories whenever a disaster strikes, an active-shooter incident occurs, or someone is rescued. Proponents also can be opportunistic with respect to mishaps, such as high-speed automobile chases and hostage situations that go wrong.

\section*{VII. FUNDING SOURCES AND MECHANISMS}

There is no such thing as a free lunch. AIR-ONE is essentially a volunteer fire department, facing the usual challenges of any such volunteer-based operation. The AIR-ONE leadership is forced to decline many less critical requests simply because it would cost too much to fly them. Public or private funding for a full-time operation, staffed by a combination of volunteers and paid professionals is unlikely. An operation like AIR-ONE must piece together support in cash and in kind from a variety of sources.\textsuperscript{515} It may be able to supplement this support with a steady flow of grants from the federal government, especially if it links its training and operations to the CAP.\textsuperscript{516}

The main determinant for the level of funding required is whether the requisite capabilities can be sustained with funding only for equipment acquisition and training, or whether additional funding is necessary for operations. If funding for operations is necessary, the amount depends on whether volunteers

\begin{thebibliography}{99}
\bibitem{512} See Villansenor, \emph{supra} note 18, at 473–74.
\bibitem{513} See \emph{supra} Part II (discussing opposition to drones).
\bibitem{514} See MEANS, \emph{supra} note 34, at 21 (emphasizing flight profiles to reduce noise footprints).
\bibitem{515} See \emph{Funding & Support, supra} note 358.
\end{thebibliography}
are available to perform some or all of the necessary functions. An operation requiring paid pilots, mechanics, TFOs, GSOs, and dispatchers obviously will have a much bigger budget than one in which volunteers are available for some or all of these job classifications. Even when operations rely on volunteerism—as in the case of AIR-ONE, the CAP, and volunteer fire departments—out-of-pocket expenditures for fuel, oil, and maintenance may still be necessary.

AIR-ONE’s OH-58 Jet Ranger helicopters burn about forty gallons of fuel per hour, and its Huey helicopters burn about eighty-five gallons per hour. Fuel for turbine engines costs approximately $5.39 per gallon. That means an out-of-pocket cost of at least $270–$575 for every AIR-ONE mission. In addition, AIR-ONE incurs as a variable cost whatever maintenance is needed, which is largely dependent on the number of hours each helicopter is flown. All operators of helicopters for hire must perform 100 hour inspections on each helicopter. A typical 100-hour inspection on a Huey helicopter costs thousands to tens-of-thousands of dollars. In addition, the age of the helicopters makes parts hard to find, thus increasing maintenance costs further.

A. LOCAL FUNDING

No general impediments exist to funding public-safety helicopter support organized in any of the ways considered in Part VII. Funds can be made available to individual agencies to provide their own helicopter assets; they can be provided for agencies to enter into contractual relationships with commercial operators; they can be provided for agencies’ contractual relationships with nonprofit operators; and they can be provided


\[520\] Assuming that the average mission requires three hours of flight time.

\[521\] A variable cost is one that varies depending on flight time, such as fuel costs. In contrast, fixed costs do not vary with flight time: hangar rental, helicopter purchase costs.

\[522\] Uncertainty exists as to whether AIR-ONE’s operations meet this test.

\[523\] 14 C.F.R. § 91.409(b) (2014).
directly to non-profits like AIR-ONE. Economies of scale for pilot recruitment and assignment, maintenance, and training suggest that helicopters can be utilized more efficiently if they are provided for through shared helicopter support—that is the thesis of this article. In other words public-safety agencies would have less budget strain if they supported AIR-ONE than if they provided helicopter support for themselves.

Restrictions exist, of course, in particularized appropriation legislation. In theory any one or more of several mechanisms could ensure basic funding to an operation like AIR-ONE: contracts and grants from local public-safety agencies at the hundred-thousand dollar level, or grants from state or federal levels of government. If contracts are the mechanism chosen, AIR-ONE must be careful to avoid the tendency of people entering into long-term contracts for helicopter services to have unrealistic expectations about their availability.

One straightforward way to fund the direct operating costs of AIR-ONE’s operation is to have the public-service agencies reimburse AIR-ONE for its direct operating costs when it flies a mission for them. But that system raises concerns about AIR-ONE losing its nonprofit status and whether the reimbursements constitute a commercial relationship that would violate the terms under which the helicopters were donated by the government.

An alternative is to have the agencies that use AIR-ONE’s services make periodic grants under contracts that define AIR-ONE’s obligations in exchange for those grants. This, however, also might raise concerns about the nature of the revenues received under the grant and compliance with the terms under which the helicopters were received from the government.

The Department of Homeland Security cannot make operating grants, but there is no reason it cannot broker agreements between AIR-ONE-like nonprofits and units of state, county, or local government wishing to contract for its services. More creative funding models employed by some types of public-safety support organizations are impracticable for an operation like AIR-ONE. Many volunteer fire departments solicit subscriptions from area homeowners and businesses, who may have an incen-

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525 Id. § 503.
526 Id.
tive to pay it because of reduced insurance rates. Otherwise they rely on donations and fundraisers such as pancake breakfasts and raffles. Some EMS helicopter operations such as CareFlite and Air Evac substantially supplement their revenue streams with memberships—a kind of de facto insurance in which individuals in the service area pay relatively small amounts annually, such as sixty dollars for CareFlite—in exchange for a commitment to supplement their regular insurance coverage so that they would not have to pay anything for an air evacuation.

In both of these instances, it is not difficult to persuade an individual or a small business owner that his personal property may be directly at risk. For an operation like AIR-ONE, the risk is more diffuse and indirect. It is much harder for an individual contributor to perceive that he personally or his business property might need helicopter-support services in the event of a crime, a lost or distressed person, or a natural disaster. It might be feasible, however, to employ a subscription model in which the subscribers are the local public-service agencies.

There is less resistance, however, to devoting resources to homeland security and natural-disaster relief. Accordingly, to the extent that helicopter assets can be useful for these purposes, it is more likely that support can be obtained for them. A good organizational concept will make sure that they could be used for a broader spectrum of public-safety support. The same infrastructure of human and physical capital that supports natural disaster relief and antiterrorism efforts also supports law-enforcement and SAR missions. As Part VIII.B suggests, the CAP funding model provides an interesting alternative for support.

528 See Wayne L. Eder, How to Form a Volunteer Fire Department, YAHOO VOICES (Oct. 29, 2009), http://voices.yahoo.com/how-form-volunteer-fire-department-4753572.html (reviewing training requirements and acquisition of surplus vehicles and other equipment); see also Welcome to the Assistance to Firefighters Grant Program, FEMA, http://www.fema.gov/welcome-assistance-firefighters-grant-program (last visited Oct. 10, 2014) (summarizing FEMA grants available for training and equipment acquisition).
529 Interview with Jim Swartz, supra note 459.
B. FEDERAL FUNDING: THE CIVIL AIR PATROL

The CAP is a nationwide organization, defined as the “U.S. Air Force auxiliary.” It uses volunteer pilots organized through a military hierarchy imitating that of the Air Force itself. It owns some of its own airplanes, but many volunteer pilot-members fly CAP missions in their own aircraft. An important part of its mission is recruiting young people into aviation careers and activities through its CAP cadet program.

The CAP is not an alternative to the AIR-ONE model, because it does not fly helicopters, and its mission is limited to SAR missions—mostly for downed aircraft. The authorizing statute says “rotorcraft . . . aircraft are not authorized for use on any CAP flight activity.” But, the CAP model is the AIR-ONE model, writ large.

Most interesting for purposes of this article is the magnitude and breadth of financial support the CAP receives from the federal government. The CAP receives funding and a general kind of oversight from Air Force headquarters. The Air Force is authorized to provide aircraft and other equipment, to detail personnel, to pay travel expenses, and to pay staff at the CAP national headquarters. The CAP may use federal agency resources to “provide assistance requested by State or local governmental authorities to perform disaster relief missions and activities, other emergency missions and activities, and non-emergency missions and activities.” Its members are entitled


534 Id.

535 10 U.S.C. § 9444(b) (enumerating types of support authorized). The Secretary of the Air Force must prescribe regulations for administration of the CAP. Id. § 9448(a).

536 Id. § 9443(a) (authorizing CAP to use federal agency resources, including aircraft, motor vehicle, computers, and communications equipment for purposes quoted in text).
to federal workers compensation, and the Air Force pays for liability insurance.

According to its 2012 Annual Report, in Fiscal year 2012, the CAP had 34,000 adult members and 26,000 cadets. It flew 703 search-and-rescue missions with 382 finds and thirty-two lives saved, 191 counter-drug missions, and 719 other state support missions. Most of its flight hours, however, were for orientation of CAP cadets and ROTC cadets. It received $1.9 million in state funding and $27.8 million in federal operations and maintenance funding.

A 2012 GAO report on the CAP, required by Congress, urged greater use of the CAP in Homeland Security missions. The GAO report noted, however, that the Posse Comitatus Act may prevent deeper CAP involvement in law-enforcement support missions.

In providing support to civilian law enforcement agencies, CAP is precluded from participating in the interdiction of vehicles, vessels, or aircraft, or in search, seizure, arrest, apprehension, surveillance, pursuit, or similar activity. CAP is also unable to transport prisoners, contraband, and law enforcement officers in direct support of an ongoing mission, or when hostilities are imminent. CBP officials told us that because of these restrictions, CAP is unable to provide the type of support that is necessary for some law enforcement activities.

Department of Defense regulations implementing the Posse Comitatus Act prohibits CAP personnel from participating in "[e]vidence collection; security functions; crowd and traffic con-

537 5 U.S.C. § 8141 (authorizing federal workers compensation benefits to volunteer civilian members of the CAP).
538 10 U.S.C. § 9443(d) (2012) (obligating Secretary of the Air Force to provide funds for the cost of liability insurance).
540 Id.
542 2012 ANNUAL REPORT, supra note 539.
543 See 155 CONG. REC. H5428-01 (May 12, 2009) (Congressional debate and support for legislation requiring the GAO study).
544 GAO REPORT, supra note 541, at 21. The Coast Guard, in particular, expressed skepticism about the CAP’s capability to assume an expanded role.
545 Id.
546 Id. at 15.
control; and operating, manning, or staffing checkpoints," or from "[s]urveillance or pursuit of individuals, vehicles, items, transactions, or physical locations." It excepts "[a] member of the Civil Air Patrol, except when performing missions pursuant to 10 U.S.C. 9442(b)."

The most serious CAP deficiency was not mentioned in the GAO report: the fact that it flies no helicopters. The CAP used to employ helicopters, but not since 1988. Congress could provide additional support and resolve the liability question by enacting a new statute treating AIR-ONE-type organizations like the CAP, but under the jurisdiction of the Department of Homeland Security. Or, it could amend the CAP statutes to encompass AIR-ONE-type organizations. Finally, it could authorize AIR-ONE activities as activities of the CAP. The disadvantage of this approach would be that it would almost certainly reduce likely flexibility to mold organization and operations to the differing needs of different regions of the country.

VIII. CONCLUSION

Unless the public-safety community, particularly the law-enforcement community, becomes more open-minded and willing to share assets and to use lower-cost helicopters, it is likely to find expensive turbine helicopters dedicated to patrol missions gradually replaced by inexpensive drones. Helicopter support for SAR, SWAT team operations, and disaster relief, on the other hand, will continue to require larger helicopters.

548 Id. § 182.6(a)(1)(iii)(A)(6).
549 Id. § 182.6(a)(2)(v).
Comments